MALTA'S NATIONAL ENERGY AND CLIMATE PLAN

December 2024

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1.1. EXECUTIVE SUMMARY

i. Political, economic, environmental, and social context of the plan

Malta has been proactive in shaping its energy and climate policies to align with the European Union's ambitious goal of achieving a climate-neutral continent by 2050. Despite its relatively low per capita emissions within the EU, Malta is dedicated to contributing to this collective effort by transitioning to a low-carbon economy. The adoption of the Low Carbon Development Strategy (LCDS) marks a significant step in this direction, outlining long term strategies to achieve climate neutrality by 2050. However, the socio-economic landscape has evolved considerably since then, with the COVID-19 pandemic and subsequent EU energy crisis reshaping the macroeconomic environment and prompting a re-evaluation of existing policies and measures.

Malta's economic development

Despite its small size, the Maltese economy has come a long way, structurally transforming itself from a naval base into an independent state, with a diversified economic base, triggered by market liberalization, investment in human capital and a targeted foreign direct investment (FDI) strategy.

The economy has registered rapid growth and showed resilience to various external shocks, from both local and global events, that have shaped its trajectory over the past six decades. Emerging from Covid-19, Malta has shown remarkable resilience and managed to achieve a robust recovery in 2021 and 2022, reaching again pre-covid levels by 2021. This was also the case after the 2008-2010 financial crisis, during which Malta experienced a strong rebound, highlighting its strong resilience.

Zooming into the past 15 years, the Maltese economy more than doubled in size, reaching €15.5 billion last year as illustrated in Figure 1 and

Figure *2*. The average annual real Gross Domestic Product (GDP) growth rate between 2013 and 2023 was roughly 6.3%, compared to the EU 27 average of 1.5%[1]. According to the most recent forecasts from the European Commission, Malta is expected to maintain a GDP growth rate that exceeds that of

[1] Eurostat (2024), GDP and main components (output, expenditure and income). Available at: https://ec.europa.eu/eurostat/databrowser/view/namq_10_gdp/default/table?lang=en&category=na10.namq_10.namq_10_ma

its European Union counterparts, with projections indicating that Malta's GDP will increase by 4.3% in 2025[2].

[2] European Commission (2024), "Winter 2024 Economic Forecast: A delayed rebound in growth amid faster easing of inflation". Available at: https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/winter-2024-economic-forecast-delayed-rebound-growth-amid-faster-easing-inflation_en

Figure 1 - Real GDP Malta

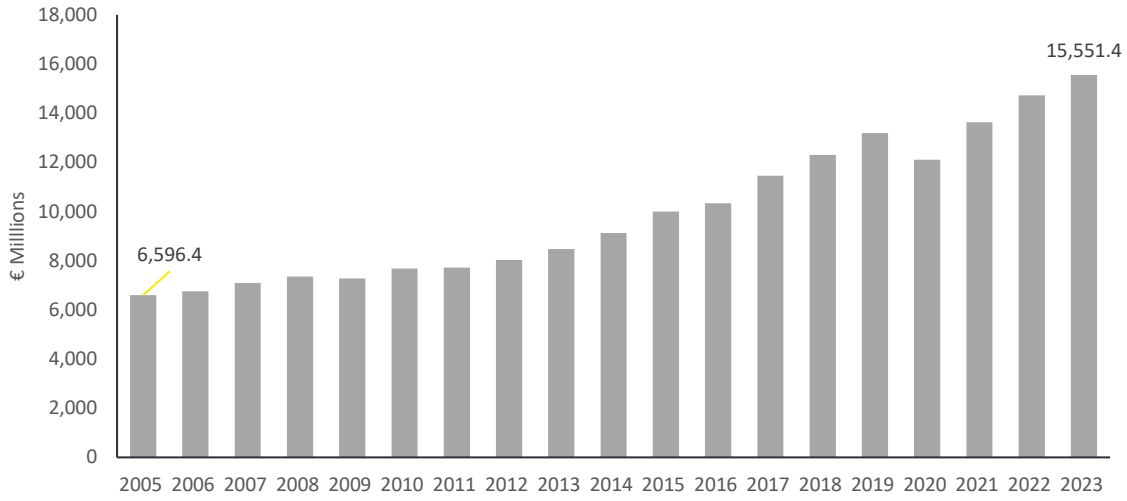
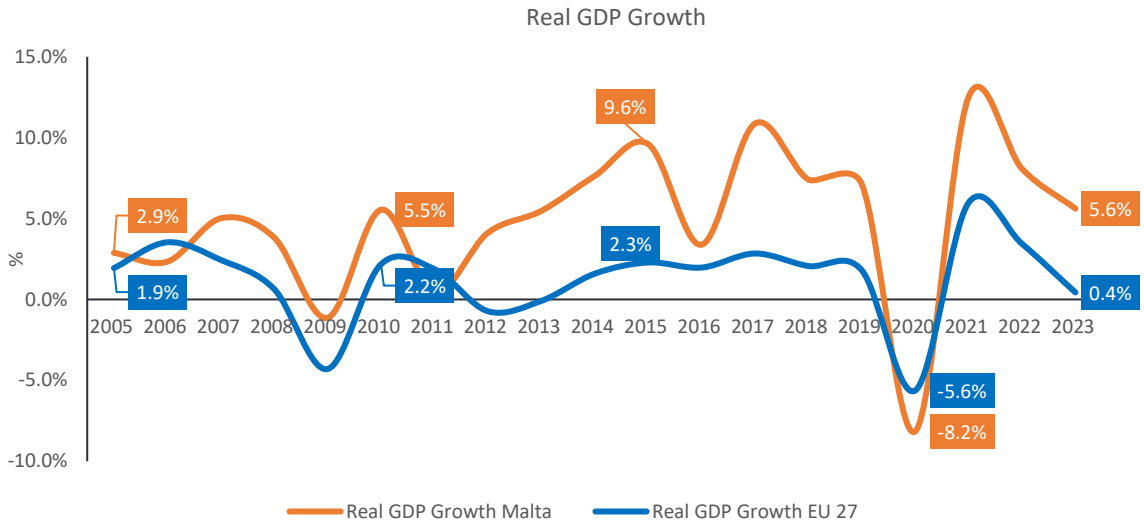
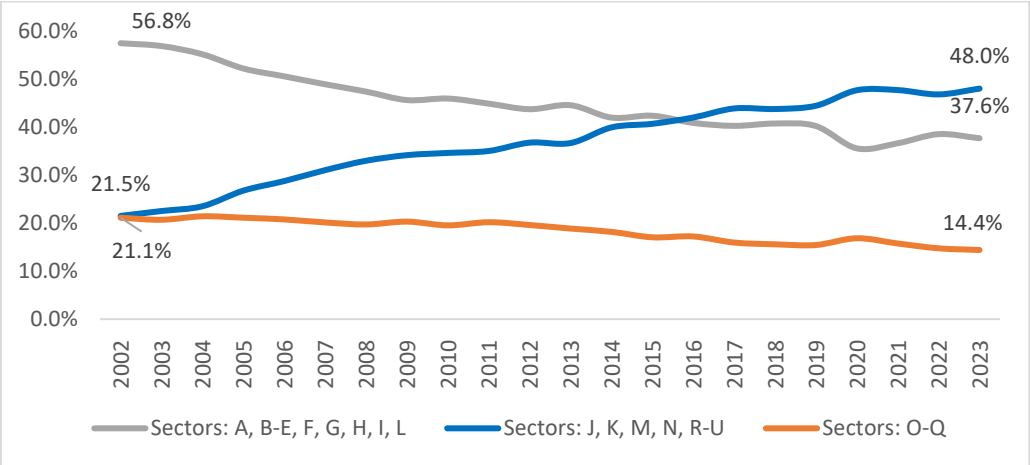


Figure 2 - Real GDP Growth



Malta's most notable economic transformation has been its successful shift towards becoming a service-based economy. Since joining the EU, the share of the services sector in Malta's economy has expanded by 25 %, accounting for approximately 48% of the economic activity in 2023. As illustrated in Figure 3 Malta has adeptly diversified its economic landscape through the implementation of targeted regulatory frameworks and incentives that have laid the foundation for this change. Malta's current economic structure boasts a dynamic mix of sectors, including emerging high-value, knowledge-driven service industries such as financial services, gaming, information and communication technology (ICT), and professional services. These developments strengthened Malta's economic growth based on non-carbon intensive industries.

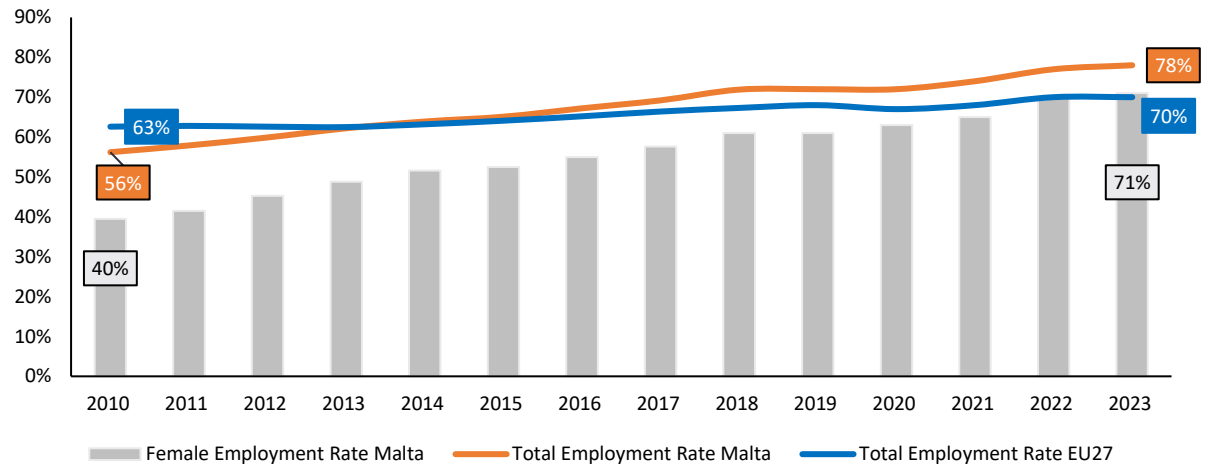
Figure 3 - Sectoral Transformation[3]



Malta's strong economic performance in recent years is also mirrored in its employment growth figures, with record employment rates that have consistently outperformed European averages. Malta's employment rate in fact surpassed the EU 27 average in 2016 and, by the end of 2023, stood at 77.0% compared to 70.0% for the EU 27. This is a significant increase from the 56.0% recorded in 2010, reflecting a sharp upward trend over the last decade. These results in the employment trends have been spurred by the highly successful active labour market policies aimed at attracting females into the labour market driven by the flagship policy that provided free childcare to returning mothers. In fact, female employment participation rates increased from just 40.0% in 2010 to 71.0% by the end of 2023.

Figure 4 – Employment Rates

[3] NACE code definitions: A: Agriculture, B-E: Industry incl. manufacturing, F: Construction, G: Wholesale and Retail, H: Transportation & Storage, I: Accommodation & food services, J: Information & Communication, K: Financial & Insurance, L: Real Estate, M: Professional services, N: Administrative & support services, O-Q: Public administration, education & health, R-U: Arts, entertainment, gaming & other services



Another key transformation most visible in Malta's labour market was the sharp increase in foreigners working in Malta. The non-Maltese workforce has been the largest contributor to the growth of Malta's labour force and has contributed significantly to overall economic performance. As a result, by August 2023, non-Maltese nationals made up roughly 35.0% of Malta's total workforce.

Alongside this economic transformation, Malta has also been experiencing a structural change in demographics with a growing shift towards an ageing population. In the span of twenty years, from 2003 to 2023, the percentage of Maltese citizens aged 65 and over rose by 10.7%, climbing from 12.8% to 23.5% of the total population. This demographic shift is attributed to both improved life expectancy and a declining birth rate. Malta has seen a decline in its fertility rate, with the 2022 statistic showing an average of 1.08 live births per woman, a rate insufficient to sustain the current population levels, thereby accentuating the trend towards an ageing population.

Over the last two decades, Malta has evidenced key milestones that have contributed to the development of its economy in a sustainable manner. One of the most significant milestones was the phase out of coal in 1990s and the subsequent switch from heavy fuel oil to LNG in 2015 which improved the efficiency of its power generation sector. Another key area is water management. Due to its semi-arid climate and no availability of rivers, water scarcity is one of the inherent challenges that impact both the economy and the environment. Nevertheless, Malta was one of the first to experiment with the membrane technology and today is known as one of the world pioneers in water polishing treatment systems.

These achievements are also reflected in the government's expenditure towards environmental protection including climate action which has grown steadily and nearly doubled in the last decade.

Effects of energy crisis and the pandemic and its impacts on climate change

Malta's unique geographic and economic conditions present specific challenges in the pursuit of carbon emission reductions especially when considering the economic development cycle as outlined earlier. Being an island state in the Mediterranean, Malta is isolated from mainland Europe, with connectivity only possible via air or sea. Malta's reliance on imported goods, further restricts its control

over emissions as it depends on the availability of such products in the international market. The country's limited natural resources and dependence on imports exacerbate any low-hanging fruit to reduce emissions. Technological advancements are also hindered by economies of scale; many technologies require a substantial minimum efficient scale, which Malta often cannot achieve. The scarcity of land restricts the expansion of woodlands for carbon sequestration and the implementation of certain mitigation strategies.

Malta's vulnerability to climate change is heightened by the same factors that limit its mitigation efforts. Countries, particularly those in Malta's position, must adopt adaptation measures to mitigate the impacts of climate change. There were key developments at EU level in terms of the adoption of the Green Deal and the FIT for 55 Package of legislations as well as various energy emergency packages that are being taken into consideration within this update. Aware of the need to strengthen capacities to monitor the nation-wide global interlinked developments in relation to climate change the government has established a Climate Action Authority[4] in efforts to fulfil such responsibilities[5] and consolidate effort.

The COVID-19 pandemic has had a profound impact on global consumption patterns, leading to a significant reduction in energy demand during the height of lockdowns and travel restrictions. the post-pandemic period was then characterised with noticeable surges in energy consumption with many sectors experiencing a rebound in activity. This resurgence, however, coincided with an energy crisis that was greatly exacerbated by the Russian aggression in Ukraine. Malta, along with other EU Member States, experienced a surge in energy prices reaching record highs since the second half of 2021. Several EU nations faced disruptions in gas supplies from Russia, leading to a significant drop in the share of Russian gas imports to the EU, from about 40% in 2021 before the crisis to around 8% in 2023[6]. This gave a strong impetus to accelerate the implementation of the European Green Deal and reinforce the resilience of the Energy Union by speeding up the clean energy transition.

One of the primary concerns for Malta in the current geopolitical landscape is the impact of high energy prices, which is further exacerbated by its geographical isolation, with no domestic energy sources and limited economies of scale. According to an EIB survey, the increase in energy costs had a notably smaller impact on Maltese businesses when compared to the EU average, with only 42% of firms based in Malta reporting to have been affected, as opposed to 93% across the EU. This lower reported impact could be partly attributed to the energy subsidies provided by the government, which have cushioned businesses from the full brunt of rising costs. Despite the mitigating effect of these subsidies, the concern among Maltese companies regarding the impacts of rising energy costs remained high, with 88% of firms reporting that they are worried about the possibility of energy costs increasing. This concern underscores the need for vigilance and proactive measures to mitigate the potential economic repercussions of the energy market's volatility.

In recent years, Malta has undergone a significant transformation in its electricity generation methods, shifting away from heavy fuel oil and gasoil towards a cleaner energy mix. The GHG emissions intensity

[4] Legizlazzjoni Malta (2024), Climate Action Act. Available at: https://legislation.mt/eli/cap/643/eng
[5] Climate Authority official website: https://www.climateaction.gov.mt/
[6] European Council (n.d.), Where does the EU's gas come from? Available at: https://www.consilium.europa.eu/en/infographics/eu-gas-supply/

of electricity generation in the existing local power plants has been halved since 2017, compared to previous years. GHG emissions from these plants, in absolute terms, saw a reduction of almost 58% compared to 2012 (reduction of almost 47% between 2014 and 2015). Malta has diversified its energy sources for electricity generation, resulting in a fuel mix (2022) with the following composition: approximately 68% of annual energy requirement is locally generated, 23% is imported through a 200MW interconnector that connects the Maltese electrical grid to the Italian grid, and the remaining 7% is generated by renewables, predominantly photovoltaic systems (PVs). The interconnector source has a composition of approximately 69% natural gas, 9% renewables, 12% coal, 2% Petroleum Products, 3% Nuclear and 3% other. [7]

Owing to its energy system's characteristics and geographical isolation, Malta faces limitations to fully contribute to the goals of the regulation as well as extending support to other Member States in emergencies. Malta's usage of natural gas is confined to its essential gas-fired power plants, which rely on LNG imports delivered via sea vessels and stored in a floating storage unit (FSU) situated adjacent to an existing power plant located in Delimara. The LNG is processed at a re-gasification facility nearby. Since there are no gas distribution networks or other end-users of natural gas in Malta, and since the country lacks connections to the trans-European Gas network or any third country network, it is unable to contribute significantly to Europe's gas demand reduction efforts. Recital 15 of Council Regulation (EU) 2022/1369 acknowledges that certain Member States without direct interconnections to another Member State's gas interconnected system cannot release substantial pipeline gas volumes for the benefit of other Member States.

ii. Strategy relating to the five dimensions of the Energy Union

As per article 3 (3) of the Climate Action Act, the government shall ensure that all necessary actions are undertaken to achieve climate neutrality by 2050. This manifests the government commitment to ensure a just green transition by providing support towards the five dimensions of the energy union.

In the area of renewable energy, Malta will continue its efforts to increase its renewable energy share through grant schemes and feed-in tariffs for small-scale PVs as well as contract-for-difference for larger renewable projects. Legislation to streamline renewable energy permitting procedures on greenhouses as well as legislation on solar panel installation on buildings that reach maximum allowed heights are being developed. New technical guidance documents for new buildings and existing buildings undergoing major renovation have been published. Moreover, Malta is committed to explore the establishment of offshore renewable energy farms. Blending of biofuels via an obligation on fuel suppliers is also expected to contribute to Malta’s higher renewable energy ambition.

Temperate climatic conditions and lack of energy-intensive industries mean that Malta has the second lowest final energy consumption per capita across all EU Member States. Nevertheless, the specific characteristics of Malta’s energy system and market due to their small scale, the existence of a single electricity distributor, the absence of natural gas and district heating and cooling networks, being on

[7] Enemalta (2024), Fuel Mix for Energy distributed by Enemalta plc. in 2022. Available at: https://www.enemalta.com.mt/environment/fuel_mix_for_energy_distribution/

the periphery of the EU, and the small size and number of suppliers and market players limit the range of measures available to reduce energy consumption. Nevertheless, the country is striving to implement a holistic approach towards achieving a higher rate of coupling between its energy sector and other sectors and industries, including the transport sector.

Malta's strategy under the Decarbonisation dimension strives to promote the transition towards climate neutrality, primarily through the pursuit of upholding national greenhouse gas (GHG) emissions reduction commitments (the Paris Agreement, and the European Green Deal in particular the Fit for 55 package). This transition will primarily take the form of deploying all viable indigenous renewable energy sources and strengthening efforts towards sustainable and active mobility, including widespread vehicle electrification through financial incentives, expanding the network of EV charging points and investing in active mobility infrastructure. Recognizing the challenges posed by Malta's small domestic market, technological development, and adaptability, the strategy also acknowledges the financial limitations in implementing necessary climate policies, especially in light of the economic strains from the COVID-19 pandemic and the conflict in Ukraine. It is understood that climate measures may affect markets, the labour force, and trade, potentially imposing additional financial and administrative burdens on both private and public sectors, as well as impacting individuals and social facets of the country.

In line with the EU's call for a fair and just transition, Malta is dedicated to ensuring that the shift to a climate-neutral economy is equitable, aiming to maximize benefits while mitigating adverse effects. The government pledges ongoing support to communities, groups, and individuals facing socio-economic hardships to facilitate a fair transition that leaves no one behind.

Moreover, a number of measures, dealing primarily with the increased energy efficiency of buildings and electrification of transport, are being implemented. Furthermore, sector-coupling and systems integration potential are being explored between the energy and waste sectors as the government is implementing an upgrade of its waste management infrastructure which includes an organic processing plant (as a result this will also generate renewable electricity and heat), pre-sorting waste facilities, skip management facilities as well as a waste-to-energy facility which will reduce overall emissions as waste is diverted away from landfill and at the same time will also generate energy.

Malta's strategy under the Energy Security dimension will continue to emphasize the Government's commitment to achieve greater security of supply through the diversification of energy sources, suppliers and multiple connections. This dimension has become ever more prominent in the context of conflict in Ukraine, as the EU strives to end dependency on Russian fossil fuels. Malta is committed to invest in a second interconnector by 2030 and is exploring cost-optimal solutions to invest in infrastructure to meet future energy demands. Additionally for Malta, an island state with limited natural resources, energy security is of vital importance, as it guarantees a reliable and self-sufficient energy supply.

Policies and measures under the internal energy market and energy security dimensions also focus on strengthening electricity interconnectivity and enhancing energy infrastructure to support energy security and the shift towards a sustainable, low-carbon economy. Malta is committed to achieving EU interconnectivity targets by investing in additional sub-sea interconnectors with Italy, which will facilitate greater integration of renewable energy and reduce fossil fuel dependence. At the same time, there is ongoing investments to modernize the electricity distribution network. Market integration

initiatives are also being pursued, with advancements in smart grid technology, increased system flexibility, and consumer engagement through smart metering and energy efficiency programs. Ensuring electricity system adequacy remains a priority, with ongoing assessments to maintain resilience and stability. Consumer protection and the competitiveness of the energy supply are addressed through regulatory measures and the promotion of competition in the fuel supply sector.

Malta will continue in its efforts to boost research, innovation and competitiveness. A national research and innovation strategy for the period until 2027 has been launched, seeking to enhance synergy between economic development and R&I, through increased investments and a focus on green and digital transitions. The strategy prioritises R&I in national budgeting and economic planning, and strong advocacy for R&I at the highest level of government, structured around five principal goals. These focus on strengthening governance and priority setting, developing the local ecosystem through upscaling efforts and fostering public-private linkages, and enhancing directionality through mission-oriented approaches aligned with national and EU policies. There is a focus on mainstreaming R&I in public policy to improve resilience and policy responses, as well as strengthening implementation structures for better collaboration and efficient monitoring of R&I activities.

Malta intends to maximise support towards these aims and objectives through the cohesion Policy funding instruments. In total, Malta is benefitting from €817 million in Cohesion Policy funding from 2021 to 2027 as outlined in its Partnership Agreement with the European Commission. From this amount, circa €417 million from the European Regional and Development Fund (ERDF) and the Cohesion Fund will be allocated to help small and medium businesses become more innovative, digital, and competitive, fostering a smarter and low-carbon economy. A significant portion of these funds will be invested in improving energy efficiency and energy storage capacity in the country, including the development of a second electricity interconnector to Italy, which will enhance electricity supply, security, and contribute to reducing GHG emissions. Moreover, the Common Agricultural Policy Strategic Plan for Malta includes climate change mitigation as one of its priority areas and identifies key initiatives to pursue co-financed under the EAFRD programme aiming to decarbonise the agricultural sector. Young people and women will have improved employment opportunities thanks to over €124.4 million from the European Social Fund Plus (ESF+). This funding will also support innovative teaching methods, inclusive education for vulnerable groups such as children with disabilities, and education in the fields of green and digital transitions. Moreover, Malta is committed to promoting active inclusion, equal opportunities, and non-discrimination for disadvantaged groups, including persons with disabilities.

Malta has outlined its strategy and investment priorities to enhance the role of culture and sustainable tourism as key drivers of economic development, social inclusion, and innovation. The country has published a Tourism Strategy (2021-2030) focusing on recovering, rethinking, and revitalizing its tourism sector. Grants will be provided to preserve cultural assets in the public domain, support regeneration efforts, and promote Malta's cultural heritage. These investments align with the EU's policy objective of promoting culture and sustainable tourism.

To enable regions and individuals address the social, employment, economic, and environmental impacts of transitioning towards the European Union's 2030 targets for energy and climate, as well as a climate-neutral economy by 2050, based on the Paris Agreement, the government is committed to supporting the maritime sector, whilst also ensuring its transition to more sustainable practices. The Government is providing shore-to-ship (StS) infrastructure powered by electricity at the Grand

Harbour, and in the future, also at the Malta Freeport, the two Core Ten-T ports, with the ultimate aim of shifting away from the dependency of heavy fuel oils whilst vessels are moored in these ports. The investments made by the Just Transition Fund (JTF) in OPS for the Southern region of the Grand Harbour complements the existing "Grand Harbour Clean Air Project," initiated in 2020 under the Connecting Europe Facility (CEF). This transition is particularly important due to the ports' proximity to densely populated residential and business areas. The investment in OPS infrastructure will facilitate sustainable maritime operations, improve environmental conditions, and protect the public health of local residents in the surrounding areas. An allocation of €23.3 million has been approved from the JTF for this purpose.

As outlined in Malta's RePower EU chapter in its Recovery Resilience Plan, to further increase local energy security, upgrades of Malta's electrical distribution network facilities are being undertaken through investments in the extension of the grid, distribution services, and battery storage. Moreover, as envisaged under the ERDF operational programme 2021-2027, tendering procedures are underway to construct and commission a new distributing feeder, linking to a second interconnector with Sicily (Italy) and another utility-scale battery storage.

Country Specific Recommendations

For 2024, the key country-specific recommendations (CSRs) pertinent to energy and climate policies include phasing out emergency support measures by the winter of 2024. It is advised that Malta maintains the rapid and effective execution of its recovery and resilience plan, which encompasses the RE Power EU chapter, to ensure all reforms and investments are completed by August 2026, and to hasten the execution of cohesion policy programs. In alignment with the mid-term review, Malta should persist in concentrating on established priorities while also exploring the potential offered by the Strategic Technologies for Europe platform Initiative to enhance competitiveness. Additionally, Malta is encouraged to expedite the introduction of renewable energy by undertaking large-scale projects and promoting small-scale investments for direct energy production and consumption. To cut emissions from road transport, Malta should tackle traffic congestion by enhancing public transport services, implementing intelligent transport systems, and investing in 'soft mobility' infrastructure. Malta, as part of the EU, has committed within the international fora 'to accelerate efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies'. Bearing in mind Malta's specificities, there are no plans to phase out any energy subsidies at this particular juncture, while remaining committed to, inter alia, encourage the adoption of technologies that can help reduce greenhouse gas emissions.

In the update of the National Energy and Climate Plan (NECP), several key actions have been considered to address the aforementioned country-specific recommendations. There is a focus on investing in Malta's energy infrastructure to continue the diversification and decarbonisation of energy sources. Support for the uptake of renewable energy sources is ongoing, with the government investing in renewable energy systems and battery storage, as well as providing co-funding opportunities for households and commercial investors. To maintain economic stability through the energy crisis, measures are in place to ensure energy affordability for households and businesses, which is crucial for sustaining consumption and economic growth, as a contraction could impede

further investment in the green transition. The plan also includes support for businesses and households in building renovations and retrofitting, with the government leading by example through upgrades to its own buildings. Furthermore, there is a significant investment in the transport sector, ranging from infrastructure development, public transport enhancements, and modal shift incentives, to electric vehicle grants, improved network efficiency, and feasibility studies for hydrogen use in transport. More detail on the relevant policies and measures contributing or projected to contribute towards the fulfilment of the energy and climate country-specific recommendations are included in the following chapters.

ii. Overview table with key objectives, policies and measures of the plan

Dimension	Objectives & Targets	Key Policies & Measures
Decarbonisation - GHG Emissions & Removals	Contributing to reaching the EU's collective climate goal of reducing EU emissions (Fit for 55 and European Green Deal) of at least 55% by 2030 as compared to 1990 levels. National target of GHG emissions reduction of -19% under the Effort Sharing Regulation (ESR) Fulfilling obligations of the Paris Agreement.	• Pursue the commitment of clean energy generation with focus on offshore renewable sources to further decrease Malta's reliance on fossil fuels. • Promote electrification of vehicle fleet, aiming to achieve equivalent savings and emissions reduction of 65,000 electric vehicles by 2030. • The installation of an extended network of EV charging points to match our ambitions in terms of support towards a higher uptake of EVs. • Promote active mobility through incentives and safer transport infrastructure. • Provision of a national free public transport system and free school transport. • Preparedness for the ICE cut-off date for the importation of internal combustion engines.in line with the Council adoption of Regulation (EU) 2019/631 on setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles • Implementing waste prevention measures in line with Malta's Waste Management Plan 2021-2030. • Investment in major waste processing infrastructure including pre-sorting facility, organic processing plant and waste to energy plant and gas extraction systems to divert waste away from the landfill. • Vulnerability Risk Assessments identify where the greatest efforts should be made in terms of adaptation.
Decarbonisation - Renewable Energy	Contribute towards the EU 2030 target of 45% renewable share in the union's energy mix.	• Publication of an offshore renewable energy policy which shall provide the necessary framework for the deployment of offshore renewable technologies.

Dimension	Objectives & Targets	Key Policies & Measures
	Increase Malta's ambition to a renewable energy share of 25% by 2030 Non-binding agreements to cooperate on goals for offshore renewable generation to be deployed within each sea basin.	• Development of an offshore renewable energy farm • Adoption of legislative measures to facilitate the deployment of renewable energy. Increased targets within the RES-E, RES-T and RES-H&C contribution • Increased efforts to deploy more on-land PV installations by 2030 • Continued support to renewable water heating technologies • Fuel supplier obligation on biofuel blending
Energy Efficiency	Contribute to the EU energy efficiency target Cumulative end-use savings Renovation of buildings owned by public bodies	• Supporting enterprises to invest in energy efficient investments through various incentives and schemes • Support for investment in energy efficiency in buildings • New energy performance standards to improve energy performance of new buildings and buildings undergoing major renovation • Renovation of buildings owned by public bodies including schools, housing, hospitals, and administrative buildings.
Energy Security	Continued diversification of energy sources and suppliers Increasing the flexibility of the national energy system Fostering regional cooperation between Europe and North Africa with the aim of improving energy security Ensuring affordable and stable energy prices for consumers Ensuring electricity system adequacy	• The introduction of the second interconnector within Malta's energy supply. • Installing large-scale battery energy storage systems • Continue to explore additional connections with EU including the hydrogen ready gas pipeline project. • Pursue on the commitment taken between the MED9 countries to enhance regional interconnections with mainland Europe.

Dimension	Objectives & Targets	Key Policies & Measures
	Facilitating further investment in renewable energy sources	• Significant accelerated investment in the electricity distribution network to enhance the security and reliability of electricity infrastructure at all voltage levels • Increase the Renewable Energy contribution from 11.5% to 25% through multiple initiatives to focus on more diversification in onshore and offshore technologies
Internal Energy Market	Increase interconnectivity within the EU internal energy market.	• Commissioning a second electricity interconnector
Research & Innovation Competitiveness	Adoption of Malta's National Research & Innovation Strategic Plan 2023-2027	• Implementation R&I initiatives in the areas of energy and climate as outlined in the national strategies/plans • Issue schemes and calls for support for R&I projects

1.2. OVERVIEW OF CURRENT POLICY SITUATION

i. National and Union energy system and policy context of the national plan

Since the submission of Malta's first NECP in 2019, the EU has raised its collective ambitions for greenhouse gas emission reductions and enhancement of removals, as part of the EU Green Deal for Europe's economy and society, to become climate-neutral by 2050. This objective, as well as the intermediate aim of reducing net GHG emissions by at least 55% by 2030 compared to 1990 levels have been adopted into EU law in 2021.

To support the EU's goal of reducing GHG emissions, the 'Fit for 55' package includes key proposals like the revised Energy Efficiency Directive (EU/2023/1791)[8], which introduces a stronger and wider legal basis for the 'energy efficiency first principle' to prioritize energy savings across all sectors. In addition to the EED, the 'Fit for 55' package includes the Energy Performance of Buildings Directive (EPBD)[9], which aims to transform European buildings into highly energy-efficient and decarbonized infrastructures by 2050. The EU Emission Trading System (ETS) now covers maritime emissions and integrates the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), while a new ETS (ETS 2) will apply carbon pricing to buildings, road transport, and non-ETS fuels starting in 2027. Additionally, the ReFuelEU Aviation initiative promotes sustainable aviation fuels (SAF), and the FuelEU Maritime initiative targets an 80% reduction in maritime energy GHG intensity by 2050. The package also includes revisions to the Effort-Sharing Regulation (ESR) for reducing emissions in non-ETS sectors, and the Land Use, Land-Use Change, and Forestry (LULUCF) legislation to balance emissions with carbon removals. Additionally, the Alternative Fuels Infrastructure Regulation (AFIR) ensures the development of infrastructure for alternative fuels, supporting the shift to sustainable transport.

The EU Renewable Energy Directive (RED), originally aimed for a 32% share of renewable energy in the EU's energy mix by 2030. In the latest revision, this was revised to at least 42.5% at EU level by 2030.[10] Furthermore, several crucial energy and climate strategies have been adopted at Union level, related to energy system integration, hydrogen, offshore renewable, solar renewable energy, digitalisation of energy systems or climate adaptation. Based on the geopolitical tensions caused by the aggression of Russia against Ukraine, measures to reduce the EU's energy dependence on Russian fossil fuels were brought forward as part of the EU's REPowerEU plan also aiming to accelerate sustainable energy sources such as biomethane, renewable hydrogen, solar PVs or offshore wind and thus further

[8] European Union (2023), Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast), Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AJOL_2023_231_R_0001&qid=1695186598766

[9] European Union (2024), Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings, Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_202401275

[10] European Union (2024), Renewable Energy Directive, https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-directive_en

supporting the diversification of energy supplies. The REPowerEU plan also provided updates to the EED.

On a national level, to aid this important transition to a low-carbon economy, Malta developed its own pathway towards 2050 looking into climate change mitigation and adaptation aspects as well as sketching out a suite of measures that will help set the country on track to deliver on its ambitions. Malta's Low Carbon Development Strategy (LCDS), which was published in October 2021, looks at various GHG abatement measures across sectors of the economy, taking also account of inherent limitations such as spatial constraints which massively limit the potential of LULUCF/afforestation or onshore renewables.

As a key driver for transforming the economy to align with climate and energy goals, Malta has launched the development of a forward-looking economic vision for 2050 - Vision Malta 2050. This vision will set the strategic direction for the country over the coming decades, with the central aim of enhancing the quality of life for all citizens, focusing on important areas like digital innovation, infrastructure, education, healthcare, sustainability, and jobs. It will include key milestones up to 2035 to ensure continuous and significant progress towards these strategic objectives. This initiative arises from the need for Malta to adapt to the increasingly complex challenges and opportunities of the 21st century. Vision Malta 2050 will address emerging issues such as climate change, technological advancements, demographic shifts, and global market dynamics, with the goal of positioning Malta as a resilient, competitive, and sustainable nation. The vision will serve as a roadmap for the country's economic, social, and environmental development, focusing on digital innovation, infrastructure, education, healthcare, and sustainability to ensure a higher quality of life for both present and future generations. This vision is a key element in Malta achieving its climate neutrality and securing a sustainable future.

Transport energy use in particular has been a major focus area as it is a key contributor towards achieving 2030 climate targets. Indeed, transport measures such as modal shift to more active modes of transport, electrification of transport and the extension of the free public transport scheme on a national level were listed as high priority measures within Malta's Low Carbon development Strategy. With regard to transport energy use, the government has been continuing its efforts to incentivise the shift to electromobility and other forms of low/zero-emission mobility by offering financial incentives to households and businesses, as well as waivers on vehicle licence fees and circulation taxes.

Buildings in their wider form represent a crucial sector in terms of energy use hence making the building stock more efficient will be a key driver in the transition to net zero by 2050 and to improve energy efficiency. The Malta Long Term Renovation Strategy (LTRS), adopted in 2021 is a key planning document that sets out how the Maltese Government aims to tackle this challenge particularly through measures and incentives to increase energy efficiency in existing or new buildings. In this respect, new building codes have been published to improve the energy performance of new buildings and those undergoing major renovations.

Malta's energy policy is being guided by several core principles, which aim to strike a balance between societal needs (e.g. to ensure a just transition by means of energy security and affordability), economic as well as geographic realities (spatial constraints, technology taker, unfavourable margins of scale, import dependency and peripheral location/island state) whilst at the same time trying to build momentum and deliver on Malta's climate ambition.

The underlying pillars guiding Malta's energy vision include:

- Sustainability: Malta is committed to a sustainable energy future, which involves reducing reliance on fossil fuels by integrating renewable energy sources from local production both on land and offshore, as well as through potential imports.
- Security: The security of Malta's energy supply is paramount. By improving the efficiency of generation capacity and investing in large-scale battery energy storage systems (BESS) and electrical interconnections with neighbouring countries, Malta aims to enhance its energy security and ensure a reliable supply with appropriate back-up capacity.
- Affordability: Ensuring that energy remains affordable is crucial for economic stability and social equity. Malta's energy policy facilitates the adoption of sustainable practices by making green technologies more accessible and preventing disruptions that can cause price spikes.
- Diversification: Diversification of energy sources is a key strategy for Malta. By increasing the share of renewables, including solar PV systems and offshore renewable energy projects, and exploring a hydrogen-ready natural gas pipeline, Malta aims to reduce its dependence on any single energy source or supplier, thereby enhancing security and promoting sustainability.
- Customer Centricity: Malta's holistic approach to energy policy ensures that interventions are synergistic and not working at cross purposes. This approach encourages collaboration across sectors, such as transportation, industry, and residential, to achieve comprehensive energy solutions. For instance, Malta is promoting the electrification of transport and the adoption of energy-efficient technologies in households and industries, which contribute to reducing the carbon footprint and greenhouse gas emissions from the transport sector.

Malta has been making progress towards addressing these objectives and is further updating its national policies to further streamline its ambitions.

The successful switch of the electricity generation capacity from heavy fuel oil to natural gas based on high efficiency combined cycle gas turbine (CCGT) power plant as well as the establishment of a Liquefied Natural Gas (LNG) Floating Storage Unit (FSU) facility with onshore regasification were crucial steps in Malta's energy transition. To further diversify supply options for the power plant, a hydrogen-ready natural gas pipeline, further connecting Malta to the TEN-E/European gas grid via Sicily (Italy) is being explored. Furthermore, Malta is committed to commissioning a second electricity interconnector by 2030 to strengthen Malta's capacity as enabler of large-scale development of renewable projects and to address intermittency issues. This will further sustain the transition towards decarbonisation, and further electrification of vehicles whilst sustaining strong economic growth, strengthening the energy mix potential.

The Government is invested in its efforts to support the deployment of renewable energy. Existing support to renewable energy technologies, namely solar, which are particularly well suited to Malta's geographic location, are being kept. Malta is also committed to pursuing the deployment of offshore renewable energy farms, in efforts to achieve a minimum of 350MW of offshore renewable generation capacity, which could further be boosted to reach 380MW, by 2030 (pursuant to article 14(1) of the TEN-E Regulation (EU) '2022/869). In this respect, the government has published the National Policy

for the Deployment of Offshore Renewable Energy[11] . The government already took actionable steps - the government initiated a preliminary market consultation (PMC) to invite internationally reputable companies to propose economic activities that can be carried out in an EEZ area beyond the territorial waters of Malta, in line with the rights provided under the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and the Malta EEZ Act, to gauge the interest of investors in Malta's offshore opportunities and gain knowledge of the possible activities that companies are willing to invest in. Earlier this year, the government launched a PMC for the development of near offshore floating solar farms[12]. The PMC seeks to assess market readiness for floating solar technology, specifically photovoltaic farms, and has identified a potential site four nautical miles off the coast of Malta, near Delimara, with a capacity of 50 MW.

Complementing these efforts, the government is making significant accelerated investment in the electricity distribution network. Strengthening the grid will help address electricity distribution bottlenecks, enable further integration of renewable energy, as well as support the electrification and decarbonisation transition.

ii. Current energy and climate policies and measures relating to the five dimensions of the Energy Union

The Energy Union is structured around five critical dimensions: security, solidarity and trust; a fully integrated internal energy market; energy efficiency; decarbonizing the economy; and research, innovation, and competitiveness. These dimensions are not only interdependent but also pivotal in steering the EU towards a sustainable, secure, and competitive energy future.

This section will examine the range of national strategies and plans that align with the Energy Union's five dimensions. Each plan is designed to meet specific needs and circumstances of Malta while contributing to the EU's broader Energy Union. The strategies collectively support the overarching goal of climate neutrality, demonstrating the practical steps being taken to transition towards decarbonisation.

Low Carbon Development Strategy[13]

The Low Carbon Development Strategy (LCDS) is Malta's Long-Term Strategy as mandated through the Paris Agreement. The strategy identifies pathways for Malta to reduce greenhouse gas emissions from

[11] Ministry for the Environment, Energy and Enterprise (2023), National Policy for the Deployment of Offshore Renewable Energy. Available at: https://energywateragency.gov.mt/wp-content/uploads/2023/08/MEE-National-Policy-23_-DIGITAL-.pdf

[12] The Malta Independent (2024), Preliminary Market Consultation for offshore photovoltaic farms launched - Energy Minister. Available at: https://www.independent.com.mt/articles/2024-01-31/local-news/Preliminary-Market-Consultation-for-offshore-photovoltaic-farms-launched-Energy-Minister-6736258225

[13] Ministry for the Environment Climate Change and Planning (2021), Malta Low Carbon Development Strategy, Available at: https://unfccc.int/documents/311041

various sectors to move towards climate neutrality by 2050. Basing on the compilation of a marginal abatement cost curve, the most cost-effective measures taking into account Malta's circumstances have been determined in order to achieve the 2030 climate targets and beyond. The strategy is one of the foundations for the update of NECP.

Long-Term Renovation Strategy[14]

The Long-Term Renovation Strategy (LTRS) relates to Malta's obligation to seek the renovation of Malta's building stock with a view of enhancing energy performance, use of renewable energy and reduction of related emissions achieving the decarbonisation of the building stock by 2050. The LTRS took into consideration the climatic conditions of Malta, the characteristics of our buildings which are not particularly well insulated, as well as the habits of the local population, which tend to lead to lower energy use when compared to dwellings in other EU countries. The strategy puts forward possible solutions aimed at achieving the long-term goal of reducing GHG emissions in buildings.

Sustainable Development Strategy

The Sustainable Development Strategy converts Malta's 2050 Sustainable Development Vision into a strategic course of action for safeguarding the environment and promoting socio-economic growth within the Maltese Islands. It aligns with the guidelines established by the 2030 Agenda for Sustainable Development and aims to catalyse and integrate initiatives throughout all governmental processes, guaranteeing the attainment of United Nations objectives and the Vision in the most coherent and optimal way achievable. It outlines key Strategic Objectives that provide a blueprint for successfully realizing the Strategy's goal by the year 2050:

- Strategic goal 1 – transitioning towards a climate neutral green and blue economy
- Strategic goal 2 – towards the preservation of sustainable urban development
- Strategic goal 3 – ensuring healthy lives and well-being for all
- Strategic goal 4 - accelerating digital transformation, smart mobility and connectivity
- Strategic goal 5 – achieving social fairness and prosperity for all

National Strategy for the Environment[15]

For the first time, Malta is developing a National Strategy for the Environment (NSE) towards 2050, a first draft for public consultation was published in September 2022. Such a strategy naturally has many

[14] Ministry for the Environment Climate Change and Planning (n.d), Long Term Renovation Strategy 2050, Available at: https://environmentcms.gov.mt/en/Documents/closedMinisterialConsultations/longTermRenovationStrategy2050.pdf

[15] Environment & Resources Authority (2022), National Strategy for the Environment 2050, Available at: https://era.org.mt/nse2050/

overlaps and synergies with the energy and climate objectives of the EU Green Deal taking into account climate mitigation and adaptation measures including nature-base solutions.

The NSE translates the Wellbeing First Vision for 2050 into a strategic directive concerning our environment. This is achieved by formulating enduring Strategic Goals and Objectives that delineate the approach. The foundational premise of the NSE acknowledges the symbiotic relationship between society and the environment; their interdependence fosters economic activity, making them indispensable to each other's prosperity.

The draft strategy was developed upon eight Strategic Goals, the NSE encompasses conventional environmental dimensions, augmented by pillars that address critical environmental hurdles confronting our nation. Simultaneously, it provides a framework for effecting the essential transformations that will underpin an environmental shift spanning a generation. The eight Strategic Goals pertain to Clean Air, Enhanced Neighbourhoods, Thriving Biodiversity, Zero Waste, Resilient Land Resources, Flourishing Marine Ecosystems, Sustainable Water Resources, and Facilitating Change.

The key policy areas relevant to decarbonisation include transport, waste management and agricultural.

The National Transport Strategy and Transport Masterplan[16]

These strategic documents encompass all pertinent modes of transportation (land, public transit, maritime, and aviation) and span across short, medium, and long-term horizons to address Malta's transport needs. The transport masterplan is being updated concurrently with the drafting of the NECP update. The development process involves the compilation of transport modelling to inform policy and provide an integrated transport analysis. Indeed, the updating of this modelling has been further undertaken during the development of the NECP update.

Waste Management Plan 2021 -2030

Malta has adopted a ten-year waste management plan as mandated under the EU's waste framework directive. It aims for Malta's achievement of the waste targets including to divert waste away from landfill. The plan's strategic objectives are to:

- Maximise the resource value in waste through different management options
- Innovate by designing waste prevention initiatives to lower Malta’s per capita generation rate
- Reform the collection system to increase economies of scale, harmonise collection practices and modernise the collection fleet
- Build the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta’s targets

[16] Transport Malta (2024), National Transport Strategy and Transport Master Plan, Available at: https://www.transport.gov.mt/strategies/strategies-policies-actions/national-transport-strategy-and-transport-master-plan-1343

- Study the feasibility of an enhanced producer responsibility framework to complement Malta's transition to a circular economy and reflect further on the true cost of waste management
- Promote further the involvement of the private sector in waste management

Common Agricultural Policy Strategic Plan (2021-2027)

The goal of the Maltese Common Agricultural Policy Strategic (CAP) Plan is to address the requirements of the agricultural domain, primarily focused on allocating sufficient resources to fulfil forthcoming needs. The CAP Plan, with a total (EU+MT) budget of approximately €166 million will continue to build on the types and patterns of support that were offered under previous CAP measures, direct payments and schemes, aimed at reducing the impact of agriculture on the environment. These encompass ecological and climate-related goals, equitable income distribution for both farmers and workers, enhancements to rural settings and infrastructure, incorporation of novel technologies and digital advancement, alongside bolstering farm robustness.

The CAP Plan focuses on three main objectives: enhancing the agricultural sector's competitiveness and food security, bolstering environmental and climate action in line with the Paris Agreement, and strengthening rural socio-economic conditions.

This plan will support action in the agricultural sector in favour of climate change. There are opportunities for farms to reduce GHG emissions directly and indirectly from better land management, such as by reducing the use of chemical fertilisers, organic farming systems, improved housing and management of manure, and improving efficiency of use of organic fertilisers, as well as to contribute to climate mitigation through energy efficiency measures.

Moreover, Malta welcomes the continuous support and guidance received from the European Commission with regard to the development and assessment of the NECP and aims to continuously improve and align it with the increased ambitions as well as economic and social realities of the country.

As outlined in section 3, the updated NECP includes additional policies and measures in the transport and buildings sector over and above those in the NECP 2019 in order to bridge the gap between Malta's projected emissions profile and its national target of –19% in terms of greenhouse emissions.

Hence, Malta will review the NECP and aims to address the potential shortcomings of the NECP and its implementation focusing on improving deliverables across the following areas and sectors:

- Building/Real Estate (monitoring, Data availability, energy efficiency measures, EPCs, renovations, increase share of NZEBs).
- Renewables ambition (installed capacity and electricity generation, incentive schemes on solar water & heat pump heaters) Mobility/Transport (electrification, modal shift, free public transport, road infrastructure projects, inter-modality, active transport).

Malta's Action Plan for Organic Food

Malta's Action Plan for Organic Food has been issued and is in line with the national focus on food security and the European Green Deal's sustainability objectives. The plan aims to enhance the quality and availability of local organic food from both farming and aquaculture, supporting producers' sustainable income and expanding the organic sector. Aligned with the EU's 'Farm to Fork' Strategy, the plan sets a goal for Malta to increase its organic cultivated area from 0.6% in 2023 to 5% by 2030, contributing to the EU target of 25% organic agricultural land. The plan is structured on three pillars: developing a supportive ecosystem for producers, strengthening government capabilities and infrastructure, and stimulating the organic market to increase demand and create new sales channels. This effort is part of a broader National Food Strategy to support organic production and consumption in Malta.

Solar Farms Policy

The Solar Farms Policy was published in 2017 to establish a framework which supports the development of solar farms in Malta. This policy sets the definition for solar farms for policy interpretation purposes, while providing guidance for the identification of suitable sites and designs of new solar farms. This policy also lists environmentally relevant specifications and relevant mitigation measures to be integrated into solar farm development.

National Policy for the Deployment of Offshore Renewable Energy[17]

Malta's National Policy for the deployment of Offshore Renewable Energy, has been adopted in October 2024 following a public consultation process in August 2023. The Policy launched for public consultation in August 2023, aims to support Malta's achievement towards a climate-neutral future by 2050. The policy aligns with the European Green Deal and the EU Offshore Renewable Energy Strategy, focusing on diversifying and decarbonising energy sources. The Offshore Renewable Energy Policy seeks to enable the offshore potential of the Mediterranean in the country's best interest.

It promotes the establishment of a sustainable offshore renewable industry in Malta, emphasising economic growth, job creation, and climate change mitigation. Within the policy Malta outlines plans to utilise floating wind and solar PV technologies within its potential Exclusive Economic Zone (EEZ), adopting a research-based approach to foster innovation, reduce investment risks, and create an attractive fiscal environment. The policy provides a comprehensive framework to promote investment in renewable energy, direct potential investors towards efficient renewable technologies, promote research, development and innovation which will support the country's energy security. The proposed policy also looks to complement the regulation and implementation framework, supporting investors in materialising their offshore projects, reducing the time from concept to commissioning by assisting directly through effective governance and monitoring. The policy underwent a Strategic Environment

[17] Ministry for Environment, Energy and Regeneration of Grand Harbour (2024), National Policy for the Deployment of Offshore Renewable Energy, Available at: https://energywateragency.gov.mt/wp-content/uploads/2024/10/MEE-National-Policy-23_-DIGITAL-_final-5.pdf

Assessment in line with Malta's legislation. The assessment report was published for public consultation in the second quarter of 2024.

The scope of the policy is to enable the Maltese government to exploit its offshore renewable energy potential for the country's best interest, developing a framework which promotes investment in research, development and innovation in renewable energy infrastructure, while supporting the implementation of offshore renewable energy projects. This document ultimately seeks to ensure that offshore energy potential contributes to the country's energy security, hence reducing the dependence on imported energy and fossil fuels.

The National Strategy for Research and Innovation in Energy and Water 2021-2030[18]

Malta's National Strategy for Research and Innovation (R&I) in Energy and Water for 2021-2030 represents the country's inaugural sector-specific R&I strategy, designed to bolster domestic R&I in alignment with both EU and national policy priorities. The strategy focuses on three thematic areas within the Energy-Water Nexus: Renewable Solutions for Islands, Integration of Renewable Energy (RE) Electricity, and Energy Efficient Solutions. Its objectives are to strengthen R&I that addresses national challenges, enhances competitiveness, and drives economic growth across various sectors. To achieve this, the strategy promotes a coordinated approach, fostering collaboration among the public sector, research institutions, and the private sector, including universities. A key component of the strategy is the creation of a Research and Innovation in Energy and Water (RINEW) Platform, which, along with financial incentives, aims to centralize support and ensure that R&I efforts translate into tangible impacts. This strategic approach is designed to increase coordination, avoid duplication, and enhance synergies, thereby driving investment across multiple sectors and entities in the fields of energy and water.

National Cycling Strategy[19]

The National Cycling Strategy, which includes a comprehensive National Cycling Action Plan, is in the final stages of development and aims to enhance the adoption of cycling as a sustainable mode of transport in Malta. This strategy is focused on creating a safer road infrastructure for cyclists, promoting the integration of bicycles and pedelecs, and addressing the specific needs and concerns of cyclists within the spatial constraints of the Maltese Islands.

To support and encourage cycling as a sustainable mode of transport, the National Cycling Strategy is designed to achieve the following strategic goals:

- Increase awareness and improve cycling skills across the Maltese population.

[18] The Energy and Water Agency (2022), National Strategy for Research and Innovation in Energy and Water 2021 – 2030, Available at: https://energywateragency.gov.mt/wp-content/uploads/2022/04/National-Strategy-for-Research-and-Innovation-in-Energy-and-Water-2021-2030-EWA-web.pdf

[19] Publicconsultation.gov.mt (2023), Measures of the National Cycling Strategy – a public consultation, Available at: https://www.gov.mt/en/publicconsultation/Pages/2023/NL-0041-2023.aspx

- Ensure a connected, cycle-friendly urban environment with an investment of €35 million in new cycling routes, making cycling infrastructure an integral component of urban planning.
- Improve safety conditions for cyclists.
- Develop and nurture a cycling culture within the community.
- Establish strong cooperation networks between all relevant stakeholders.

The strategy includes measures that span a wide range of areas, with the Government's intent to make cycling a practical alternative for mobility needs in Malta. These measures aim to alleviate congestion and emissions, contributing to the development of a healthier lifestyle and a more livable urban environment. The measures are categorized into three main groups: infrastructure and bicycles, rules and safety, and information and awareness.

National Air Pollution Control Programme

The National Air Pollution Control Programme (NAPCP)[20], required under Directive (EU) 2016/2284, outlines national policies and measures aimed at reducing the annual anthropogenic emissions of five key pollutants: nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs), sulfur dioxide (SO_2), ammonia (NH_3), and fine particulate matter ($PM_{2.5}$). The first NAPCP was published in 2020 and is currently being updated to include pertinent alignment with the content of this NECP.

The NAPCP's objective is to achieve the national emission reduction commitments for the years 2020 and 2030, which will contribute to meeting air quality standards and ensure consistency with related strategies and actions across various sectors, including climate, energy, agriculture, industry, and transport. Based on the historical emissions inventory data prepared by ERA, the updated NAPCP will prioritise reducing NO_x emissions from its major key source category, i.e. the road transport sector. This policy prioritisation is also reflected in this NECP. There are therefore strong synergies between the NAPCP and the NECP, as they both rely on similar measures to reduce emissions, though the NAPCP specifically focuses on atmospheric pollutants, while the NECP concentrates on climate action.

[20] Environment and Resource Authority (2020), Malta's National Air Pollution Control Programme. Available at: https://era.org.mt/wp-content/uploads/2021/04/NAPCP.pdf

The Minimum Energy Performance Requirements in Buildings (Technical Guidance Document F)[21]

In accordance with the Energy Performance of Buildings Directive, the energy performance standards for new and renovated buildings are being revised, thereby replacing the previous standards set in 2016 by Legal Notice 434/2015. These revisions are the result of extensive studies as required by the EU directives and are structured into three parts. Part 1 establishes the energy performance criteria for residential buildings, addressing both new builds and major renovations, and includes specifications for building components and the incorporation of renewable energy sources. Part 2 applies to non-residential buildings and mirrors the requirements of Part 1. Lastly, Part 3 delineates the standards for technical systems within buildings, emphasising the enhancement of energy efficiency across various systems, including cooling, heating, domestic hot water, and lighting.

Single-Use Plastic Products Strategy for Malta (2021-2030)[22]

The Single-Use Plastic Products Strategy for Malta is part of the EC's initiative to advance towards a Circular Economy. This strategy aims to help Malta transition to a more sustainable economy by closing the loop of product lifecycles, reducing environmental and health impacts from plastic pollution, and minimizing litter and single-use plastic consumption. It also focuses on improving the collection and recycling of single-use plastic waste. The strategy emphasises the importance of stakeholder engagement, education, and awareness campaigns to ensure that the public understands the benefits of reducing single-use plastics and to foster a shift in behaviour. The main objectives of the strategy are to reduce the consumption of single-use plastic products and to enhance the quality and quantity of single-use plastic waste that is collected for recycling. The ultimate goal is to protect the environment and human health from the detrimental effects of plastic pollution.

Construction and Demolition Waste Strategy for Malta (2021-2030)[23]

The EC's push towards a Circular Economy has led to the development of Malta's Construction and Demolition Waste Strategy. This strategy aims to mitigate environmental and health risks associated with waste pollution, reduce the extraction of raw materials, and enhance the recycling of construction

[21] Building and Construction Authority (2023), Technical Document F 2023, Part 1: Dwellings Minimum Energy Performance and Building Envelope Requirements, Available at: https://bca.org.mt/wp-content/uploads/2023/06/Technical-Document-F-Part-1-Dwellings-Minimum-Energy-Performance-requirements-and-building-envelope.pdf ; Part 2: Non-Dwellings Minimum Energy Performance and Building Envelope Requirements, Available at: https://bca.org.mt/wp-content/uploads/2023/06/Technical-Document-F-Part-2-Non-Dwellings-Minimum-Energy-Performance-requirement-and-building-envelope.pdf; Part 3: Technical Building Systems, Available at: https://bca.org.mt/wp-content/uploads/2023/06/Technical-Document-F-Part-3-Technical-Building-systems-for-All-buildings.pdf

[22] Ministry for the Environment, Energy and Regeneration of the Grand Harbour (n.d), Single Use Plastic Products Strategy for Malta 2021-2030, Available at: https://era.org.mt/wp-content/uploads/2021/12/Single-Use-Plastics-Strategy.pdf

[23] Ministry for the Environment, Energy and Regeneration of the Grand Harbour (n.d.), Construction and Demolition Waste Strategy for Malta (2021-2030), Available at: https://era.org.mt/wp-content/uploads/2021/10/Construction-and-Demolition-Waste-Strategy-for-Malta-2021-2030-Managing-Construction-Demolition.pdf

and demolition waste. It serves as a blueprint to foster a cultural and operational shift in the construction sector's approach to excavation, demolition, and construction. Recognising the EU's focus on construction and demolition waste due to its volume and potential for reuse, the strategy outlines a comprehensive approach to managing this waste, moving from mere backfilling to reuse and recycling. It also addresses the need for high-quality secondary materials that meet market demand while upholding safety and environmental standards. The strategy is structured around four main priority areas: Planning and Design, Waste Management, Quality Management, and Policy and Regulatory Framework, each with specific measures to improve the industry's sustainability. Through these interconnected areas, the strategy aims to drive growth, create eco-friendly jobs, foster innovation, and protect human health and the environment.

National Research and Innovation Strategic Plan 2021-2023[24]

Malta's updated National Research and Innovation Strategic Plan for the period 2023-2027 aims to integrate research and innovation into society, focusing on quality of life, resilience, and sustainability. It aligns with the national economic vision, enhancing synergy between economic development and research and innovation (R&I), with a commitment to green and digital transitions. The plan adopts a mission-oriented approach, supported by public and private investments, and prioritizes R&I in national budgeting and governance. It promotes a multipronged investment strategy, gender balance, and diverse representation in R&I. The five principal goals include strengthening R&I governance, developing the local ecosystem, enhancing directionality through missions and smart specialization, mainstreaming R&I in public policy, and strengthening R&I implementation structures.

National Reform Programme

The National Reform Programme (NRP) for 2024 outlines the Government’s planned and executive strategic interventions which will continue to increase Malta’s economy’s resilience in the face of adversity. Such initiatives laydown critical foundational layers to the economy, highlighting Malta’s commitment towards sustainable economic growth and social progress. The Maltese Government places priorities on five key principles, those of renewing Malta’s infrastructure, good governance, enhancing the quality of life for all citizens, investing in education, and achieving carbon neutrality by 2050. The 2024 NRP focuses on key policy challenges that are organised under key themes like environment, productivity, macroeconomic stability, fairness, governance, and taxation. Environmental sustainability remains a top priority, implementing initiatives which are aimed to promote the green transition by investing in energy efficiency and renewable energy sources.[25]

[24] Ministry for Education, Sport, Youth , Research and Innovation (2024), “Malta’s National Research and Innovation Strategic Plan 2023-2027”, Available at: https://parlament.mt/media/127203/pq17648.pdf

[25] Ministry for Finance (2024), Malta National Reform Programme, Available at: https://finance.gov.mt/wp-content/uploads/2024/05/National-Reform-Programme-2024.pdf

National Policy for Electric Vehicle Public Charging Infrastructure[26]

In line with the Maltese Government's policy to promote the uptake of Electric Vehicles, this National Policy aims to cover the charging infrastructure for plug-in and electric vehicles accessible by the public. The policy focuses on promoting climate neutrality in Malta by improving the public charging infrastructure for electric vehicles (EVs). It emphasizes technological harmonization, compliance with EU standards, and a strong regulatory framework. The policy aims to ensure interoperability and safety, encourage private investment, foster skilled job creation in the EV sector, and provide updated information for seamless EV usage throughout Europe.

National Biodiversity Strategy and Action Plan to 2030[27]

In 2023, Malta's Environment & Resources Authority (ERA) released a draft National Biodiversity Strategy and Action Plan for public consultation. The strategy aligns with the National Strategy for the Environment's goal to appreciate, protect, rejuvenate, and utilize Malta's biodiversity for the benefit of the environment, society, and climate. The Action Plan aims to put Malta's biodiversity on a path to restoration and acts as a guide for developing targeted national policies and measures. It outlines a strategic framework to help Malta meet its environmental targets by 2050, identifying five critical policy areas: conservation and restoration of nature, addressing biodiversity depletion causes, sustainable biodiversity use, mainstreaming and awareness-raising, and enhancing implementation and cooperation.

Towards a Circular Economy 2020-2030[28]

Malta's strategy for embracing a circular economy by 2030, calls for a shift in how products are designed, manufactured, and recycled. The strategy prioritizes the transformation of waste into a valuable resource for new production, rather than seeing it as disposable. Key initiatives include enhancing waste segregation and treatment, enforcing design regulations to increase product longevity and recyclability, recognizing the economic value of resources for recovery, and stimulating markets for recycled materials. These measures aim to minimize waste mismanagement and create a sustainable, resource-efficient economy.

[26] Ministry for the Environment, Energy and Regeneration of the Grand Harbour (2022), National Policy for Electric Vehicle Public Charging Infrastructure, Available at: https://energycms.gov.mt/en/Documents/2022%20Documents/ELECTRIC%20CARS%20INFRASTRUCTURE%20DOC%202022-2%20(1).pdf

[27] Environment & Resources Authority (2023), National Biodiversity Strategy and Action Plan to 2030. Available at: https://era.org.mt/wp-content/uploads/2023/02/NBSAP-public-consultation-draft-19.01.23.pdf

[28] Ministry for the Environment, Sustainable Development and Climate Change (2021), Towards a Circular Economy 2020-2030. Available at: https://www.cemalta.gov.mt/wp-content/uploads/2021/09/email-version-fin.pdf

National Strategy for Poverty and Social Inclusion 2025-2035[29]

The National Strategy for Poverty Reduction and Social Inclusion 2025-2035 is a comprehensive plan aimed at addressing poverty and social exclusion through a multi-faceted approach that prioritizes the welfare of all citizens. The strategy envisions a society characterized by community cohesion, empowerment, solidarity, and dignity. It acknowledges the complexity of poverty and social exclusion as issues that extend beyond mere income disparities and seeks to address the broader aspects of well-being. The strategy aims to tackle the root causes of poverty through targeted interventions that improve access to education, healthcare, and employment opportunities, as well as strengthening social support structures. This is still under consultation process.

iii. Key issues of cross-border relevance

Issues of cross-border relevance for Malta have to be viewed within the context of an island with no land borders and with effectively one neighbouring Member State. This has direct implications on Malta's energy system which are reflected in this plan, in particular under the Energy Security and Internal Energy Market dimensions.

Issues of cross-border relevance relate primarily to commercial contracts relevant to importation of electricity via the electricity interconnector(s) and LNG for fuelling of the power station.

The government is committed to commission a second interconnector with Italy, with the aim of sustaining strong economic growth, strengthening the energy mix potential and providing for increased growth in renewable energy sources, thus increasing energy security. This project will double the interconnectivity capacity of Malta with the European electricity network.

Moreover, a hydrogen-ready gas pipeline interconnection between Malta and Gela (Sicily, Italy) is also being explored. Following a positive assessment by the Commission pursuant to Article 24 (1) and (2) of TEN-E Regulation (EU) 2022/869, the project has retained its Project of Common Interest (PCI) status in the 6th PCI list of 2023. The project was submitted as a candidate for inclusion in the TYNDP 2024 as a first step to the 7th PCI list selection process of 2025.

The government is also open to explore cross-border cooperation in areas falling under the other dimensions, such as joint projects in renewables in particular offshore, cooperation and sharing of best-practices on measures targeting energy efficiency and possible joint projects in the area of research & innovation in low-carbon technologies.

Additionally, the Maltese Government is actively pursuing enhanced energy security, sustainability, and affordability through cross-border interconnections with southern European and North African countries.

[29] Ministry for Social Policy and children's rights (2024), National Strategy for Poverty and Social Inclusion 2025-2035, Available at: https://socialsecurity.gov.mt/wp-content/uploads/2024/10/NationalStrategyforPovertyReductionandSocialInclusion2025-2035EN.pdf

Malta's engagement in regional energy collaboration is exemplified by its role in the 5+5 Dialogue with Western Mediterranean countries. A platform was established under the auspices of MED 9 Energy ministers aimed to transform the Mediterranean as a hub for green energy, focusing on offshore renewables and interconnections to foster EU investment in sustainable energy. Malta remains committed to promoting dialogue and building a platform for a green energy hub within the Mediterranean region.

iv. *Administrative structure of implementing national energy and climate policies*

To enhance the strategic coordination and oversight of national energy and climate initiatives, an Inter-ministerial committee (IMC) has been formed. This committee is composed of high-level officials who are instrumental in policy development and execution, alongside subject-matter experts from pivotal sectors that intersect with energy and climate concerns. These sectors encompass energy generation and distribution, climate change mitigation and adaptation, transportation systems, building standards (which include planning and construction regulations), finance, economic development, and the strategic utilization of EU funds.

The IMC's mandate is multifaceted. It acts as a collaborative platform for the synchronization of various policies and measures that are integral to the national plan. By fostering interdepartmental communication and cooperation, the IMC ensures that policies are not only well-aligned but also that they complement and reinforce each other across different sectors. Additionally, the committee is tasked with the diligent monitoring of these policies' implementation, tracking progress, identifying challenges, and facilitating timely adjustments to meet the set objectives. Through this structured approach, the IMC aims to drive forward a cohesive and effective energy and climate strategy.

The coordination of the National Energy and Climate Plan has been entrusted to the new Climate Action Authority (CAA) established under Chapter 643 of the Maltese Laws the Climate Action Act adopted in 2024. One of the functions of the new authority is to prepare and update the National Energy and Climate Plan for government's approval. The Climate Action Authority Act furthermore provides a comprehensive framework for climate action in Malta, mandating both the government and individuals to take preventive and remedial measures to protect the climate. The government is responsible for developing, updating, and publishing national inventories of greenhouse gas emissions and removals, formulating and implementing policies to mitigate climate change, and promoting technologies that reduce emissions across various sectors. The CAA, will ensure that Malta meets its national and international climate commitments, in alignmnent with the objectives set out in the LCDS and the NECP.

1.3. CONSULTATIONS AND INVOLVEMENT OF NATIONAL AND UNION ENTITIES AND THEIR OUTCOME

i. Involvement of the national parliament

Malta's national law during the drafting of the NECP, does not require formal endorsement of Malta's National Energy and Climate Plan by the Parliament. As outlined in Section 1.2, the IMC was established to ensure a coordinated approach of all Ministries relevant to the development of the Plan.

It is pertinent to note that the new Climate Action requires the Minister responsible for climate change policy under Chapter 463 to report to the House and the House of representatives and shall discuss on a yearly basis the progress registered in climate action. Additionally, the Minister must also table strategies related to climate action, along with any updates, to the House of Representatives at least once in every five years for review and discussion.

ii. Involvement of local and regional authorities

Given Malta's size, regional authorities do not exist. Local Councils form the most basic form of local government; however, their role is primarily administrative and their involvement in energy and climate policy design is marginal. Nevertheless, Local Councils were invited to provide feedback on Malta's NECP as part of the formal consultation process which took place in 2024. This is further detailed in the section below.

iii. Consultations of stakeholders, including the social partners, and engagement of civil society and the general public

The involvement of local authorities, social partners, civil society organisation, the business community, industry and other stakeholders as well as the general public are considered key processes under the Regulation on the Governance of the Energy Union. The importance of providing stakeholders with a platform for discussing different options for future national energy and climate policies is rooted in Article 11 of the Governance Regulation.

The final NECP update has undergone a significant consultation process, involving a series of stakeholder meetings to discuss Malta's energy and climate goals. These meetings featured in-depth discussions with key entities such as the Malta Council for Economic and Social Development (MCESD), an advisory body dedicated to enhancing Social Dialogue and ensuring that socioeconomic recommendations are considered by the Government before policy implementation, amongst other entities.

During the consultation, stakeholders were asked to review Malta's existing initiatives, policies, measures, and support mechanisms, providing feedback on their effectiveness and suggesting potential improvements to align with the sector's needs and the country's transition goals. Key stakeholders were involved from the early stages of the NECP update, and a public consultation was later conducted to gather broader input from society, through the government's online platform.

A structured questionnaire was used to collect detailed feedback, focusing on the effectiveness of Malta's strategies and identifying challenges—regulatory, technical, economic, or social—that could hinder the achievement of energy and climate targets. Stakeholders were encouraged to propose practical solutions, prioritize investment strategies, and recommend policy measures that could accelerate Malta's transition, with an emphasis on balancing diverse interests and fostering innovation.

A summary of the feedback received from this comprehensive engagement is provided in the subsequent section of this document. More detailed feedback can be found in Annex I.

Consultation feedback received during the public consultation on the NECP update

In the feedback received on the transport sector, there is a pronounced emphasis on the need for comprehensive strategies to alleviate traffic congestion and promote sustainable transportation, particularly given that a large portion of Malta's emissions stem from road transport. Respondents suggested that there should be policies aimed at reducing the number of passenger vehicles per capita and promoting cleaner modes of transport. Expansion and financial support for existing grant schemes related to green mobility and electric vehicles are deemed crucial, alongside calls for improvements in EV infrastructure, such as advanced charging stations and smart grids. Policies should incentivise sustainable practices and align with business and personal interests. Immediate action on energy efficiency and a gradual shift to hybrid vehicles are proposed to manage electricity grid demand.

There are calls for a modal shift to reduce reliance on private vehicles by enhancing public transport and incentivising shared mobility. This includes overhauling the public transport system with more efficient routes, a centrally managed permitting system, and investments in alternative transport like a Bus Rapid Transit system and a connected cycling and walking network. Addressing the cultural preference for private car ownership through behavioural economics and improving public bus services are seen as necessary steps. Finally, fostering community initiatives, incentivising sustainable transport adoption, and creating a framework for innovative mobility solutions are suggested to further support the transition to a greener transportation system.

The decarbonisation of aviation and maritime sectors is identified as a priority, with Sustainable Aviation Fuels (SAF) and clean maritime fuels seen as key short-term solutions. Stakeholders proposed the development of a national plan to secure SAF supply and to consider support mechanisms that would make SAF more cost-competitive. Access to clean maritime fuels is a top priority for the decarbonisation of the shipping sector. For shipping to reach its decarbonisation goals and Europe to become the first carbon-neutral continent, it is important that the supply and affordability barriers of the use of alternative clean fuels are tackled through the development of capacity, access to, and infrastructure for green maritime fuels. The industry will for the first time be competing for fuels with other industries and therefore, to ensure that the industry is able to continue to perform its role as a

provider of security of supply, it is crucial that proper focus is given to ensuring that fuel suppliers can provide enough clean and safe fuels produced/able to be supplied for the maritime sector.

Consultation with the airline and shipping industries is essential to address Malta's specific needs and to implement effective incentives for SAF and clean maritime fuel uptake. Without such measures, Malta risks falling behind in aviation and maritime decarbonisation and losing its appeal as a destination for airlines and shipping companies in the future. The country's unique reliance on air and sea transport also underscores the importance of making clean air and maritime transport accessible to all its citizens.

Within the buildings sector, there is a strong emphasis among stakeholders on the necessity for building regulations to adhere to the Energy Performance in Buildings Directive (EPBD), and a call for effective enforcement of these regulations. Among the key recommendations is the establishment of a system mandating a minimum energy efficiency score as well as the introduction of a building logbook that documents the structural and fabric history of buildings, including certification details.

Stakeholders also propose financial measures such as advantageous loans, fiscal incentives for green buildings, and financing models like Energy Performance Contracting to encourage the development of environmentally friendly buildings. Furthermore, the implementation of minimum Energy Performance Certificate (EPC) rating requirements for new constructions is advised in addition to the imposition of strict quotas on electrical and thermal efficiency for all new buildings, coupled with incentives to retrofit and enhance old buildings to boost their efficiency. A preference for Design-Build contracts has been expressed, indicating a desire for elevated standards in building construction and maintenance. Moreover, there is a significant interest to incentivise rainwater harvesting and the adoption of cleaner energy sources, which includes the integration of mandatory design elements to future-proof buildings against the impacts of climate change and to encourage the renovation of existing structures.

Stakeholders have conveyed a strong consensus on advancing the renewable energy sector. Key points include the continuation and enhancement of incentives for photovoltaic (PV) and wind energy installations, coupled with energy audits and grants for energy-saving measures. A strategic shift from energy subsidies to financial incentives for renewable investments is deemed essential, with suggestions for higher feed-in tariffs and mechanisms for updating older solar arrays. Additionally, stakeholders note the absence of options to purchase renewable electricity from the national utility supplier and recommend implementing a premium tariff for renewable energy generation. The introduction of green bonds and zero VAT rates on PV systems are proposed to stimulate investment in sustainable projects.

Stakeholders proposed the implementation of mandatory solar installations for all new constructions and significant renovations, emphasizing the need for a comprehensive Long-Term Energy Resilience Plan. Such plan should include a diverse energy mix with offshore wind and solar energy. The private sector's interest in renewable investments is noted, with a push for simplified aid processes and legislation mandating PV installations for large-scale industries. There is an urgent need for legislation on 'solar rights' to protect investments in solar PVs from shading due to increased building heights. The promotion of renewable energy communities and citizen involvement in offshore renewables is recommended, alongside the importance of energy storage and community energy initiatives. Technical barriers are acknowledged, with alternative solutions like floating solar panels suggested,

and the potential for private-public partnerships (PPPs) to accelerate large-scale renewable projects. Overall, there is a strong call for clear policies, robust monitoring, and community-driven approaches to achieve Malta's environmental targets.

Investment in energy efficiency solutions is pivotal for Malta's decarbonisation, with a particular focus on enhancing industrial estates. The feedback underscores the necessity of deploying energy-saving technologies throughout public and private sectors and the establishment of a comprehensive energy performance database. It proposes tax incentives for businesses reinvesting profits into environmentally sustainable systems and suggests a tiered VAT reduction system to encourage consumers to switch to more efficient appliances based on energy ratings. The feedback also calls for increased funding and awareness for energy audits, consistent energy billing, and a review of night energy tariffs for industrial use. It stresses the need for policy reforms to update planning requirements and standards for energy-efficient projects, urging the government to exemplify green procurement practices.

Additionally, the feedback recognizes the need for Malta to adopt a more sustainable approach to infrastructural development that balances economic growth, competitiveness, and environmental and social sustainability. Infrastructure investment should focus on exploiting synergies rather than being dispersed across piecemeal projects. To facilitate the green transition, stakeholders called for a reduction in the bureaucracy of grants, citing the EENergy grant as a successful example of simplified procedures aiding companies in investing in energy efficiency. Recommendations included automating customer care, introducing real-time status tracking technology, and accelerating the setup of an integrated portal for reporting and payments.

Stakeholders emphasized the importance of addressing energy poverty with targeted assistance for low-income earners and vulnerable communities. To support a just transition, the feedback called for the development of targeted programs and inclusive planning that involves all stakeholders, including those most affected by energy poverty. Tax and pension reforms were proposed to alleviate the financial burden on low-income workers, alongside retraining programs to help workers shift to green jobs. Public awareness campaigns were recommended to educate the public on the transition's benefits and encourage behavioural contributions. Furthermore, it was noted that provisions must be made to ensure that individuals living in or at risk of poverty can benefit from renewable energy incentives, and that the business community's investment in alternative energy does not inadvertently increase the cost of living. The overarching message was that the transition to a low-carbon economy should be equitable, avoiding a one-size-fits-all approach and instead focusing on measures that ensure long-term sustainability and profitability for all members of society.

Focusing on energy security, Malta’s high energy import dependency has also been highlighted. The need for increased investment in renewable energy installations, particularly in innovative formats like solar panels covering parking areas or building facades. It advocates for hyper-local energy storage solutions, such as home battery storage systems and electric vehicles with Vehicle2Home and Vehicle2Grid capabilities, coupled with financial incentives for these energy storage solutions. There is a call for increased funding for initiatives that reduce the burden on the grid and encourage investments in renewable energy to lessen dependency on imported fuels.

Challenges identified include infrastructure and land-use planning centred around private cars, scale diseconomies in renewable energy implementation, and reliance on fuel imports affecting electricity

production costs and supply security. The feedback suggests repurposing waste for energy generation and calls for more decentralization in the energy sector to prevent widespread power outages from centralized generation issues. The feedback emphasizes the importance of energy storage, both electrical and thermal, and suggests a regulatory framework for various power sources and storage methods, including mass thermal storage and alternative fuels. Lastly, the feedback calls for grid decentralization, solar desalination, and the consideration of offshore renewables to overcome space limitations on the islands.

Research and innovation (R&I) is critical to advancing Malta's green transition, with the potential to create jobs, attract investment, and improve energy security. To harness these benefits, Malta must establish clear and stable policies that attract investment into green technologies. By positioning itself as a hub for green technology and innovation, Malta can draw in skilled professionals and sustainable economic growth. The implementation of smart grids and the promotion of R&I in renewable energy are strategic moves that can place Malta at the forefront of the green transition. The government's role in fostering innovation includes supporting programmes that encourage the re-examination of global supply networks, with a particular emphasis on integrating AI and machine learning into supply chain operations. This approach should be complemented by a partnership-based strategy for supply chain security, involving collaboration with key partners. Investment in R&I is essential, particularly in renewable energy research tailored to island jurisdictions. Local innovations, such as those emerging from the University of Malta, should receive promotion and funding for local testing. Upskilling and educational investment, especially at the postgraduate level, are necessary to retain local talent and support the transition. To further bolster R&I, Malta should fund university research projects focused on renewable energy storage and generation, with a long-term vision of establishing companies where the government holds a minor share.

With regards to the internal energy market, feedback calls for crucial investments in Malta's utility infrastructure, including electricity, water, and sewage systems, to meet increasing demand. It advocates for the liberalisation of the energy distribution network to allow private companies to use alternative energy sources more effectively. Significant upgrades to the distribution network are needed to improve reliability and support the transition to green energy, with a modern grid reducing costs and preventing blackouts. The feedback also suggests integrating green infrastructure into road projects and mapping industrial processes to optimize resource use. Additionally, it proposes incentivising businesses to adopt green energy by increasing the rates for energy fed into the national grid as fuel subsidies are reduced.

Other feedback calls for a cross-sectoral approach on energy efficiency, education, and waste management, among other themes. It emphasises the need for energy-saving technologies, better waste management, and energy performance databases. The feedback also highlights the importance of public awareness campaigns, retraining programs for green jobs, and the integration of sustainable development in education.

Other Consultation processes of key thematic policies and strategies relevant to NECP

National Policy for the Deployment of Offshore Renewable Energy[30]

The National Policy for the Deployment of Offshore Renewable Energy was launched for public consultation on the 31st of August, 2023. The consultation period lasted until the 30th of September, 2023 and during this period a total of sixty four responses have been received. This public consultation collected:

- Open-form responses from members of the public,
- Open-form responses from entities (government entities, local chambers, NGOs, political parties)
- Questionnaire replies from all groups

A number of meetings were held with interested parties after the consultation exercise, namely BirdLife Malta, Department of Fisheries, Koperattiva Tas-Sajd Malta, The Continental Shelf Department and The Malta Air Traffic Services Ltd. The common issues across all sectors where considerations for the development of renewable energy projects in marine environments, including co-location, investment in R&I and marine life protection. Suggestions mentioned the integration of renewable energy projects, the need for government support in R&I to explore new research opportunities arising from these projects. It underscores the importance of Marine Life Protection, cautioning that neglecting environmental measures could lead to opposition and delays in project implementation.

In general feedback from various sectors regarding renewable energy projects in marine environments was positive. Concerns from the public centered around potential conflicts with fishing activities, while entities emphasized the importance of protecting marine life, including avifauna. International organizations called for clearer definitions of rules, periods, and requirements involved in the processes. Despite these concerns, no critical changes to the draft policy were deemed necessary, with all points raised during the consultation set to receive due attention.

Malta's National Air Pollution Control Programme

The Public consultation for the Air Pollution Control programme collected a total of 20 responses from general public as well as various entities such as NGO's, private companies and government entities.

The public consultation yielded several recommendations, which include:

- Reducing the use of fireworks.
- Implementing Social Impact Assessments in policymaking.
- Transitioning to cleaner government vehicle fleets.
- Lowering emissions from shipping.

[30] Energy and Water Agency (2024), Outcome of the Public Consultation for the National Policy for the Deployment of Offshore Renewable Energy. Available at: https://energywateragency.gov.mt/wp-content/uploads/2024/01/Offshore-Public-Consultation-Report.pdf

- Improving cycling infrastructure.

The public showed a strong interest in designating the Mediterranean Sea as an Emission Control Area and in technical solutions to reduce maritime emissions. There was also a push for developing sustainable transportation and expanding cycling paths. In response, the ERA has committed to negotiating a Sulphur Emission Control Area, assessing the air quality impact of cruise liners, and collaborating with authorities to enhance cycling facilities.

Other proposals from the consultation include:

- Incentivizing shoreline power connections for ships.
- Exploring hydrogen power for buses.
- Encouraging green mobility plans in the private sector.
- Tax restructuring to support environmentally friendly transport options.

The ERA acknowledges the need for better infrastructure for charging electric vehicles and is working with relevant ministries to address this. The feedback also pointed out the increasing emissions from road transport and suggested policy changes to promote electric vehicle usage and improve public transport. Fiscal measures such as taxing SUVs to subsidize grants for electric cars and integrating alternative fuels were also discussed.

The ERA is undertaking air quality studies to evaluate the impact of cruise liners and transboundary shipping and is aware of the challenges in adopting emissions strategies from aviation and marine sources. It aims to balance economic gains with environmental health. Finally, the ERA plans to intensify studies on local and transboundary pollution and to work across ministries to establish comprehensive environmental and transportation policies. While meeting EU obligations is essential, the well-being of Maltese citizens remains a priority, and the ERA is actively seeking ways to reduce pollution and promote sustainable transport solution.

Long-Term Waste Management Plan

The Plan was developed with the input from a Strategic Environmental Assessment (SEA) and public consultations. The SEA highlighted the environmental benefits of reducing waste and improving management techniques. It recommended promoting markets for recycled materials, reducing the use of disposable bags, and encouraging private sector involvement. The plan includes monitoring measures for various environmental aspects such as air quality, biodiversity, soil integrity, greenhouse gas emissions, cultural heritage, energy consumption, water resources, public health, landscape, transport, and resource management. These measures are essential to assess the plan's effectiveness and to mitigate any negative impacts from infrastructure development and waste processing activities.

The SEA concluded that full implementation of the WMP would maximize environmental benefits, which would be greater than those achieved through partial implementation or no change at all. The final WMP incorporates feedback from the public and experts.

The consensus among respondents was the need for a more extended strategic timeframe, advocating for a vision stretching to 2050 rather than the initial proposal ending in 2025. This extension aims to facilitate detailed planning across short, medium, and long-term goals. Stakeholders also emphasized

the importance of integrating future projections for waste generation into the Strategy to ensure its relevance and effectiveness in the coming years. The principles of a circular economy were widely supported, particularly in the construction and building sectors, to significantly reduce resource use and waste. The management of construction and demolition waste was a focal point, with a push for promoting recycling and re-use, alongside the establishment of storage depots to decrease reliance on backfilling practices. The consultation responses highlighted a need for the 2020-2025 Strategy to align with the National Strategy for the Environment's long-term vision, with clear deadlines for achieving specific objectives within this period. The introduction of Key Performance Indicators at the action plan stage was agreed upon to ensure the Strategy's measures are effectively implemented. Lastly, the Strategy's flexibility was evident in its readiness to review and potentially amend certain measures, such as the standardization of building apertures, in response to concerns about design and energy performance.

Construction and Demolition Waste Strategy for Malta

The Public consultation for the Construction and Demolition Waste Strategy collected a total of 25 responses from general public as well as various entities such as NGO's, private companies and government entities.

In the consultation regarding Malta's strategy for Construction & Demolition (C&D) Waste Management, stakeholders acknowledged the critical role of site management and project administration in minimizing the impact of development sites on neighborhoods. The strategy was praised for its inclusion of stakeholder discussions, training, and standards necessary for fostering positive change. However, there was recognition of past shortcomings, as the repetition of proposals from the previous Waste Management Plan (2014-2020) in the current draft strategy indicated a historical failure to address issues comprehensively. The Ministry and the Environmental Resources Authority (ERA) were urged to demonstrate a firm commitment to the strategy's implementation and to foster industry-wide cooperation to meet the established targets.

Clarity was sought on how the 2020-2025 Strategy aligns with the National Strategy for the Environment's long-term vision extending to 2050, with the expectation that the short-term strategy would serve as a vehicle to achieve the long-term objectives within specific deadlines. Emphasis was placed on the need for the strategy to focus on the reduction and reuse of construction waste, suggesting that incentives be created for the reuse and recycling of stone to prevent wasteful practices.

The challenges of achieving recycling targets were acknowledged, given the large quantities of waste generated, but it was noted that Malta has achieved an average of 18% recycling rate for CDW. This consultation revealed a consensus on the necessity of effective waste management strategy implementation, active stakeholder engagement, and the development of incentives to advance recycling and reuse within the industry.

Malta Solar Farms Policy

The consultation process revealed a consensus on the importance of maximizing renewable solar energy potential in Malta, with the understanding that quarries should not be prematurely designated

as no-go areas for solar farm development at the policy stage. It was agreed that solar farm proposals should be subject to environmental screening, including both Environmental Impact Assessments (EIA) and Appropriate Assessments (AA), on a case-by-case basis to identify feasible mitigation strategies for potential environmental impacts.

The SEA highlighted the necessity of backfilling quarries below the surrounding terrain's highest elevation to maintain the landscape's integrity, especially in sensitive areas. It also recommended the establishment of buffer zones with a minimum of 3 meters around solar farms located within or adjacent to Natura 2000 SACs for soft landscaping purposes. The assessment underscored the importance of preferring underground ancillary infrastructure to avoid disturbing protected habitats and species, particularly within Natura 2000 SACs and SPAs.

The SEA also called for rigorous environmental monitoring by experienced teams approved by the ERA, with monitoring requirements tailored to each project in accordance with local legislation. Post-decommissioning, it was advised that quarry sites within Natura 2000 areas should undergo rehabilitation in line with the respective Management Plans, ensuring the restoration of impacted habitats and species.

Concerns were raised by stakeholders, including Nature Trust Malta and the Institute of Earth Systems, regarding the potential use of pesticides and weed killers, which could harm biodiversity and contaminate aquifers. The SEA recommended that the use of such chemicals should be regulated by existing legislation and assessed individually for each project. Additionally, the source of water for operational washing of PV panels was identified as a consideration that should be addressed on a project-level basis.

The SEA also addressed the potential impact of large-scale solar farms on the national electrical grid's stability, suggesting the integration of grid stabilization and energy storage systems to mitigate fluctuations in electrical output. The adoption of the best available technology was emphasized to minimize environmental impacts, including noise and light pollution, with technology choices to be determined during project-level environmental assessments.

Air Quality Plan

The public consultation of the Air Quality plan gathered a total of 12 responses from general public as well as various entities such as NGO’s and government authorities. Feedback on Malta's Air Quality Plan highlights several key areas for improvement, including the enhancement of public transportation systems to reduce reliance on private vehicles and alleviate traffic congestion. Stakeholders suggest that more comfortable and secure park-and-ride facilities could encourage the use of public transport and car sharing, thus reducing pollution. There is a call for local councils to be empowered to implement air quality projects, with specific grants and schemes targeting urban greening and pedestrianization. The importance of updating the highway code to prioritize pedestrians and cyclists is also noted, as well as the need for better enforcement of environmental regulations and the introduction of bus priority measures to make public transport more attractive.

Responses to the feedback indicate that studies are being planned to assess the feasibility of park-and-ride systems, and that local councils can benefit from various funds and EU programs to support green initiatives. A revised network for public transport is being outlined, which includes the introduction of

hubs for express services and bus rapid transit systems. Remote work policies have been updated to promote work-life balance, and efforts are being made to harmonize data collection approaches at national and regional levels. The enforcement of regulations concerning roadside inspections and the identification of polluting vehicles is being addressed through technology and pilot projects. Additionally, the electrification of transport and the expansion of the electric vehicle charging network are being considered, with the acknowledgment that local initiatives should complement national policy directions. The plan also references the need for safe and reliable alternatives to private motor vehicle use, with a focus on sustainable mobility and the reduction of pollution exposure.

Long-Term Renovation Strategy

The public consultation gathered a total of 14 responses from the public consultation from various stakeholders, government agencies and individuals. Feedback suggests a need for prioritizing emissions control from vehicles and heavy machinery, with stakeholders noting that current vehicle testing does little to curb emissions. There is also a call for better infrastructure to support investment in solar and renewable energy, as well as more streamlined processes for solar farm applications. Stakeholders recommend conducting energy audits before issuing grants for energy improvements and suggest that a slowdown in property price inflation would make sustainable renovations more viable for homeowners.

Responses concluded that transport regulation is being addressed in other policy initiatives and have amended the Long-Term Renovation Strategy (LTRS) to clarify the link with national perspectives on communal photovoltaic farms. Existing policies already provide assistance for energy renovation plans, and the requirement for an Energy Performance Certificate (EPC) will be considered for different incentive schemes. The regulation of the property market is beyond the scope of the LTRS, but the strategy supports improving existing stock and ensuring energy-efficient new builds.

Other feedback includes suggestions for updating building legislation, including tax incentives for non-residential buildings, guaranteeing solar rights, and emphasizing the renovation of public buildings. The authorities note that these comments offer insights into operationalizing LTRS initiatives and have made changes to various sections of the document to include considerations on Green Public Procurement and certifications. Some stakeholders highlight the need for more detailed proposals and measurable progress indicators, as well as a financial component to support the strategy. The authorities have provided milestones in the main LTRS document and an associated impact assessment, with further details to be released with the implementation of specific schemes. These suggestions have been noted and changes have been incorporated where appropriate, with a focus on providing incentives, updating standards, and ensuring effective implementation of the strategy.

Low Carbon Development Strategy

The public consultation received a total of 30 responses. Feedback focused on the need for more aggressive incentives for electric vehicles (EVs) and renewable energy to the importance of protecting natural environments and improving public transportation. Stakeholders propose measures such as increasing the number of trees and vegetation, especially in urban areas, to provide shade and filter pollution, and call for stronger control measures in the construction industry to mitigate pollution.

There is also a push for promoting cycling and walking by creating better infrastructure, such as cycling lanes and larger walkways.

In response, the need for a comprehensive approach to encourage the use of efficient heating systems and public transport was acknowledged. They are considering the feasibility of driverless vehicles and promoting the spread of office buildings to reduce traffic congestion. The responses also indicate that studies are being planned to understand the potential for park-and-ride systems and that local councils can benefit from various funds to support green initiatives. A revised network for public transport is being outlined, which includes the introduction of hubs for express services and bus rapid transit systems. The enforcement of regulations concerning roadside inspections and the identification of polluting vehicles is being addressed through technology and pilot projects. Additionally, the electrification of transport and the expansion of the electric vehicle charging network are being considered, with the acknowledgment that local initiatives should complement national policy directions.

Minimum Energy Performance Requirements in Buildings

A total of 15 responses were received, predominantly from technical professionals such as architects and engineers, however viewpoints were also contributed by private and public entities. In-depth consultations were held with key stakeholders, including the Water Services Corporation (WSC), the Malta University Holding Company, and through inter-ministerial discussions. The breakdown of the feedback is as follows: 19 responses in total, with 7 from individuals and 12 from organizations, all of which were submitted via email. Through feedback examination, a decision has been made regarding the classification of third-party walls in densely constructed areas. It has been concluded that third-party walls should not be treated as external walls. The imposition of mandatory insulation on these walls could lead to significant waste. Furthermore, the difficulty in identifying the third parties responsible for exposed walls for compliance purposes has prompted a decision to treat third-party walls as internal walls.

National Strategy for Poverty Reduction and Social Inclusion

In 2024, the Ministry for Social Policy and Children's Rights has released a draft of the forthcoming National Strategy for Poverty Reduction and Social Inclusion, spanning from 2025 to 2035. Initiated in September 2023, the drafting process has been comprehensive, involving pre-consultation with more than 50 entities and the integration of strategic foresight techniques in partnership with the OECD to proactively address potential future challenges.

These sessions have been instrumental in identifying the evolving determinants of poverty and exclusion since 2014, pinpointing areas that require sustained attention, and shaping the discourse for the upcoming strategy term. The consultation process revealed that several recommendations from previous strategies had not been effectively implemented, prompting the need for their reiteration in the new strategy. To address these strategic concerns, the Ministry collaborated with the Organisation for Economic Cooperation and Development (OECD) to apply strategic foresight as a tool for strategy and policy design. This innovative approach aims to prepare for future challenges by understanding and acting on emerging ideas of the future in the present.

Key determinants of poverty and social exclusion have been analyzed through Working Papers, and focus groups have provided insights from individuals directly affected by these issues. A National Steering Committee has been established to guide the strategy's development, and collaborations with various departments have informed its economic and data analysis components.

The Ministry is now seeking public input on the published draft strategy to ensure a comprehensive and inclusive approach to reducing poverty and enhancing social inclusion across Malta and Gozo.

iv. Consultations with other Member States

Malta recognizes the advantages that can be gained from participating in regional cooperation and has actively engaged with neighbouring Member States. Given Malta's location on the periphery of the European Union, already linked to the European electricity grid via Italy, the focus of regional consultations has primarily been with Italy in relation to existing and future infrastructure. This is in light of Malta's efforts to reinforce its electrical interconnectivity by planning an additional interconnector and considering the potential for a hydrogen-ready gas pipeline between Malta and Italy.

v. Iterative process with the Commission

In compliance with the Governance Regulation, Malta presented its Draft NECP in 2023. Following the European Commission's review of Malta's initial submission in February 2024, significant strides have been taken to incorporate the Commission's feedback into the definitive NECP. To facilitate the integration of these revisions, the Maltese Government has engaged in bilateral discussions with the European Commission, focusing on the practical aspects of enacting the recommended amendments. Malta engaged in discussions with the European Commission through working groups under the Energy Union Committee and the Ad-hoc Working Group 2 of the Climate Change Committee. Furthermore, Malta conducted bilateral dialogues with the European Commission during the finalization of its NECP update.

1.4. REGIONAL COOPERATION IN PREPARING THE PLAN

i. Elements subject to joint or coordinated planning with other Member States

As explained in Section 1.2 iii above, Malta’s insularity limits the potential and the need for joint and coordinated planning with other Member States within the framework for the development of the NECP. Nevertheless, Malta considers regional cooperation as a key element of its NECP. Regional cooperation focuses primarily on the energy security dimension. Cooperation at government level, in technical and environmental studies as well as accelerated permitting procedures are explained in

more detail throughout the relevant sections of the Energy Security dimension. Regional cooperation is also considered within the area of contingency planning under the Energy Security dimension.

ii. Explanation of how regional cooperation is considered in the plan

Aspects related to regional cooperation are considered in more detail within each individual dimension under Section 3.

2 NATIONAL OBJECTIVES AND TARGETS

2.1 DIMENSION DECARBONISATION

Malta's commitment to sustainability is reflected in its ambitious goals for reducing greenhouse gas emissions and increasing the share of renewable energy in its energy production and consumption mixes. Aligning with the EU legislative framework, Malta aims to achieve significant reductions in GHG emissions by 2030 and 2050, transitioning towards climate neutrality. This long-term vision includes the electrification of most energy consuming processes and end-uses whilst exploring biofuels and green hydrogen as sustainable energy options for processes and sectors which are not feasible to be electrified in the short and medium term (e.g. hard-to-abate sectors), whilst supporting technological innovation and research to develop new energy solutions tailored to Malta's unique context. The following sections will outline Malta's commitments, objectives and targets for the GHG emissions and removals dimension and the renewable energy dimension.

The European Union, committed to the objectives of the Paris Agreement, has adopted a comprehensive long-term strategy aimed at reaching climate neutrality by the year 2050. As part of its obligations under the Governance Regulation (EU) 2018/1999, every Member State, is obligated to prepare a detailed Low-Carbon Development Strategy (LCDS) that extends to 2050. These strategies are to be refreshed with a new vision every ten years and reviewed—and updated if needed—every five years to ensure relevance and effectiveness. Malta published its first LCDS[31] in 2021. Malta's LCDS targets a variety of sectors, including transport, energy, buildings, waste, agriculture, and LULUCF, with the primary aim of reducing GHG emissions. Apart from initiatives which act as mitigation measures, the strategy also includes adaptation measures aimed to address specific risks and vulnerabilities that Malta faces as an island in the Mediterranean. Furthermore, under the ESR[32], Malta is required to reduce its GHG emissions by 19% in 2030, when compared to 2005, and thus the LCDS outlines measures that will help Malta achieve this target. The LCDS is the result of a three-year process, which started in 2018, whereby measures are researched and short-listed, possible abatement levels quantified through Marginal Abatement Cost Curve (MACC) modelling (i.e. ratio of abatement potential against incremental cost of measure), and stakeholders consulted, leading to a list of realistic and cost-effective measures which are being proposed to be implemented in the years to come. The baseline and proposed measures are based on a pre-COVID scenario and thus had to be re-modelled to be re-considered for inclusion in the NECP.

[31] Ministry for the Environment, Climate Change and Planning (2021), Malta Low Carbon Development Strategy. Available at: https://unfccc.int/sites/default/files/resource/MLT_LTS_Nov2021.pdf

[32] European Parliament and The Council of the European Union (2023), Regulation (EU) 2023/857 of the European Parliament and of The Council of 19 April 2023 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R0857

Malta has developed updated fuel and electricity demand projections that consider new population and macroeconomic projections. These projections take into account the economic situation of the recent years, namely the short- and longer-term effect of the pandemic and the Ukraine conflict.

As Malta's population and economy continue to grow, the island faces the challenge of increasing energy demand. Despite Malta's efforts to invest in renewable energy sources and reduce GHG emissions, the relative impact of these initiatives may be overshadowed by the overall rise in energy consumption. This situation necessitates a strategic approach tailored to Malta's unique context, where land availability for large-scale renewable projects is limited, and the economy is heavily reliant on tourism and services.

The subsequent sections will delve into the specific circumstances, endeavours, and constraints associated with Malta's GHG emissions, mitigation efforts, and the development of renewable energy. These discussions will offer a comprehensive overview of Malta's current environmental challenges and the measures being taken to address them, as well as the inherent limitations faced by the island in its pursuit of a more sustainable and low-carbon future.

2.1.1 GHG Emissions and Removals

Malta, as a member of the European Union, is actively aligning its national strategies with the EU legislative framework to reduce GHG emissions and combat climate change. The country has established a set of targets and commitments to contribute to the collective effort of mitigating the effects of global warming, as outlined in Regulation (EU) 2018/842 regarding its binding national target for GHG emissions, and Regulation (EU) 2018/841 for net greenhouse gas removals. These efforts are part of Malta's broader alignment with the objectives of the Energy Union and its adherence to the long-term Union greenhouse gas emissions commitments consistent with the Paris Agreement. The focus is on Malta's current targets and objectives, and the progress made towards these goals.

The original EU emission trading system (ETS), introduced in 2005, served as a carbon market that adopts a cap-and-trade system for emission allowances, primarily focusing on sectors such as power generation and energy-intensive industries. The updated ETS now considers, amongst others, the following:

- Inclusion of emissions from the maritime transport sector
- Accelerating the decrement of emissions allowances in circulation and gradually eliminating free allowances for certain sectors.
- Incorporation of the worldwide Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)
- Boosting financial aid for the Modernisation Fund and the Innovation Fund
- Revisiting the provisions of the Market Stability Reserve
- The establishment of the separate emissions trading system for buildings, road transport, and additional activities

Malta's obligations under the EU ETS, prior to the publishing of the ETS revision, primarily extended to its public electricity plants and the intra-European Economic Area (EEA) flights coming to or departing from the country's international airport. Foreseeably, the shipping sector will be significantly impacted

by the 2023 expansion of the EU ETS, as it will likely encompass a substantial number of trips to and from Maltese ports.

In the context of the revised EU ETS, which currently covers public electricity generation plants and intra-EEA flights in Malta, the country is preparing for the extension of the EU ETS to the shipping sector and the establishment of the separate emissions trading system for buildings, road transport, and additional activities (ETS-2).[33] This will result in the majority of fossil fuels used in Malta being subject to a carbon price by 2030. The new self-standing ETS, which will be operational as from 2027, will extend carbon pricing to buildings, road transport, and fuels not covered in the existing ETS, requiring fuel suppliers to purchase and surrender allowances for their emissions.

Malta is working on the ongoing implementation of the extensions of ETS to maritime operators, with a national impact assessment being carried out to understand the implications. In the aviation sector, Malta is preparing for the phase-out of free allowances by 2026 as part of the ongoing implementation of the ETS aviation. For fuel use in buildings and road transport (BRT), Malta is preparing for the extension of ETS to BRT operators, with plans to carry out a national impact assessment to gauge the effects of this regulation.

To address the social and economic impacts of these changes, particularly for vulnerable groups, the EC has introduced the Social Climate Fund (SCF) regulation (Regulation (EU) 2023/955).[34] This regulation aims to mitigate the social and distributional impact of the new carbon pricing mechanism for buildings and road transport. Malta is required to develop a Social Climate Plan (SCP) to support vulnerable households, micro-enterprises, and transport users affected by rising energy costs due to the inclusion of GHG emissions from buildings and transport within the scope of ETS 2. The submission of Malta's first SCP to the European Commission (EC) by June 2025 is a crucial step in this process.

As a small island nation within the European Union, Malta faces unique challenges and responsibilities in the global effort to combat climate change. The country's commitment to reducing GHG emissions is not only a response to international agreements but also a proactive measure to protect its own environment and economy from the adverse effects of climate change. Malta is committed to the Paris Agreement to address climate issues to their fullest potential and to contribute towards the European Union’s increased collective target of 55% reduction of its GHG emissions by 2030 compared to 1990 levels. Malta's strategy encompasses a range of legislative and policy initiatives designed to meet specific targets that contribute to the EU's overarching climate goals. These initiatives are tailored to Malta's specific circumstances, taking into account its economic structure, geographic limitations, and social considerations.

[33] Official Journal of the European Union (2023), Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emissions allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.130.01.0134.01.ENG

[34] Official Journal of the European Union (2023), Regulation (EU) 2023/955 of the European Parliament and of the Council of 10 May 2023 establishing a Social Climate Fund and amending Regulation (EU) 2021/1060. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.130.01.0134.01.ENG

Malta's commitment to climate action is confirmed with the setting up of a dedicated Climate Action Authority, making Malta one of the first countries in the world to have such an authority. The Authority was set up in 2024 and has been established to spearhead the nation's climate change initiatives, focusing on the implementation of measures to combat, mitigate, and adapt to climate change. It operates within the framework of the Climate Action Bill[35].

The Authority's responsibilities include supervising the enforcement of climate legislation, ensuring Malta's compliance with international climate agreements such as the UNFCCC, and entrusted with the coordination of climate action across different government and non-government stakeholders in order to consolidate all national effort. It also is responsible to prepare the long-term strategy, climate adaptation strategy and the national energy and climate plan and any other relevant plans as may be assigned to it.

i. The elements set out in point (a)(1) of Article 4

Binding national target for GHG emissions and annual binding national limits pursuant to Effort Sharing Regulation

Regulation (EU) 2023/857 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, also known as the Effort Sharing Regulation (ESR), sets binding annual GHG emission targets for Member States for the period 2021‑2030. The ESR aims to reduce emissions in those sectors which traditionally did not fall within scope of the ETS\, such as buildings, agriculture, waste, small industry and transport, with a contribution to the EU effort, of 40% reduction by 2030 compared to 2005 levels. Malta' share of the overall effort is to reduce GHG emissions falling within the scope of the ESR by 19%, when compared to 2005 emission levels, by 2030. The recent update to the ESR, which is part of the broader 'Fit for 55' legislative package, acknowledges Malta's unique challenges in mitigating emissions and the high costs associated with such efforts. Consequently, Malta's emission reduction target has been kept at the same level as before the introduction of the 'Fit for 55' measures.

The updated ESR mandates specific annual GHG emissions limits for each Member State for the years 2021–2030. These limits are determined based on the methodologies described in Article 4 of the Regulation. The national annual emissions allocations from 2021 to 2025 are detailed in Implementing Decision (EU) 2023/1319. The allocations for the subsequent years, 2026 to 2030, will be determined by the European Commission in 2025, following a comprehensive review of the emission data. The 2030 target under the Effort Sharing Regulation (ESR), which mandates a 19% reduction in emissions from 2005 levels, sets a challenging goal for Malta, limiting emissions to a maximum of 826.7 kts of CO_2 equivalent by 2030. Achieving this is no small feat, especially considering the growth and transformation of the Maltese economy since 2005.

[35] Legizlazzjoni Malta (2024), Climate Action Act. Available at: https://legislation.mt/eli/cap/643/eng

Since the publication of Malta's initial NECP in 2019, the country has experienced significant changes across its social, economic, and industrial spheres. A notable surge in population—from 491,586 in 2019 to 563,000 in 2023[36]—has led to increased demands for water and energy, a rise in waste generation, and a growth in the number of registered vehicles on the roads. Concurrently, Malta is witnessing the emergence of new industries, while the tourism sector continues to flourish, rebounding from the temporary downturns caused by the Covid-19 pandemic and the geopolitical tensions following the Russian invasion of Ukraine.

Despite these hurdles, Malta is steadfast in its commitment to advancing mitigation efforts to fulfil its responsibilities and contribute to the collective EU goals, in line with the stipulations of EU legislation. This commitment is made with a full understanding of the societal, economic, and geophysical constraints Malta faces, including its climate, which limits the options for transitioning to a low-carbon economy. The challenges are diverse across sectors, ranging from diseconomies of scale, high abatement costs, and generally low mitigation potential—as seen in Agriculture or the Land Use, Land-Use Change, and Forestry (LULUCF) sector—to issues of technology and innovation (such as refrigeration and cooling) and land use conflicts (including transportation and renewable energy deployment).

The government has already implemented a variety of measures to address these challenges. These include a combination of regulatory actions, incentives for adopting clean technologies, and campaigns to encourage behavioural shifts among individuals and businesses. The government remains resolute in its pursuit of achieving climate neutrality and is therefore considering additional policies and measures. However, these potential solutions are not always cost-effective, and the opportunities for straightforward, impactful interventions—often referred to as "low-hanging fruits"—are becoming increasingly scarce.

The macro-economic projections from 2005, when the -19% target was established, differ markedly from today's reality, particularly in terms of population growth. Yet, when assessing ESR emissions with respect to GDP, Malta's performance indicates positive outcomes, with a 56% decrease between 2005 and 2022, as can be seen in Figure 5. ESR emissions per capita, on the other hand, have remained relatively stable over the same period, with an increase of 0.00021 Gg CO2 eq. corresponding to an 8% increase (Figure 6).

[36] NSO (2024), World Population Day: 11 July 2024. Available at: https://nso.gov.mt/world-population-day-11-july2024/#:~:text=The%20estimated%20total%20population%20of,compared%20to%20the%20previous%20year

Figure 5 - ESR emissions per unit of GDP. Source: CAA

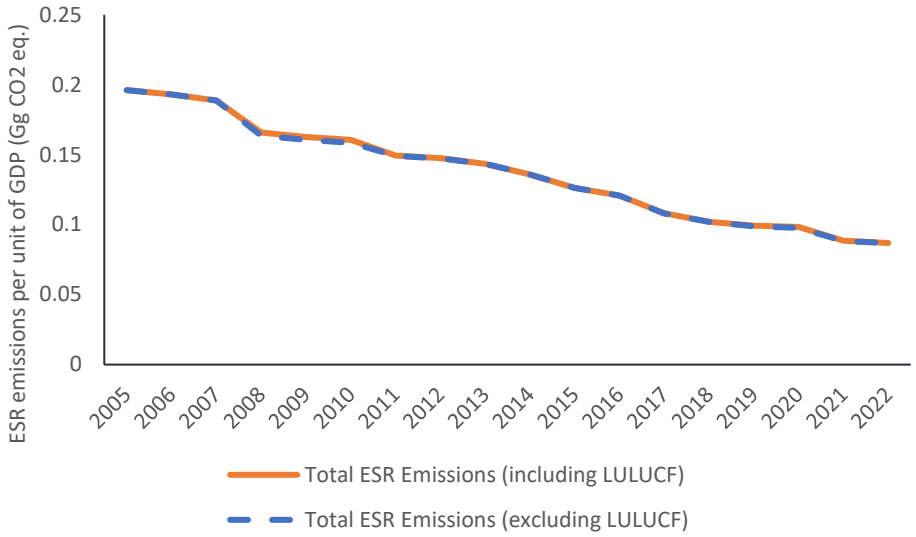
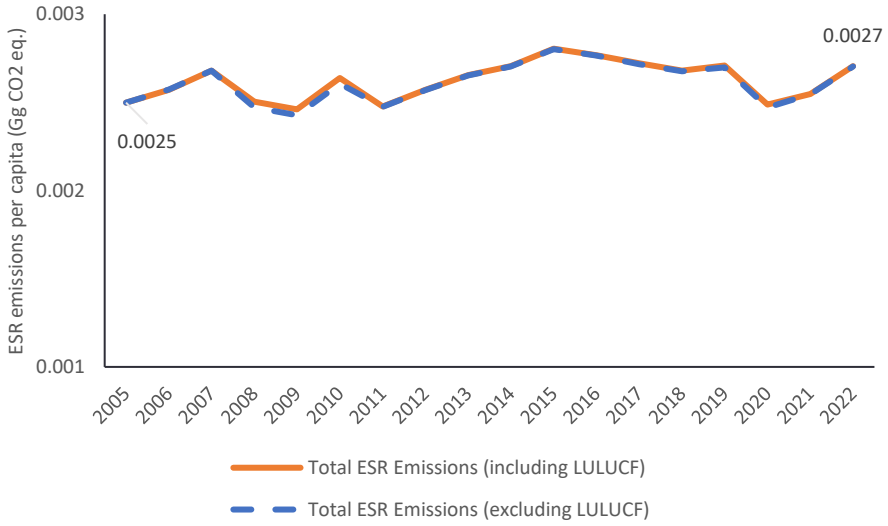


Figure 6 - ESR emissions per capita. Source: CAA



Despite these achievements, the target remains ambitious for Malta, and flexibilities available within the EU framework will continue to be crucial for the country to meet its obligations. Malta's journey towards its 2030 goals illustrates the complexity of balancing environmental objectives with economic and societal needs, especially for a small island nation facing unique challenges. The country's approach includes a mix of regulatory measures, incentives for clean technologies, and initiatives to promote behavioural change among citizens and businesses.

Figure 7 indicates that the transport sector accounted for almost half of total ESR emissions in 2022, with a 49% share. The other major contributing sectors are the IPPU and the waste sectors, with a 15%

and a 13% share respectively. A more detailed breakdown of emissions by gas and sector is provided in Chapter 4.

Figure 7 - ESR emissions profile for 2022. Source: National GHG Inventory 2022

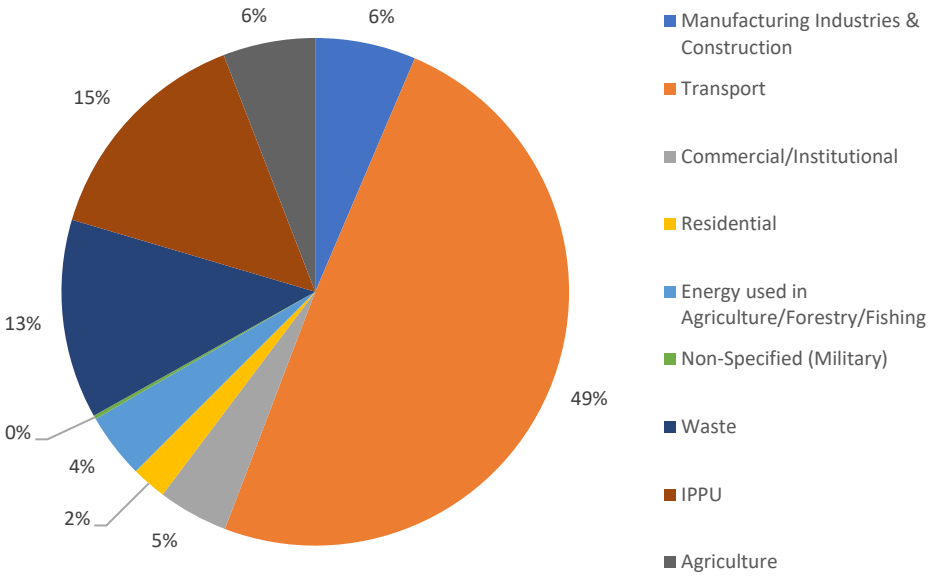
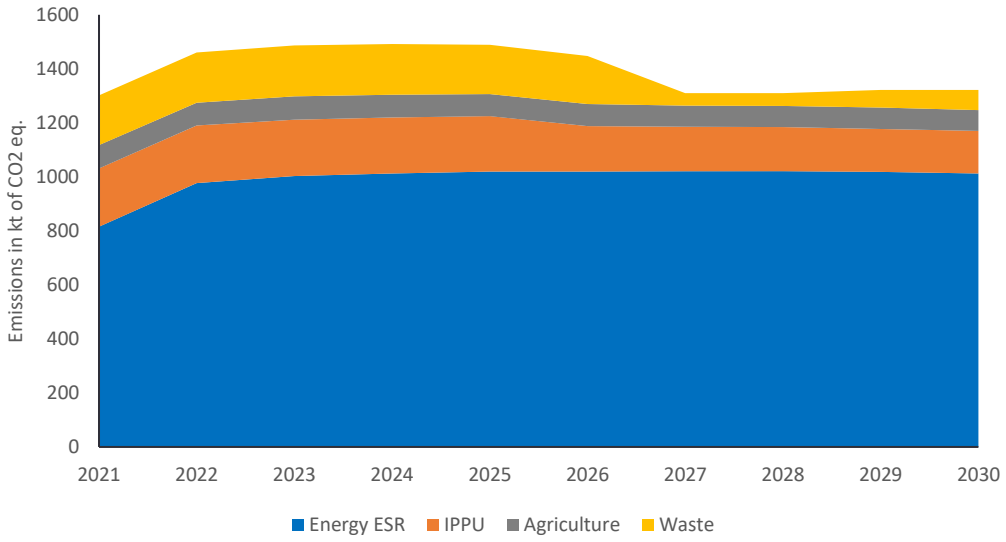


Figure 8 shows the projected ESR emissions by sector under the WPM scenario. The Maltese Government has undertaken a comprehensive approach in its efforts to meet the 2030 emissions reduction target under the Effort Sharing Regulation (ESR). These efforts are substantial and include financial incentives to support the transition to cleaner fuels and investment in key capital projects.

While significant efforts are underway, updated macroeconomic projections suggest that meeting the 2030 target (under amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions for Member States, as well as Regulation (EU) 2018/1999), may remain challenging. In response, the Government will continue to evaluate a range of additional initiatives to help bridge this gap. These measures will aim to further drive the transition to a low-carbon economy, with an emphasis on key sectors such as transportation, energy, industrial processes, and building infrastructure.

Figure 8 - ESR Emissions projections by sector, WPM Scenario



Commitments and national targets for net greenhouse gas removals pursuant to LULUCF regulation 2018/841

Regulation (EU) 2018/841, also referred to as the Land Use, Land Use Change, and Forestry (LULUCF) Regulation, requires Member States to comply with the commitments for the period from 2021 to 2025 and target for 2030 as set out in Article 4. For the period 2021 to 2025, Malta must demonstrate compliance with the 'no-debit rule' which means that the Member State accounted emissions do not exceed accounted removals. In terms of the 2030 target, Malta must ensure that, the sum of its GHG emissions and removals reported for the year 2030, which is determined in its GHG inventory submission in 2032, compared to the average of its GHG inventory data for the years 2016, 2017 and 2018, does not exceed the target of -2 kt of CO2 eq. This national effort will contribute to the 2030 Union target for net greenhouse gas removals of 310 million tonnes of CO2 equivalent. Moreover, Malta must ensure that the sum of the differences between its GHG emissions and removals and the average value for its GHG inventory data for the years 2021, 2022 and 2023, as determined in submission of 2032, for each year in the period from 2026 to 2029, does not exceed the budget set for 2026 to 2029.

For Malta, this involves managing its limited land resources to maximize their carbon sink potential. The country's initiatives include afforestation projects, sustainable urban planning that incorporates green spaces, and the conservation of natural areas that can act as carbon reservoirs. Malta also focuses on improving soil health through better agricultural practices, which can enhance the soil's ability to store carbon. These efforts are part of a broader strategy to create a more resilient and sustainable land use sector that can contribute to climate change mitigation and adaptation.

In view of inherent national circumstances including the high population density of the islands and the limited land availability, and to a certain extent the local climatic conditions (such as limited rainfall), the potential for further reduction of CO2 emissions or enhancement of the removals through carbon

sequestration in (new) vegetation is envisaged to remain minimal. The woodland areas of the Maltese Islands total about 200 hectares. These residual woodland areas are now protected by legislation. Data indicates that the potential abatement in this sector is small compared to other sectors. The National Forestry Accounting Plan (NFAP) 2019[37] reported on Malta's planned levels of afforestation and estimated the likely levels of sequestration achieved by new and existing, forests, forests stands. The total sequestration potential of Malta was estimated to be 0.0376 kt CO2 (or 37.6 tonnes CO2) for commitment period 1 (2021-2025) and 0.0479 kt CO2 (or 47.9 tonnes CO2) for commitment period 2 (2026-2030), which is a significantly limited contribution in the context of overall national net removals.

Notwithstanding, Malta is channelling significant investment into creating green spaces and ecosystem restoration in bolstering and strengthening the islands' ecology as well as improve accessibility to green spaces for Malta's population. In 2023 Malta created a new agency 'Project Green' tasked with the upkeep of national parks and other public spaces. Over a period of 7 years Malta will invest €700 million for the creation, maintenance and invigoration of parks, gardens and other green infrastructure. Although the minor positive impact on CO2 sequestration from these afforestation projects, will likely not be accounted towards the LULUCF targets due to methodological constraints (such as the applicable definition of forests), it is indisputable that these projects will be contributing to a healthier lifestyle, increased well-being and a more sustainable environment also by means of climate change mitigation and by creating or increasing natural carbon sinks.

As part of the 2023 submission of the National GHG Inventory Report[38], and subsequent inventory submissions, the Governance Regulation applies. Thus, Malta is required to report to the Commission using the Global Warming Potentials (GWP) adopted from the IPCC Fifth Assessment Report (AR5).

Using the AR5 values for the GWPs, the LULUCF sector accounted for 0.77kt of CO_2 equivalent emissions in 2022. Importantly to note that this sector can contribute both emissions (from sources) and removals (through sinks) of kt CO_2 equivalent. For the various categories within the LULUCF sector (Forest Land, Cropland, Grassland, Wetland, Settlements and Other Land), CO_2 is the main GHG emission source and sink.

[37] Malta Resources Authority (2019), National Forestry Accounting Plan Containing Malta's Forest Reference Level. Available at: https://cdr.eionet.europa.eu/mt/eu/mmr/lulucf/envxif3ca/Revised_NFAP_V1.pdf

[38] Malta Resources Authority (2023), Malta. 2023 National Inventory Report (NIR). Available at: https://unfccc.int/documents/627693

Table 1 - GHG emissions/removals by gas in the LULUCF sector for 1990-2022 using AR5 GWP (kt CO¬2¬ eq). Source: Malta National GHG Report

	CO_2	N_2O	CH_4
1990	-10.255	0.321	0.027
1995	-9.601	0.279	0.027
2000	-9.166	0.232	0.027
2005	-0.264	0.208	0.027
2010	13.855	0.134	-
2015	1.067	0.128	-
2020	7.955	0.588	-
2022	0.193	0.579	-

Malta has one of the lowest levels of forest coverage and an extensive anthropicization of the land with the only remaining forest remnants occurring in localized pockets, with four particular corpses of significant age. Given the total woodland area of Malta and the forest/woodland areas considered for the compilation of the category Forest Land, none of these woodland areas are utilised for logging. In Malta, there is no relevant harvest commercialized for material use, and the wood for material use is currently imported from other countries. The only mature woodland in Malta now is only present in Buskett – and thus contains a Special Area of Conservation (SAC) and Special Protection Area (SPA).

Methane emissions from Solid Waste Disposal and Wastewater categories

In Malta, Methane emissions account for 10% of total national GHG emissions – based on 2022 figures. Contributions by the respective GHG inventory sectors are presented and compared with 1990 and 2005 levels, for the main contributing sectors in Table 2.

Table 2 - GHG emissions sectoral shares. Source: CAA

	Sector share of total national CH4 emissions	Change in 2022 compared to 1990 levels	Change in 2022 compared to 2005 levels
Energy	1.1%	-49%	-46.4%
IPPU	0%	-	-
Agriculture	20.1%	-33.8%	-18.1%
LULUCF	0%	-	-
Waste	78.8%	+172.4%	-3.1%

In future, the key contributor towards a reduction in methane emissions is expected to be the Waste sector, primarily due to the diversion of waste form landfilling to the Waste-to-Energy Facility. The Wastewater category is also expected to contribute, assuming full (100%) wastewater treatment by 2030. In the Agriculture sector, the impact on methane emissions is practically nil; the main impact is expected to be in respect of nitrous oxide emissions.

ii. Where applicable, other national objectives and targets consistent with the Paris Agreement and the existing long-term strategies. Where applicable for the contribution to the overall Union commitment

of reducing the GHG emissions, other objectives and targets, including sector targets and adaptation goals, if available

Malta as party to the Paris agreement, and as contributor towards the collective effort of the EU towards the objectives of this Agreement, is committed towards the overarching global goal of limiting the increase in the global average temperature to well below 2°C above pre-industrial and pursue efforts to limit the temperature increase of 1.5°C above pre-industrial levels. Furthermore, it strives to achieve a balance between GHG emissions and removals in the second half of this century.

Within its LCDS, which was published in 2021, Malta sets out a framework and trajectory as well as policy priorities and mitigation measures that will enable to achieve a low-carbon economy by 2050.

The LCDS proposes a number of measures related to seven sectors; those of energy, transport, buildings, industry, waste, water and agriculture and land -use and land-use change and forestry (LULUCF). Such measures have been analysed, based on the macro-economic parameters of 2017, using marginal abatement cost curves and social and environmental impact assessments.

Given Malta's size and its geophysical and economical context, the LCDS is quite limited in comparison to other countries, since its characteristics reduce the number of recommended measures that can be used towards the reduction of carbon emissions. Malta's position in the Mediterranean as an island means that it is physically separated from Europe, and thus can only have connections through air or sea transport. Moreover, domestic measures which are linked to other countries emissions from cross border travel are not included within the LCDS.

Malta is also limited in its natural resources and relies heavily on imports where emissions fall with the country of origin. Malta faces a number of diseconomies of scale especially in the technology field, as most technologies require a high-level minimum efficient scale, a scale that is mostly unattainable for Malta. Moreover, limited land availability means that there is a limit of woodlands being used for natural carbon sequestration and certain mitigation measures such as large-scale onshore renewable farms, such as onshore wind farms cannot be implemented.

Furthermore, Malta's mild weather conditions means that there are comparatively lower heating requirements in buildings, and therefore there are lower emission reductions that can be obtained when compared to other countries. Hence, this means that due to its size, location and economic position, Malta remains one of the lowest emitters of GHGs per capita and per unit GDP in the EU. Such limitations mean that results of measures put forward for carbon saving will take longer to be seen than other countries. Malta is particularly vulnerable to the impacts of climate change, including by virtue of the same characteristics that limits its mitigation effort. All countries, and even more those in Malta's situation, should adopt adaptive measures to reduce negative climate change impacts, and thus Malta is also presenting a number of adaptation measures aimed at making Malta responsive and resilient to changes brought through climate change. Malta remains fully committed to its international and national objectives with regard to climate change mitigation This entails aligning strategies with evolving economic and societal dynamics, optimizing synergies, and enhancing the efficacy of emission reduction initiatives to navigate towards a sustainable future effectively.

Adaptation goals

Climate change poses significant risks to Malta, a small island nation with heightened vulnerabilities due to limited land area, reliance on coastal infrastructure, and dependence on sensitive economic activities like tourism and agriculture. Water scarcity, exacerbated by climate change, is a critical issue.

Since the preparation of the initial NECPs, the importance of climate adaptation has been increasingly recognised globally. In 2021, the Commission published a new EU strategy on adaptation to climate change[39] which underlined the importance of integrating climate resilience in national fiscal frameworks, and of nature-based solutions. The European Climate Law[40] stresses the importance of sectoral measures being resilient to the potential adverse impacts of climate change. This emphasis is being made internationally as well through Article 7 of the Paris Agreement which established 'The Global Goal on Adaptation (GGA). Furthermore, the UAE Framework for Global Climate Resilience, adopted at CMA 5, provides targets for adaptation actions, with a two-year UAE – Belém work programme focusing on developing indicators to measure progress towards these targets, a process Malta is currently following closely.

Malta's adaptation efforts are outlined in the Low Carbon Development Strategy (LCDS) section on climate adaptation which serves as an update of Malta's Adaptation Strategy. The LCDS's Climate Adaptation section revolves around 47 sector-specific measures addressing energy, transport, buildings, industry, waste, water, and agriculture. A key measure is the need to carry out a vulnerability risk assessment (VRA). The VRA provides a detailed analysis of sectoral vulnerabilities and adaptive capacities, guiding effective adaptation strategies. In this section a detailed analysis of Malta's adaptation goals, progress, and ongoing actions will be described.

The strategy outlines several adaptation priorities essential for addressing climate change impacts on the Maltese islands:

1. Water Resources: Malta faces water scarcity due to its semi-arid Mediterranean climate, limited rainfall, and reliance on groundwater, which is affected by nitrate pollution and seawater intrusion. Climate change exacerbates these issues with extreme storms and flash floods, reducing groundwater recharge and increasing runoff, leading to potential flooding and infrastructure damage.

2. Infrastructure and Transport: Malta's infrastructure, particularly its transport systems, is at risk from more intense and frequent extreme weather events like storms and high winds. As an island nation reliant on air and sea transport for supplies, disruptions can significantly impact food and resource security. Increased maintenance and resilience in infrastructure are necessary to cope

[39] European Commission (2021), Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN

[40] European Parliament and the Council of the European Union (2021), REGULATION (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119

with these challenges.

3. Land Use and Buildings: Adaptation measures are needed to address the impacts of changing climatic conditions on land use and building infrastructure, including managing risks related to soil erosion, landslides, and the stability of buildings and other structures.

4. Natural Ecosystems, Agriculture, and Fisheries: Malta's natural ecosystems and agricultural sectors are vulnerable to climate change. Changes in temperature and precipitation patterns can affect crop yields, fish populations, and overall ecosystem health, necessitating adaptive measures to protect these resources.

5. Health Issues and Civil Protection: The strategy acknowledges the potential health impacts of climate change, such as heat-related illnesses and the spread of vector-borne diseases. It also emphasizes the importance of civil protection measures to ensure public safety during extreme weather events and other climate-related emergencies.

6. Tourism: Given the significance of tourism to Malta's economy, the strategy highlights the need to adapt to climate change impacts that could affect tourist attractions and infrastructure. Ensuring the resilience of the tourism sector is vital for sustaining economic stability.

7. Cross-Sectoral: Recognizing that some adaptation measures have implications across multiple sectors, the strategy includes a cross-sectoral category to address risks and vulnerabilities that require coordinated efforts among different sectors.

The adaptation priorities are based on a vulnerability assessment and an impact-likelihood matrix, which evaluates the importance of climate change risks based on their potential impact and likelihood. This approach helps identify which risks need to be addressed first to enhance Malta's resilience to climate change.

Some of the adaptation actions put forward in the LCDS are discussed below, categorising measures by sector and advancement since the launch of the LCDS.

Completed Actions

a. Water Resource Measures
    I. A comprehensive study of the current hydrological cycle monitoring capacity and new hydrological data modelling and management. This measure involves a study which aims to better understand the hydrological cycle (e.g. rainfall, run-off, evaporation), while also analysing whether gaps in data collection exist currently. The study was done through the ‘Cohesion Fund Project’ which concluded in December 2023.

b. Cross Sectoral Measures
    I. Survey to gauge level of CC understanding in Malta. This measure includes a study to assess climate change concerns, perceived impacts, and awareness levels among the Maltese population aged 16 and over, based on telephone interviews with 600 individuals

conducted between March and May 2021. The study found that the top three environmental concerns among the Maltese population are air pollution (63.0%), construction (59.6%), and traffic congestion (59.0%). Concerns vary by age group and region, with younger individuals (16-25) most troubled by traffic congestion, while older individuals (66+) are more concerned about air pollution and construction. Regionally, Northern Harbour and Gozo and Comino residents worry most about construction, while Southeastern district residents are primarily concerned with air pollution. A significant portion of respondents (44.6%) attribute climate change to human activities affecting the global atmosphere, leading to rising sea levels, and shrinking glaciers. This view is especially prevalent among older respondents (66+), with 67.9% attributing climate change to global warming. Similar views are echoed by residents of Gozo and Comino and the Western district. The study also found that awareness of climate change varies across demographics. About 64.3% of respondents are familiar with the concept of a carbon footprint, with highest awareness among the 16-25 age group. However, only 5.4% have used a carbon footprint calculator. A large majority (87.2%) supports mandatory inclusion of climate change education in the national curriculum. Moderate awareness of the European Green Deal exists, with 36.0% having heard of it. Awareness is higher among females and younger age groups (16-25 and 26-35), suggesting younger generations are more attuned to international climate initiatives. This study highlights the diverse concerns, perceptions, and awareness levels regarding climate change among the Maltese population. Understanding these demographic differences enables policymakers and educators to enhance public engagement and foster a more informed and responsive society, crucial for shaping effective and inclusive environmental policies in Malta.

Ongoing Actions

a. Water Resources Measures

I. Surveying and managing existing rainwater harvesting infrastructure. This measure includes surveys of the status of existing relevant infrastructure (e.g. public reservoirs, wells), including the identification of the potential users of such rainwater. This is being done through Alteraqua Project. Which allowed EWA to pilot the rehabilitation of specific reservoirs in Kottonera.

II. Further enforcement of legislation mandating rainwater capture reservoirs or wells. This measure involves the assurance that all new developments are provided with a water reservoir which is connected to a pump connected to a second-class distribution system, enabling each dwelling to store and re-use its rainwater run-off from its own built-up area.

III. Studies to identify new areas for water catchment infrastructure. This study set to identify areas where reservoirs and retention systems can be developed (preferably located within the urban context and within existing committed road network infrastructure) to increase the local water storage capacity, collect water run-off and decrease flooding, whilst creating an additional water supply. At this stage, preliminary consultations together with the Lands Authority are in the process to identify new reservoirs and retention systems that can be developed within Urban Areas. Moreover, amid 2020/2021 a new underground soakaway with a capacity of 11,000 cum was constructed by PWD as part of the upgrading of the Mqabba Square. A manual and a policy Guidance document for Green Infrastructure is

being drafted by PWD as part of the LIFE Rainwater Basin Management Plan. Moreover, works in relation to the implementation of 5 pilot projects to demonstrate the effectiveness of Green Infrastructure in dealing with surface water runoff are also being carried out by the PWD as part of an EU Life Project in preparation of the 3rd River Basin Management Plan. The water courses will be cleaned and restored to improve stormwater infiltration and storage and Sustainable Urban Drainage Systems will be installed in the play areas. This pilot project has a financial commitment of €2.3 million of which 80% is EU-Funded.

b. Infrastructure and Transport Measures

I. Energy Efficiency Standards (infrastructure). This measure involves supporting EE standards for infrastructure, through both legislation and economic incentives. The Minimum Energy Performance Requirements for new and renovated buildings are being updated in accordance with the Energy Performance of Buildings Directive (10/31EU and 844/18 EU), replacing those enforced since 2016 under Legal Notice 434/2015. These updates follow extensive studies mandated by the EU directives and are divided into three parts. Part 1 and Part 2 pertain to dwellings and non-dwellings, respectively, focusing on overall energy performance and the integration of renewable energy sources. Part 3 outlines requirements for technical systems within buildings, addressing the energy efficiency of heating, cooling, domestic hot water, and lighting systems. The document emphasizes energy adaptation through enhanced Energy Efficiency (EE) standards for infrastructure, supported by both legislation and economic incentives. For dwellings, it mandates maximum whole-building energy performance and specifies minimum performance levels for building elements, including thermal transmittance limits for opaque and glazed elements, solar gains, and shading factors. It also requires the integration of on-site renewable energy systems such as solar photovoltaic systems and heat pumps to reduce overall primary energy demand. For non-dwellings, the document sets similar requirements, ensuring energy performance limits and promoting renewable energy generation. It includes provisions for on-site energy generation to cover a portion of annual primary energy consumption, leveraging systems like solar photovoltaic panels and geothermal systems. Additionally, new buildings must incorporate rainwater collection and reuse systems, and renovated buildings must utilize existing water reservoirs. Overall, these measures aim to achieve nearly zero energy buildings by reducing energy consumption and enhancing the use of renewable energy sources, thus contributing to both mitigation and adaptation strategies against climate change.

II. Study on green infrastructure in Malta. A study is underway to identify green features and integrate infrastructure in urban areas, including ports, for sustainability. The Intelligent Planning Consultative Forum is involved in assessing scenarios for success. The Public Works Department is drafting a manual and policy guidance for Green Infrastructure as part of the LIFE Rainwater Basin Management Plan. Additionally, the department is implementing five pilot projects, largely EU funded, to demonstrate the effectiveness of Green Infrastructure in managing surface water runoff. These projects aim to improve stormwater infiltration and storage, contributing to sustainable urban development efforts.

III. Identify and screen critical risks and concerns for i) the aviation sector and airports; ii) maritime sector and ports.

IV. Introduce maritime weather stations in ports to record trends of major parameter. This measure involves the development of port weather stations and data collection buoys to collect information in relation to the major sea climate parameters, such as sea temperature, sea level rise and wave strength.

c. Land use and Buildings Measures

I. Identify high risk/vulnerability areas in Malta and apply appropriate treatment. To fulfil this measure a number of research projects were initiated to tackle risk and vulnerability. The Vulnerability Risk Assessment (VRA) and Coastal SAGE projects aim to evaluate climate risks and address coastal erosion in Malta. VRA assesses national climate risks to economic sectors (which will be discussed below in further detail), while Coastal SAGE utilizes SAR and deep learning techniques to monitor coastal erosion. The C-COVER project, funded by the EC, aims to develop a sustainable coastal protection management system to mitigate global warming impacts. It includes policy prioritization, risk assessment, and stakeholder engagement, led by EUCC and supported by international experts.

d. Natural Ecosystems, Agriculture and Fisheries Measures

I. Implement good sustainable farming practices (e.g. wind curbing, soil conservation techniques, cultivation methods). This measure involves the Implementation (through research and experimentation) of wind curbing and soil conservation techniques (e.g. rubble walls) that are suitable for local climatic conditions, including the protection of green water. While also, carry out research and experimentation on new crops that require less water and fertilizer requirements, and which have a higher economic return.

II. Implementation of the National Strategy on Invasive Alien Species and promotion of complementing, sector-specific Codes of Best Practice.

e. Tourism Measures

I. Increase awareness of CC effects within the hospitality industry. This is being done by carrying out a tailored awareness program, directed specifically at informing industry operators, on the potential CC effects on operations and solutions to the problem (e.g. sustainable/ eco-tourism practices). Through this knowledge sharing, the market will be better equipped to respond to such changes. The Tourism Strategy to 2030 gives due recognition to this through two specific Strategies, namely Strategy 10 and Strategy 11, described hereunder which deal directly with addressing Climate Change from the Tourism Perspective. Strategy 10 To give due recognition to the detrimental effects which unchecked climate change and global warming are bound to have on the country's tourism appeal and to engage in a national and global effort aimed at achieving Climate Friendly Travel by 2050. Strategy 11 To introduce a set of measurable climate and sustainability indicators to properly measure tourism impacts on the environment to ensure that future tourism development embraces sustainable parameters within the widest possible range of measurable variables. Beyond this, further discussions are being held regarding how climate change effects the tourism industry, and possible adaptation and mitigation strategies to counter act these effects.

f. Cross Sectoral Measures
   I. Update policies with CC considerations.
   II. Joint initiatives between MCST and Ministry responsible for climate action. This measure aims to further push research and innovation within climate change.
   III. Create an 'online community' where entities can share their knowledge on CC as well as possible adaptation measures.
   IV. Carry out vulnerability assessments to identify where the greatest efforts should be made in terms of adaptation. The Vulnerability Risk Assessment (VRA) and Coastal SAGE projects aim to evaluate climate risks and address coastal erosion in Malta. The VRA assesses national climate risks to economic sectors (this assessment will be discussed in greater details below), while Coastal SAGE utilizes SAR and deep learning techniques to monitor coastal erosion. The C-COVER project, funded by the EC, aims to develop a sustainable coastal protection management system to mitigate global warming impacts. It includes policy prioritization, risk assessment, and stakeholder engagement, led by EUCC and supported by international experts. The total cost is €637,500, with VRA funded nationally and C-COVER funded by the EU.

Within it, the LCDS mandates the creation of a 'Vulnerability Risk Assessment' (VRA). The VRA aimed at creating a tool for policymakers, has been in development for the past three years., One dimension of the VRA found in Phase I of the project is the impact chain assessment. The objectives of this impact chain assessment are to firstly identify climate impacts on the Maltese Islands, summarize climate change scenarios, describe climate impact chains for sectors, consider indirect sensitivities between sectors, and present ratings on potential climate impacts.

The methodology of the VRA Phase I assessment was conducted at a sectoral level, focusing on NACE Level 2 sectors. Each sector was broken down by asset type to understand how climate change could impact it. Only the most important assets, as determined by expert judgment, were identified for each asset type. The process involved:

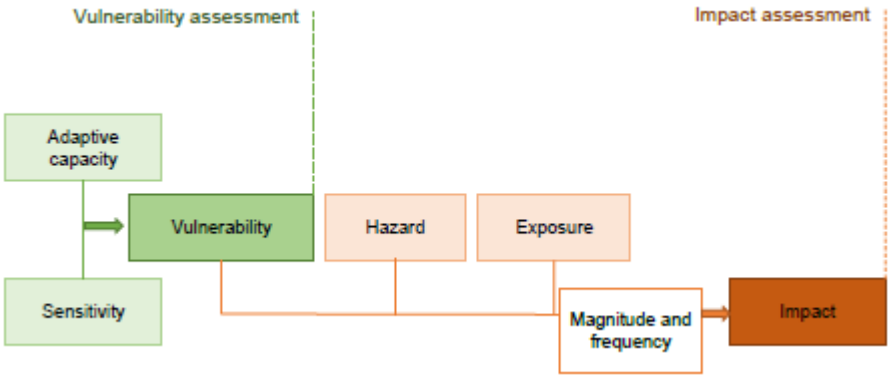
- Assessing each sector's current sensitivity to climate-related hazards: The sensitivity of each sector indicates its potential to be affected by the variability of climate-related hazards, either directly or indirectly because of other sectors. The assessment referred to the list of climate-related hazards from IPCC AR6, where they are termed "climate-impact drivers," using those relevant to Malta for this assessment.
- Evaluating each sector's current adaptive capacity: Each sector's adaptive capacity was assessed at the sectoral level in relation to the sensitivities identified. Identification of the capacity of a sector to adapt to sensitivities focused on elements like economic resources, institutions, technology, information and skills, infrastructure, and equity.
- Deducing the vulnerability of each sector: Through the assessment of each sector's sensitivity and adaptive capacity, the vulnerability of each sector was deduced. Vulnerability here is thus the propensity or predisposition to be adversely affected by climate change, encompassing sensitivity or susceptibility to harm and lack of capacity to cope and adapt.
- Identifying projections of climate-related hazards for all SSPs and timeframes: Assessing the magnitude and frequency of these hazards, taken from the IPCC AR6 and tailored to the

local context. This involved extensive desktop research and reviewing over 200 sources of data.

- Assessing sectors' exposure to climate-related hazards: Impacts on Maltese sectors may occur if vulnerable assets are exposed to projected climate-related hazards. The potential level of exposure was assessed and rated based on the location and extent of assets exposed.

All these components allowed for an impact assessment to be carried out. Climate impact is thus a product of vulnerability and exposure to a hazard. Vulnerability results from sensitivity and an associated lack of adaptive capacity. This is shown clearly through the below figure.

Figure 9 - Interactions of Module 1 Components



Adding to this, each sector was assigned a rating from one to five at each step, indicating its sensitivity, adaptive capacity, hazard magnitude and frequency, impact, and exposure. These ratings were used to define:

A. The current level of vulnerability of NACE Level 2 sectors.
B. The exposure of NACE Level 2 sectors to hazards given their magnitude and frequency.
C. The potential level of impact on NACE Level 2 sectors.

Another initiative currently ongoing locally is the 'Island for Islands Initiative'. Malta's 'Island for Islands Initiative' was launched in November 2021 with the aim of supporting small Island states and in particular, Small Island Developing States (SIDS) in tackling, among others, the unique challenges that climate change presents through the sharing of information, lessons learnt, technical know-how and best practices. This initiative aims to identify Malta as a leading SIDS and small island state partner within the EU and within other multilateral fora such as the UN, the Commonwealth, AOSIS, OACPS, OECS, the Archipelagic and Islands (AIS) Forum and IRENA, through the IRENA SIDS Lighthouses Initiative. Through the Commonwealth Small States Centre of Excellence based in Malta, Malta has been organising a series of capacity building webinars for SIDS officials in various topics related to climate change. Within the Commonwealth, Malta is leading the Water Management action group of

the Living Lands Charter which helps developing countries including SIDS safeguard global land resources. Malta also consistently holds focused side events on matters of relevance to SIDS at major international conferences such as UNFCCC COP meetings which serve to share experiences and offer scalable solutions to SIDS facing green transition and climate resilience challenges. Malta is currently undertaking a project with the OACPS and the University of Malta's Islands and Small States Institute focused on climate vulnerabilities and resilience, which is a primary concern for small island states and small island developing states. Through bilateral cooperation projects funded though Malta's ODA, Malta is currently assisting Antigua and Barbuda on small island water management systems.

Malta has been awarding scholarships at Master and PhD levels specifically to nationals of ODA-eligible SIDS since 2021 through a partnership between the Ministry for Foreign and European Affairs and Trade and the University of Malta's Islands and Small State Institute. Between 2021 and 2023, 6 scholarships for studies at Masters level were awarded to nationals from Fiji, Mauritius, Grenada, Niue, St Vincent and the Grenadines and Jamaica, while 1 national from Belize was awarded a scholarship to pursue studies at PhD level. These scholarships covered research on matters related to climate change. This scholarship partnership was awarded the 2023 UN SIDS Partnership Award in the 'Social' category. The next three-year programming period will provide for 2 PhD scholarships and 9 Master scholarships.

Carbon Capture and Storage

The emphasis on the pivotal role of carbon capture in the Industrial Carbon Management communication is acknowledged, including the call for a unified and thorough policy and investment framework to address all facets of industrial carbon management. This framework is instrumental in aiding the reduction of emissions that are difficult to mitigate and in pursuing negative emissions post-2050. However, Malta has expressed reservations about the potential diversion of focus from advancing cleaner technologies and energy sources due to the heightened emphasis on Carbon Capture and Storage (CCS). From the perspective of Malta's climate strategy perspective, the Low Carbon Development Strategy does not foresee the widespread adoption of carbon capture, largely due to the country's geographical constraints.

In 2021, the Continental Shelf Department commissioned a high-level study to evaluate the feasibility of geologically storing carbon dioxide off Malta's coast. The findings revealed the existence of possible storage sites but also highlighted significant geological uncertainties and risks. It is important to note that most carbon dioxide storage sites in Europe are depleted hydrocarbon fields, which Malta lacks. Consequently, Malta advocates for the European Union to adopt a flexible approach to CCS initiatives, considering the unique geological conditions and risks of each member state.

Geological storage of carbon dioxide demands a thorough understanding of the geological structures, including the reservoir rock and its cap, to ensure secure containment of the injected carbon dioxide. Such knowledge typically comes from years of exploiting a reservoir, during which extensive information about fluid dynamics and geological formations is gathered. Geophysical surveys and tests are conducted to determine the extent of the reservoir, the integrity of the sealing formations, and the properties of both the reservoir and its cap. Drilling multiple wells also contributes to this knowledge base. Undertaking carbon dioxide storage without such detailed understanding, especially

in member states like Malta where it is lacking, would require significant investment to explore potential sites with the risk of them proving unsuitable.

While Malta does not possess depleted oil and gas fields suitable for carbon dioxide storage, the country is willing to facilitate exploration by providing geological data to qualified companies interested in evaluating the potential for carbon dioxide storage sites in Malta. The EU should consider the geological limitations of different Member States, allowing them the flexibility to choose the most suitable carbon management strategies for their territories.

Furthermore, the de-risking of potential geological storage sites demands substantial investment, potentially running into millions of euros, to prevent leakage. This exploratory risk should primarily be shouldered by the private sector, with the government creating an administrative and fiscal environment that encourages such investments, possibly supported by EU funding. Given these risks, it is crucial to explore alternatives to geological storage within the territories of individual member states and to concurrently develop more cost-effective carbon dioxide infrastructure.

Circular Economy

The Ministry for the Environment, Energy and Public Cleanliness (MEEC) published Malta's strategy with respect to the vision for the circular economy[41] until 2030. The circular economy necessitates a complete re-evaluation of product lifecycle processes, from design and manufacturing to repair, maintenance, and ultimately, the collection and recycling or reuse of materials. Waste at the end of a product's life is no longer viewed as merely disposable, but rather as a valuable resource that can be reintegrated into the production of new products.

The priorities outlined in this strategy include:

1. Implementing policies and infrastructure upgrades to bolster the segregation of waste at the source, ensuring it is directed to high-quality treatment facilities. These measures aim to minimise waste mismanagement, such as exporting, landfilling, or incineration, by enforcing regulations that guarantee consistent access to particular waste streams, exemplified by bottle deposit programs.
2. Enacting regulations that mandate product designs conducive to reuse and repair, thereby prolonging their lifespan. These regulations also support end-of-life product management strategies that favour recycling.
3. Establishing regulations that recognise and capitalise on the economic worth of resources contained within products, or that achieve attainable recovery rates through technical means.
4. Introducing policies that stimulate the demand for recycled materials or foster the creation of markets for secondary raw materials.

[41] Ministry for the Environment, Sustainable Development and Climate Change (2021), Towards a Circular Economy 2020-2030. Available at: https://www.cemalta.gov.mt/wp-content/uploads/2021/09/email-version-fin..pdf

Biodiversity

In 2023, the Environment & Resources Authority (ERA) published a draft National Biodiversity Strategy and Action Plan for public consultation[42]. The strategy is guided by the overarching goal outlined in the National Strategy for the Environment, which aims to ensure that Malta's biodiversity is appreciated, protected, rejuvenated, and utilised in a way that benefits the environment, society, and climate, as stated by the authority.

This Action Plan intensifies national initiatives to set Malta's biodiversity on a trajectory towards restoration. It will serve as a roadmap for crafting targeted policies and measures at the national level, creating a strategic framework that supports Malta in progressively meeting its environmental targets by 2050.

The Action Plan pinpoints five key policy areas requiring intervention:

1. The conservation and restoration of nature;
2. Tackling the root causes of biodiversity depletion;
3. Sustainable use of biodiversity;
4. Mainstreaming and awareness-raising; and
5. Improving implementation and cooperation.

Air pollution

The National Air Pollution Control Programme (NAPCP)[43] guides the Maltese government in developing domestic strategies and actions with the goal of curbing the annual anthropogenic emissions of the following five pollutants: nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOCs), sulfur dioxide (SO2), ammonia (NH3), and fine particulate matter (PM2.5). The NAPCP is designed to meet the national emission reduction targets set for 2020 and 2030, contributing to the attainment of air quality standards and ensuring alignment with other pertinent strategies and initiatives in sectors such as climate, energy, agriculture, industry, and transportation.

Noise

The Environmental Noise Directive (END, Directive 2002/49/EC) mandates that Member States formulate action plans to tackle noise-related issues and their impacts, which may include measures for noise abatement along major transportation routes and within urban areas.

In line with this directive, the revised Noise Action Plan (NAP)[44] for Malta aims to manage environmental noise stemming from transportation sources such as roads and aviation, as well as industrial noise, with a particular focus on Major Roads throughout the Maltese archipelago. The NAP outlines the regulatory requirements and duties, summarises the findings from strategic noise

[42] Environment & Resources Authority (2023), National Biodiversity Strategy and Action Plan to 2030. Available at: https://era.org.mt/wp-content/uploads/2023/02/NBSAP-public-consultation-draft-19.01.23.pdf

[43] Environment Resource Authority (2020), Malta's National Air Pollution Control Programme. Available at: https://era.org.mt/wp-content/uploads/2021/04/NAPCP.pdf

[44] Environment Resource Authority (2019), Nosie Action Plan Malta Agglomeration 2019-2024. Available at: https://era.org.mt/wp-content/uploads/2023/12/Noise-Action-Plan-Agglomeration-Interactive.pdf

mapping, and details the initiatives that relevant authorities plan to implement over the next five years. It is important to distinguish between noise as a general annoyance and environmental noise pollution, with the latter being defined as prolonged exposure to noise levels that exceed established thresholds and cause harm to the environment.

The goals of the Noise Action Plan include establishing a long-term strategy to prevent and mitigate environmental noise where necessary, especially in cases where noise levels may have detrimental effects on human health, and to maintain areas where the environmental noise quality is currently satisfactory. The plan also involves a systematic assessment of existing environmental noise levels from various sources to identify priority areas for intervention and aims to protect areas of relative tranquillity in urban centres and the countryside by recognising and designating such zones.

Environment

ERA published a draft for public consultation of the National Strategy for the Environment 2050[45], in 2022 with the consultation closing in October of the same year. This strategy establishes a comprehensive policy framework for Malta's environment until 2050, providing long-term goals and detailing the strategic objectives that will guide the achievement of these ambitions. The National Strategy for the Environment, as required by Article 45 of the Environment Protection Act (Cap. 549), embodies this vision and sets forth a strategic policy direction for Malta's environment.

The NSE is structured around eight fundamental components, known as Strategic Goals, which serve as the foundation of the strategy:

1. Clean air for wellbeing, healthy humans and thriving nature;
2. A quality environment for liveable towns and villages, conducive to healthy living;
3. Biodiversity valued, conserved, restored and sustainably used for the benefit of our nature, people and climate;
4. Responsible and efficient resource use that reflects the value of raw and waste materials in support of zero waste to landfill;
5. Land resources managed to sustain natural functions and increase resilience to climate change;
6. Ecologically diverse, healthy and productive marine waters, capable of supporting sustainable growth;
7. Sustainable water resources that ensure long-term use and support water-dependent ecosystems; and
8. Enabling and empowering the required green transition

[45]Environment Resource Authority (2022), National Strategy for the Environment 2050. Available at: https://era.org.mt/wp-content/uploads/2022/09/National-Strategy-for-the-Environment-2050-%E2%80%93-Public-Consultation-Draft.pdf

2.1.2 Renewable Energy

Directive (EU) 2018/2001 as regards the promotion of energy from renewable sources was revised in 2023 by Directive (EU) 2023/2413 to reflect the higher ambition of the Fit-for-55 package, Article 3 of the revised Renewable Energy Directive (RED) requires Member States to collectively ensure that the share of energy from renewable sources in the Union's gross final consumption of energy in 2030 is at least 42.5%. Furthermore, Member States shall collectively endeavour to increase this share to 45%.

The RED puts in place sector-specific targets for renewables in buildings, industry, heating and cooling and transport. These are as follows:

- Buildings: Article 15a of the RED puts forward an indicative target of at least 49% renewable energy share in buildings in 2030.
- Industry: Article 22a of the RED stipulates an indicative increase in the renewable energy share in the industry sector of 1.6% calculated as an annual average over two intervals – 2021 to 2025 and 2026 to 2030. Furthermore, Member States shall ensure that the contribution of RFNBOs for final energy and non-energy purposes shall be at least 42% of the hydrogen used in industry by 2030 and 60% by 2035.
- Heating and cooling: Article 23a of the RED mandates Member States to achieve a RES share in heating and cooling of 0.8% and 1.1%, calculated as an annual average increase over the periods 2021 to 2025, and 2026 to 2030, respectively.
- Transport: Article 25 of the RED puts forward an increase of renewable energy and reduction of greenhouse gas intensity in the transport sector, where each Member State is to set an obligation on fuel suppliers ensuring that the amount of renewable energy within the final consumption of energy in the transport sector is at least 29% by 2030, or a greenhouse gas intensity reduction of at least 14.5% by 2030, when compared to the baseline set out in Article 27(1). Furthermore, Each Member State shall reach a combined share of advanced biofuels and biogas and renewable fuels of non-biological origin (RFNBOs) of at least 1% in 2025 and 5.5% in 2030, of which at least 1% are RFNBOs in 2030. Member States with maritime ports shall endeavour to ensure that as of 2030 the share of RFNBOs in the total amount of energy supplied to the transport sector is at least 1.2%.

Relevant circumstances affecting renewable energy deployment (Article 5(1)(e))

In recent years, Malta has experienced remarkable growth in population and GDP. With an estimated population of 563,000 in 2023, the country has seen an annual increase of over 10 thousand inhabitants since 2011[46]. Notably, Malta has the highest population density in the EU[47]. It is projected

[46] NSO (2024), World Population Day: 11 July 2024. Available at: https://nso.gov.mt/world-population-day-11-july2024/#:~:text=The%20estimated%20total%20population%20of,compared%20to%20the%20previous%20year.

[47] Eurostat (2024), Population density by NUTS 3 region. Available at: https://ec.europa.eu/eurostat/databrowser/view/demo_r_d3dens/default/table?lang=en&category=demo.demo_ind

that the population will exceed 600,000 by 2030[48]. The country has also undergone a period of significant economic growth, reaching its peak in 2017. Despite a decrease of 8.2% in 2020 due to the COVID-19 pandemic, figures for 2023 show that GDP has risen by 5.6%. The economy is expected to continue growing, albeit at a slower pace.

Malta faces various challenges in maximizing its potential for renewable energy. Physical and spatial limitations (leading to high cost of land), technology readiness, and resource potential are the main factors influencing the deployment of renewable energy sources. Due to its geology and topology, the production of hydro and geothermal energy is deemed not viable in Malta, as the highest point on the island is only 253 meters above sea level, and there is no significant thermal gradient or water bodies. Additionally, wave energy production is still in the research stage. The scarcity of fresh water and agricultural land also limits the feasibility of biomass production. Although conventional wind technology is considered largely incompatible with Malta's local context, as already highlighted in the 2019 NECP, recent technological advancements have created new opportunities for offshore renewables, particularly wind.

Solar Photovoltaics (PV)

In Malta's first NECP (2019), solar energy was identified as the most predominant and most viable renewable energy resource in Malta to date. Testament to this are the numerous installations of solar and PV technologies which have significantly contributed to the local uptake of renewables.

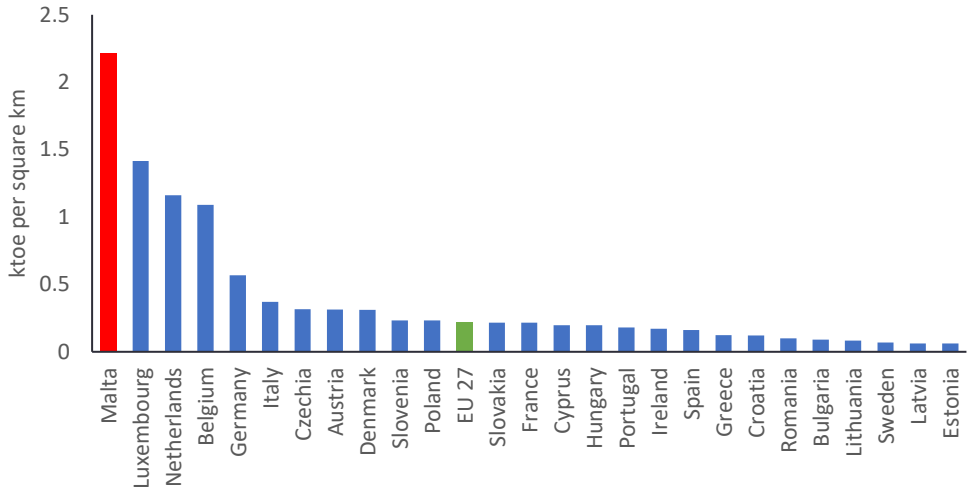
By the end of2023, the cumulative installed PV capacity exceeded 241MWp[49]. This figure now exceeds both the capacity of the existing interconnector and that of the D4 generating plant at Delimara, albeit operating at a much lower capacity factor. Considering this context, the Maltese Government committed to install and commission a second interconnector to assist with grid stability in view of the intermittent nature of PV generation.

Malta's efforts to meet its renewable energy target must also be framed within the context of having to rely on land intensive renewable energy sources such as PV. Figure 10 highlights how, the energy consumption per square km is the highest among EU Member States. It follows that to achieve the same share of renewables, the amount of renewable energy which needs to be extracted per unit of area is much higher in the case of Malta. This is particularly relevant for land intensive renewables such as PV.

[48] This is based on national projections

[49] NSO (2024), Renewable Energy from Photovoltaic Panels (PVs): 2023. Available at: NSO Malta | Renewable Energy from Photovoltaic Panels (PVs): 2023 - NSO Malta (gov.mt)

Figure 10 - 2022 Final Energy Consumption per square kilometre (ktoe)[50]



Onshore future PV deployment will largely remain most suitable for rooftops within the residential, commercial and industrial sectors, as well as for a limited amount of potential ground-mounted systems. The total area of the Maltese islands (316km^2), coupled with a high population density, largely restricts the availability of green field sites.

The Solar Farms Policy (published in 2017)[6] was designed to take full advantage of brownfield sites such as car parks, industrial rooftops, disused quarries and landfills. The policy provides guidance for the location of new solar farms and identifies environmentally-relevant specifications that need to be integrated into solar farm development. Furthermore, following the completion of the plan-level Appropriate Assessment and Strategic Environmental Assessment (SEA) procedure in April 2021, proposals for the development of solar farm installations in quarries which are located within, or partly within or adjacent to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) will be subject to the requirements of the solar farm policy and in addition will be assessed in more detail on a case-by case basis[51], in accordance with the findings and recommendations of the Appropriate Assessment (AA) and the Strategic Environment Assessment (SEA) that address these locations. Nevertheless, high land costs for such sites, driven by increasing land scarcity, together with significant grid connection costs are impacting the financial viability of solar farms.

In order to address these barriers, Government has identified clusters of potential sites (mainly quarries) which could benefit from a common grid re-enforcement. Funds from the RRP have been allocated for this purpose and through investments in the grid, distribution services and battery

[50] Calculation based on Eurostat (2024), Area by NUTS 3 region. Available at: https://ec.europa.eu/eurostat/databrowser/view/reg_area3__custom_12751073/default/table?lang=en and Eurostat (2024), Complete energy balances. Available at: https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_C__custom_12751020/default/table?lang=en

[51] Planning Authority (2021), Solar Farms Policy. Available at: https://www.pa.org.mt/file.aspx?f=BF118FF0729BBDC2DEB7A21873465DD7D6C445EFB153498A

storage, the electricity distribution network will be upgraded to facilitate additional integration of renewable energy sources[52].

The solar farm policy also permits the installation of PV on greenhouses provided these are not sited in sensitive areas and are genuinely intended to support the agricultural activity. The Government intends to reform the permitting framework for renewable energy projects, including that for the installation of PVs on greenhouses to shorten the timelines for the application and permit-granting procedures. Solar panels installed on greenhouses serve two functions: they produce energy and promote sustainable farming practices. These panels blend effortlessly into the agricultural environment, utilising solar energy to boost plant growth and enhance the financial viability of farms. This innovative fusion of energy generation with agricultural advantages positions solar panels on greenhouses as a unique and beneficial investment. Agrivoltaic investments should prioritize agricultural productivity, with energy generation as a secondary benefit. Consequently, the design of greenhouses should aim to maximize crop yields beyond what is achievable in open fields. In this context, several government ministries and entities are in advanced stages of formulating policies to facilitate these types of investments, while simultaneously implementing adequate measures to protect agricultural production.

In 2018, a high-level assessment of Malta's technical potential for solar PV was conducted by the Energy & Water Agency. In 2021, the Energy and Water Agency initiated a collaborative research project with the University of Malta to more accurately estimate the PV rooftop potential in urban areas. The project proposes a refined methodology and approach for the calculation of the PV potential using refined Geographic Information System (GIS) and Artificial Intelligence (AI) methods and uses the Digital Surface Model captured by the Planning Authority in 2018. Whilst the project is still ongoing, the results are expected to provide a more accurate update of the rooftop potential as the whole urban landscape is being analysed, and considerations like shadowing effects and the amount of solar irradiance are being considered as part of the development of this approach.

Further to the results of this assessment, other aspects, such as the type of dwelling hosting the PV panels are important elements that need to be taken into consideration. Rooftops in Malta accommodate water tanks, TV antennae/aerials, outdoor units of air-conditioning systems, and other building services equipment. Some roof areas are also used for natural drying and airing of clothes and as a place for family leisure. Furthermore, apartments are the most popular choice for new residential developments representing over 85% of the new dwelling approvals issued by the Planning Authority in recent years[53]. This trend is projected to be sustained over the next decade in view of projected net immigration and population growth. This has a twofold effect: an increase in the depth of shadows cast on neighbouring buildings, and an increase in PV investor uncertainty, wary of possible overshadowing within the useful lifetime of the PV system. In view of these challenges, the Government of Malta has committed to introduce legislative instruments to oblige the installation of Solar Panels on New Buildings reaching maximum height limitations as per the established local plans.

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[52] European Commission (n.d.), Malta's recovery and resilience plan. Available at: https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/country-pages/maltas-recovery-and-resilience-plan_en

[53] Planning Authority (n.d.), Dwelling Unit Approvals for 2000-2021 – PA. Available at: https://www.pa.org.mt/file.aspx?f=35409

This initiative is part of a broader strategy to increase the use of renewable energy sources and ensure sustainable urban development. For buildings that may be shadowed or have design limitations, alternative measures such as mandatory contributions to a central renewable energy fund or investment in off-site renewable energy sources are being proposed.

Wind Energy

With the technological advancements in recent years, wind energy has become globally accepted as one of the most developed, cost effective and well proven renewable energy technologies to meet the ever-increasing demands in a sustainable manner. The EU Commission in fact predicts that wind will amount to half of Europe's electricity production by 2050[54].

At the time of the first NECP in 2019, mature conventional technologies, namely onshore turbines and fixed-bottom offshore turbines, were reported to have significant restrictions in the local context, encompassing technical, social and environmental constraints.

For onshore wind, the inhibiting factors existing at the time are still there, if not exacerbated, mainly due to the limited availability of land for such projects. Onshore installations also have some planning constraints such as the potential interference with the safety of airport operations as well as the significant negative visual impact, proximity to densely inhabited areas, and impacts on protected bird colonies and bats. Similar restrictive statements can be quoted for the possibilities of fixed-bottom near-shore wind turbines. The limited coastal and reef locations with depths less than 50m constituting potential areas for the development of fixed bottom wind farms, were, and still are, burdened with significant environmental and economic concerns.

This leaves the option of floating wind generation as the most appropriate technical option for offshore renewable generation in the Maltese Islands. Significant technological advances in offshore wind floating technologies have now opened a possible local alternative for feasible offshore renewable projects located further away from the coast. These floating projects offer several advantages, including reduced environmental impact and potentially minimised interference with various economic activities that rely on the same areas. Larger offshore wind structures capable of capturing higher wind speeds and advances in floating technologies lead to lower Levelised Cost of Energy (LCOE). This is also expected to benefit from economies of scale in production as the pipeline of projects for floating offshore wind start being rolled out. This positions offshore floating wind as a reasonable option for harnessing renewable energy in Malta. To note that recently the offshore wind industry has been impacted by macroeconomic trends, such as supply chain bottlenecks, which have caused delays in project realizations globally. Vulnerability is largely due to the industry's exposure to

[54] WindEurope (2024), Wind energy today. Available at: https://windeurope.org/about-wind/wind-energy-today/

material costs. Developers have seen LCOE increases of around 40-60% compared to 2020. Therefore, the increasing number of projects can also have a negative impact on price and deployment[55].

The Maltese Government's commitment to advancing offshore wind floating opportunities is a key component of its Low Carbon Development Strategy (LCDS). In alignment with this strategic direction, the focus is now on harnessing Malta's offshore renewable potential. The country has committed to a progressive vision for offshore renewable energy generation, aiming for a capacity of 350MW by 2050, as part of a non-binding agreement under the TEN-E Regulation.

To translate this vision into actionable steps, the government initiated a preliminary market consultation (PMC) in May 2022. This consultation serves as a foundational move to engage stakeholders, align market capabilities with the government's renewable energy targets, and ensure that the ambitious goals set forth in the LCDS are met through collaborative and informed planning.

The PMC sought proposals of economic activities within Malta's Exclusive Economic Zone (EEZ). The purpose of this PMC was to invite internationally reputable companies to propose economic activities that can be carried out in an EEZ area beyond the territorial waters of Malta, in line with the rights provided under the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and the Malta EEZ Act, so that Government could gauge the interest of investors in Malta's offshore opportunities and gain knowledge of the possible activities that companies are willing to invest in. Fifteen of the proposals that were submitted from the private sector target the development of offshore wind farms within Malta's continental shelf[56].

In October 2024, the government launched a National Policy for the Deployment of Offshore Renewable Energy[57]. The strategy aims to harness the untapped offshore resources of the Mediterranean. The strategy outlines a robust framework that fosters investment in renewable energy, guides potential investors to efficient renewable technologies, enhances research, development, and innovation, and ensures offshore resources bolster the nation's energy independence. Further information is provided in Section 3.1.2.

Based on a preliminary consultation with the main stakeholders, and an assessment of the bathymetry, wind resource, technology constraints, marine traffic and other environmental constraints, six zones were identified for possible siting of large scale offshore renewables. Certain areas with high degree of risk significance, such as those close to airport and harbour approaches or with high traffic density, have been identified as No-Go areas. The pre-defined zones are intended to guide prospective project developers, however, project proponents will remain responsible for carrying out all relevant studies to assess the severity of any impacts on competing uses and the environment.

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[55] McKinsey & Company (2024), Offshore wind: Strategies for uncertain times. Available at: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/offshore-wind-strategies-for-uncertain-times

[56] Business Today (2023), Harnessing the wind: clean energy and strategic autonomy. Available at: https://www.businesstoday.com.mt/people/people/2364/harnessing_the_wind_clean_energy_and_strategic_autonomy

[57] Energy Water Agency (2024), National Policy for the Deployment of Offshore Renewable Energy. Available at: https://energywateragency.gov.mt/wp-content/uploads/2024/10/MEE-National-Policy-23_-DIGITAL-_final-5.pdf

The National Policy was subjected to a Strategic Environmental Assessment (SEA). In March 2024, the Ministry for the Environment, Energy and Public Cleanliness (MEEC) issued for public consultation an Environment Report on the National Policy. The National Offshore Policy was officially launched and adopted in October 2024.

The Government intends to publish a Pre-Qualification Questionnaire for the development of offshore renewable energy within part or parts of the zones identified within the Policy for Offshore RES. The questionnaire will aim to evaluate the technical and financial capabilities of interested economic operators before proceeding to the more advanced stages of project development. Short-listed candidates will be invited to participate in the Invitation to Participate in Dialogue (ITPD) stage.

It will be the responsibility of the single point of contact to undertake the procedure, acting independently or involving other administrative authorities in the process, improving overall efficiency[58]. Moreover, Member States are to ensure that both applicants as well as the general public have easy access to simple procedures, to allow for the settlement of disputes which concern the permit-granting procedure and issuance of permits to build and operate renewable energy plants.

Malta has also made progress on gauging the market readiness for nearshore floating solar technology projects, specifically floating PV farms. In view of this, the Government has launched a Preliminary Market Consultation (PMC), the aim of which is to solicit proposals from operators for the deployment of floating solar technology projects within the zone extending up to 12 nautical miles off the coast of the Maltese islands. A total of 13 proposals were gathered by the submission deadline of April 2024. This initiative will facilitate the evaluation of investor interest, allowing the Government of Malta to assess the current market preparedness for floating PV technology[59].

Grid Stability Considerations

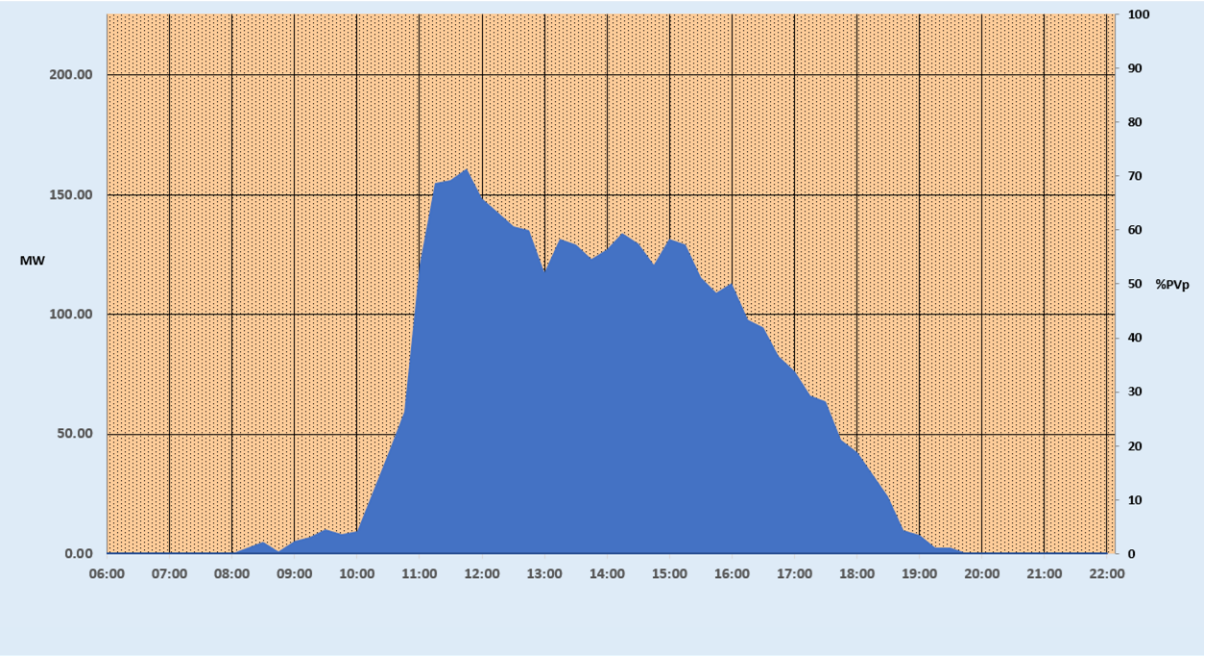
Malta's renewable energy potential post-2020 faces grid integration challenges due to the intermittency of generation sources like PV and wind as well as the size of the power system. These inherent intermittency issues are particularly relevant in small, peripheral electricity systems like Malta's. These challenges primarily revolve around integrating the intermittent nature of both solar and wind into the electricity system and maintaining a reliable and stable power supply.

In the case of PV systems, these installations will be concentrated within a very limited space (Malta's footprint), and generation is therefore highly susceptible to rapid fluctuations in output due to cloud coverage. Preliminary assessment shows that with 236MWp (as of end 2023), of installed capacity, cloud cover caused rapid variation in output of up to 95MW in 30 min, as may be seen in Figure 11. These rapid fluctuations already pose a significant risk to grid stability, as at times of high insolation PVs will be covering more than half of Malta's electricity demand (especially on weekends during the shoulder months). Please refer to section 2.4.1 for more information.

[58] The Energy & Water Agency (2023). National Policy for the Deployment of Offshore Renewable Energy, A draft for Public Consultation. Available at: https://content.maltatoday.com.mt/ui/files/2023_ministry_for_energy_national_wind_energy_policy.pdf

[59] Regulator for Energy and Water Services (2024), Preliminary Market consultation. Available at: Regulator for Energy and Water Services > en/pmc/276 (rews.org.mt).

Figure 11 - Solar PV generation during a typical day in April with intermittent cloud cover (MW)



Balancing the variability of large scale solar and wind generation with the demand for electricity requires advanced grid management techniques, energy storage solutions, and a robust transmission infrastructure. Additionally, ensuring grid stability of intermittent RES generation such as from wind turbines and PV may necessitate backup generation or alternative energy sources.

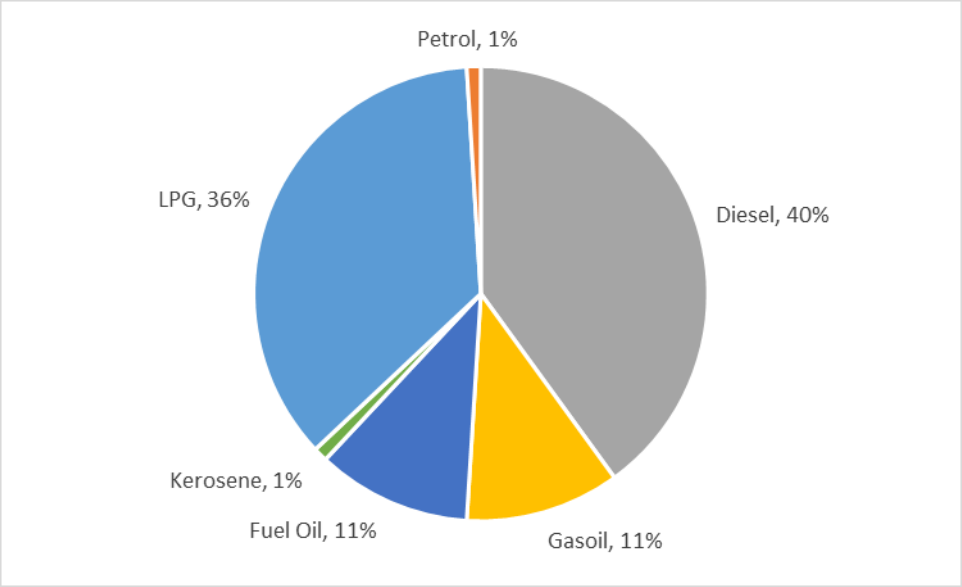
Addressing these issues will be crucial to successfully harness the potential of offshore wind and further deployment of solar PV while maintaining a secure and stable energy system. Ensuring system stability will either require significant spinning capacity, utility scale battery storage or flexible balancing services over the electricity interconnector with Sicily. This within the context that with further deployment of solar and wind in both Malta and Sicily, the production profiles at both ends are bound to be similar. This may have implications on the commercial feasibility of future large scale renewable energy projects as well as network congestion.

The Government's commitment to add a second interconnector with Italy, together with investment in utility-scale battery storage, is expected to alleviate, to some extent, the strain on the electricity grid, and thus increase the potential of adding more RES electricity to the Maltese generation mix.

Heating and Cooling

In 2022 983.45 GWh of fossil fuels were consumed in Malta for heating and cooling, with the largest contributions coming from LPG and diesel (Figure 12). Half of the LPG share is attributed to households for cooking and spatial heating, with the rest being consumed in the services and industry sectors. Gasoil, fuel oil, and diesel for heating and cooling are almost entirely consumed by the industry and services sectors for process heating. These fuels are typically used as alternatives to LPG in cases where the LPG storage requirements cannot be overcome due to space or safety restrictions.

Figure 12 - Fossil fuels consumed for heating and cooling in 2022



In 2015, a comprehensive assessment on the potential for the application of high efficiency cogeneration and efficient district heating and cooling in Malta was delivered to the Commission in accordance with Article 14(1) of Directive 2012/27/EU. This report determined that district heating systems are not cost-effective solutions for Malta due to the fact that the final energy consumption for heating purposes in Malta is relatively low compared to what is needed to justify the considerable investment required for district heating networks.

In 2020, Member States were required to submit an update of this assessment to the Commission in line with Article 14 of the Directive 2012/27/EU whilst ensuring compliance with Annexes VIII and IX of the same Directive as amended by Commission delegated regulation (EU) 2019/826 of 4th March 2019 amending Annexes VIII and IX to Directive 2012/27/EU. This report once again determined that despite the projected increase in final energy consumption for heating and cooling foreseen for 2030 and 2050, the final heating demand is likely to remain below the necessary threshold that render such technologies economically feasible and for this reason the scenarios explored in the report did not consider the possible use of district heating networks. This makes it more challenging to address the heating and cooling sectors through cost-effective solutions.

In 2024, an updated comprehensive assessment was finalised in line with Article 25 and Annexes X and XI of Directive (EU) 2023/1791 and Article 23 1b of Directive (EU) 2023/2412. The assessment includes an extensive analysis of energy consumption patterns within residential, industrial and services sectors, projecting future demands and identifying opportunities for efficiency improvements through intervention measures for the Maltese Islands. The interventions proposed for the residential, hotel, and restaurant sectors, which by extension could also be relevant to other services sector, all lead to economically favourable outcomes, though some of these would need financial support to make them viable.

RES-Transport

There is no local production of biofuels in Malta, so all biofuel, namely biodiesel and HVO, currently blended in road transport is imported. Bioethanol is currently not available for consumption in Malta. This is due to the hot Maltese climate which creates technical difficulties for the blending of bioethanol with petrol. The addition of bioethanol to petrol in low percentages increases the vapour pressure of the fuel blend and therefore increases the possibility of emissions of benzene and volatile organic compounds, particularly in high ambient temperatures. Therefore, unless petrol with a sufficiently low reid vapour pressure (RVP) is readily available in relatively small volumes and competitive prices, the warm climate in Malta would drive the vapour pressure of bioethanol-petrol blends above the limit determined by EN 228.

This highlights the need for alternative clean transport solutions, such as the adoption of electric vehicles (EVs). However, this is influenced by advancements in EV technology, models available in the EU market and overall global progress in electric mobility. Affordability is also a major consideration in this transition, making government incentives and the expansion an EV charging infrastructure critical to facilitating the shift towards renewable energy transport options.

i. The elements set out in point (a)(2) of Article 4

The European Union has set binding renewable energy targets to achieve a sustainable energy transition. The initial target for 2020 was 20%, which was later increased to a binding target of at least 32% by 2030. However, with the aim of further raising climate ambition, the European Commission proposed revising the Renewable Energy Directive to increase the target to at least 40% renewable energy in the EU's overall energy mix by 2030. The onset of the conflict in Ukraine and subsequent energy crises has placed unprecedented urgency on the deployment of renewable energy to bridge the energy gap resulting from the reduction in gas imports from Russia and to reduce the EU's reliance on fossil fuels. To expedite renewable deployment, a temporary emergency regulation was adopted to streamline permit-granting procedures for renewable projects. In November 2023, the revised Directive (EU) 2023/2413 came into effect, resulting in an increase of the mandatory EU renewable energy target to a minimum of 42.5% by the year 2030.

These actions demonstrate the EU's commitment to increase the share of renewable energy and advance towards a more sustainable energy future. Malta is also committed to contribute to the EU ambition by updating its objectives put forward in the 2019 NECP.

Taking full account of all the relevant circumstances affecting the deployment of renewable energy described in the introduction to this section, Malta's contribution to the 2030 Union target in terms of the share of energy from renewable energy in gross final consumption is shown in Table 3.

Malta's RES share, and thus its contribution to the Union's 2030 target is expected to amount to 24.5% in 2030. Malta's RES contribution in 2025 and 2027 is expected to reach 16.5% and 20.7%, respectively. The indicative trajectory being put forward shall reach the indicative trajectory reference points of at least 43% and 65% in years 2025 and 2027, respectively, of the total increase in the share of energy from renewable sources between Malta's binding 2020 national target and its contribution to the 2030 target. Malta's 2020 binding target was 10.0%. Compared to the 2019 NECP, the contribution includes

additional effort to deploy solar PV systems on land and extract energy from biogas plants within waste facilities, higher biofuel blending in transport, ambient cooling captured by air-to-air heat pumps in line with the EC established methodology and does not envisage the use of statistical transfers or other types of cooperation mechanisms. It is important to clarify that offshore wind does not contribute to Malta's RES contribution shown in the Table as it is not envisaged to be completed and commissioned by 2030.

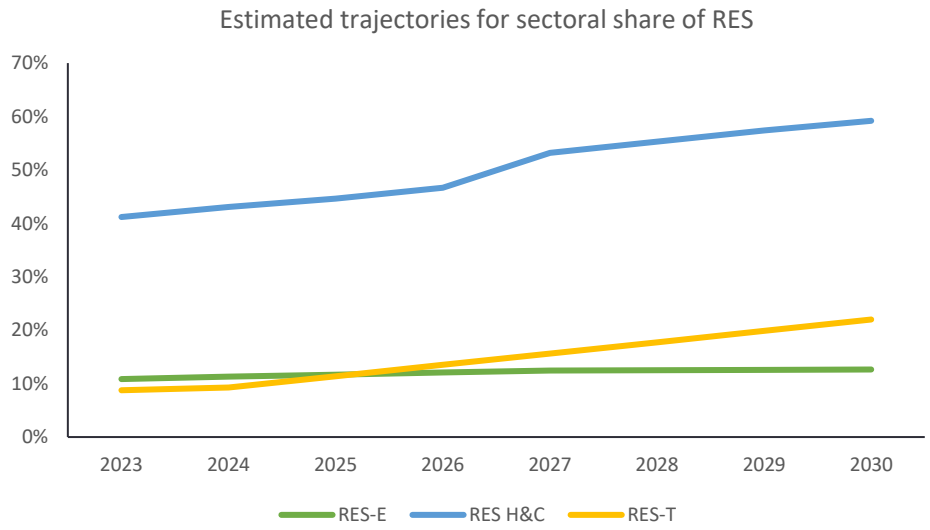
Table 3 - Malta's RES contribution up to 2030, %

	2023	2024	2025	2026	2027	2028	2029	2030
Indicative RES target	14.7%	15.5%	16.5%	17.7%	20.7%	21.9%	23.2%	24.5%
Indicative trajectory for RES increase as per Article 4(a)(2)			43%		65%			
RES minimum trajectory			16.2%		19.4%			

ii. Estimated trajectories for the sectoral share of renewable energy in final energy consumption from 2021 to 2030 in the electricity, heating and cooling, and transport sector

Estimated trajectories for electricity, heating and cooling and transport are provided in Figure 13. Malta's RES share in all three sectors is expected to increase in the period until 2030 as a result of the implementation of policies and measures outlined in Section 3.1.2 of this report.

Figure 13 - Estimated trajectories for sectoral share of RES for Electricity, Heating & Cooling, and Transport. Source: EWA



In line with the revised RED, Malta is required to achieve a RES share in heating and cooling of 0.8% and 1.1%, calculated as an annual average increase over the periods 2021 to 2025, and 2026 to 2030, respectively. This target is expected to be met, primarily as a result of the continued deployment of

heat pump technologies, for which both ambient heat and cooling are being accounted for towards this sectoral target.

The Directive also requires Member States to increase the renewable energy and reduce the greenhouse gas intensity in the transport sector through an obligation on fuel suppliers. By 2030, the amount of renewable energy within the final consumption of energy in the transport sector should be at least 29% by 2030. Alternatively, there should be a greenhouse gas intensity reduction of at least 14.5% by 2030. The government is committed to meet this target via the introduction of additional obligations on fuel suppliers to the transport sector.

iii. Estimated trajectories by renewable energy technology that the Member State projects to use to achieve the overall and sectoral trajectories for renewable energy from 2021 to 2030, including expected total gross final energy consumption per technology and sector in Mtoe and total planned installed capacity (divided by new capacity and repowering) per technology and sector in MW.

RES-Electricity

The RES-E trajectory up until 2030 is composed of renewable electricity generated by PV and biogas from waste plants/facilities. Electricity generation from waste-to-energy plants is expected to contribute a relatively small share to the RES-E trajectory as shown in Figure 14 illustrates the projected capacity of solar PV from 2023-2030, based on the Government's commitment to support higher penetration of solar PV through financial support schemes and other enabling and regulatory measures which facilitate uptake. Solar PV is expected to reach 350 MWp by 2030.

Figure 14 - RES in electricity sector. Source: EWA

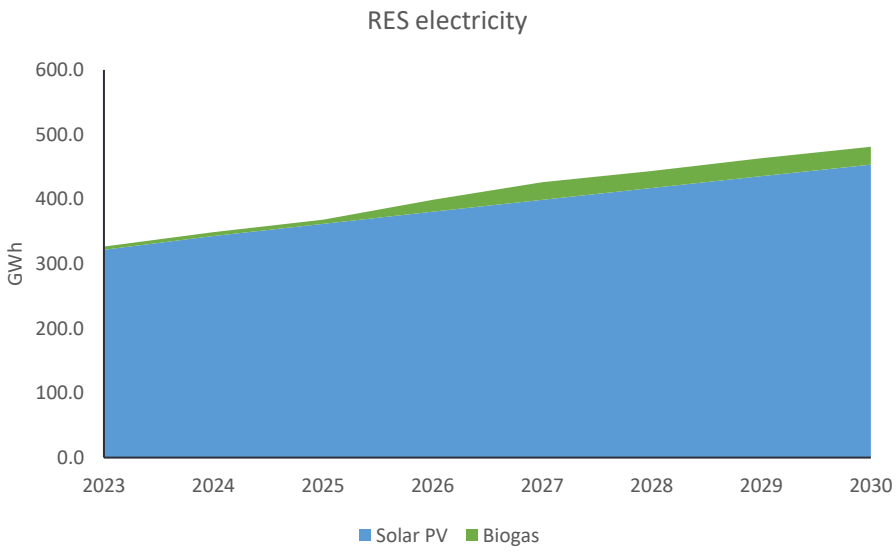
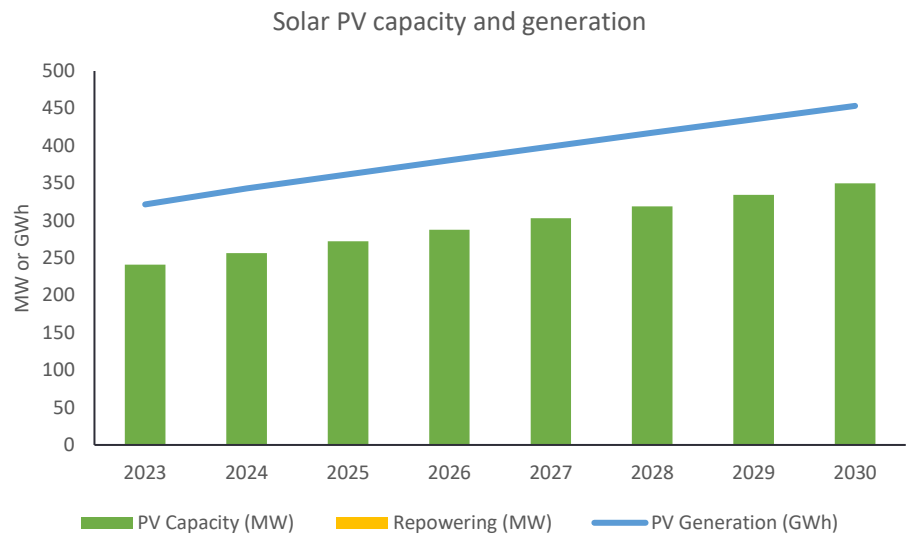


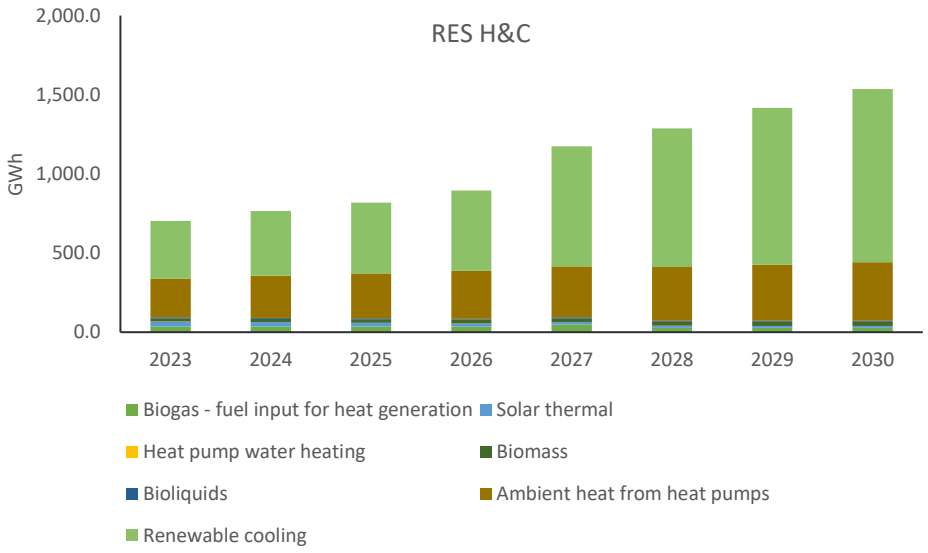
Figure 15 - Solar PV capacity and generation. Source: EWA



RES-Heating and Cooling

Renewable energy in the heating and cooling sector is projected to contribute to 63% of Malta's RES contribution in 2030. Figure 16 shows the relative contribution by each H&C technology towards this share. The highest contributor is ambient cooling from heat pumps, following by ambient heat from heat pumps, biogas, biomass, solar water heaters, bioliquids and heat pump water heaters. The Government is planning to extend measures targeting solar water heaters and heat pump water heaters. The contribution from the share of air-to-air heat pumps is not deemed to need policy intervention.

Figure 16 - RES heating and cooling. Source: EWA



RES-Transport

The RES-T share is expected to be predominantly met by an increase in biofuel consumption, achieved through the extension of the present substitution obligation on importers of road diesel and petrol, which is currently targeting only fuels used for road transport. The new substitution obligation, which is still under discussion at a national level, will require fuel suppliers to different transport modes to increase the share of biofuels in the fuel mix. This includes fuel suppliers to the maritime and aviation sectors. Biofuel blending in the international aviation sector is assumed to follow the minimum targets set in the ReFuelEU Aviation Regulation, with the remaining biofuel required to meet the obligation being met through the supply to the road and maritime sectors. The share of renewable energy from electricity in transport is due to a projected increase in the share of electric vehicles in the road transport vehicle fleet. The stock of electric passenger cars (M1) and goods vehicles (N1) vehicles (EVs) and plug-in-hybrid electric vehicles is currently projected to increase from just under 9,000[60] in 2023 to almost 65,000 equivalent by 2030. This shift is partly driven by Regulation (EU) 2018/1832 and Regulation (EU) 2019/318 which impose stricter CO2 emissions standards on manufacturers of road vehicles post-2020. The government has in place a number of schemes and initiatives in place to support the uptake of electrification of its road transport fleet. It must be noted that there is no rail system in Malta, which further exposes Malta's reliance on road transport.

iv. Estimated trajectories on bioenergy demand, disaggregated between heat, electricity and transport, and on biomass supply by feedstocks and origin (distinguishing between domestic production and imports). For forest biomass, an assessment of its source and impact on the LULUCF sink

Bioenergy is projected to grow, largely due to an increasing percentage of biofuels expected to be blended in the transport sector. Production of bioenergy from waste facilities, both electricity and heat is on the increase mainly due to investment in new plants and systems. The use of biomass for space heating in the residential sector is expected to remain largely stable in the projected period.

Biofuels are expected to continue increasing throughout the projected period mainly due to the continued blending of transport fuels and advanced biofuels in line with the Renewable Energy Directive.

The share of synthetic aviation fuel (SAF) is expected to form part of the mix, in line with Regulation (EU) 2023/2405. As from January 2025, SAF has to be at a minimum share of 2% annually. As from 2030, SAF has to reach a minimum share of 6%. Furthermore, Member States with maritime ports shall endeavour to ensure that as of 2030 the share of RNFBOs in the total amount of energy supplied to the maritime sector is at least 1.2%.

Malta possesses no sustainable sources of biomass and does not have the land area or resources required to cultivate energy crops to any practical extent. Imported biomass in Malta primarily includes wood pellets, fuel wood in logs or briquettes, sawdust and wood charcoal, all of which is assumed to

[60] NSO(2024), Motor Vehicles: Q4/2023. Available at: https://nso.gov.mt/motor-vehicles-q4-2023/

be consumed by the residential sector for heating and cooking purposes. Under both scenarios, imports of biomass are expected to increase.

v. *Where applicable, other national trajectories and objectives, including those that are long term or sectoral (e.g., share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, renewable energy communities and renewables self-consumers, energy recovered from the sludge acquired through the treatment of wastewater).*

The Government of Malta has established a strategic national goal to advance the development of offshore renewable energy sources. Additionally, Malta is committed to implementing regulatory measures and incentives designed to optimize the generation of renewable energy in the buildings sector, aligning with the Long-Term Renovation Strategy. This approach is further elaborated in Section 3.1.2 of the report.

The Long-Term Renovation Strategy also addresses the recovery of energy from sewage sludge, which is part of the Water Services Corporation's investment in energy efficiency improvements. As detailed in Section 3.2, the Corporation is actively pursuing initiatives to transform into a net zero utility.

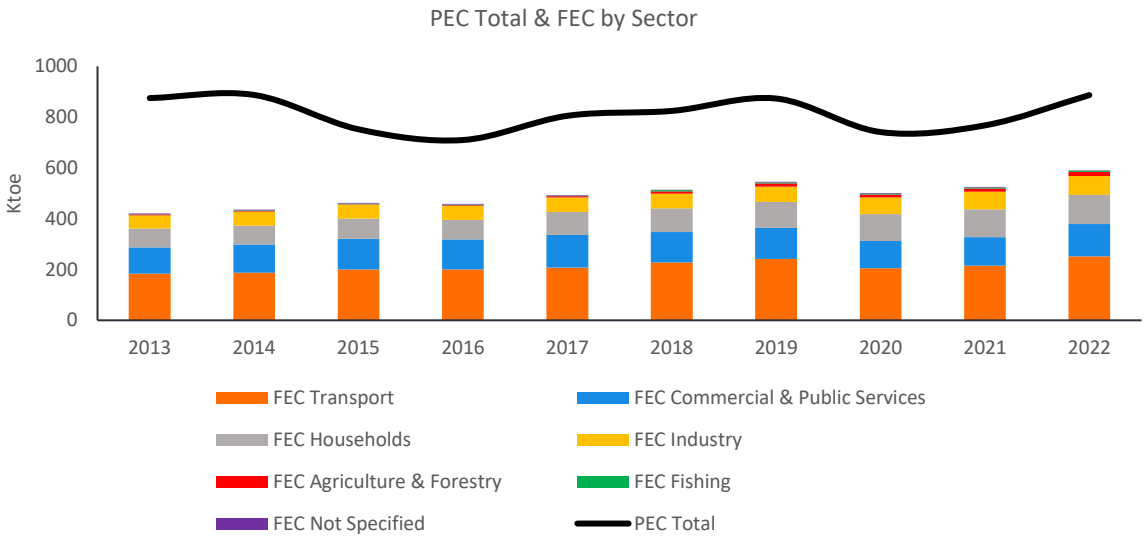
2.2 DIMENSION ENERGY EFFICIENCY

Relevant circumstances affecting energy consumption

Energy efficiency is another critical aspect of Malta's energy sustainability strategy. The submission of the updated NECP is taking place following a very particular and challenging time marked by significant global events, with the global economy having gone through a two-year long pandemic and a conflict breaking out in the EU's neighbourhood, highlighting the need for careful consideration and adaptation in the formulation of energy and climate policies.

During the pandemic, Malta saw both its total primary energy consumption (PEC) and final energy consumption (FEC) decrease substantially, largely due to the measures put in place to curb the spread of the virus, including a ban on travel both into and out of the country (except for some extraordinary circumstances) together with limited intra-island mobility. Moreover, the reduced use and shutting down of hospitality, entertainment areas, offices and sports facilities also had a bearing on reduced energy use. In 2022, however, with most measures relating to the pandemic being lifted, the trends observed before the pandemic started to emerge once again with the most noticeable one being in the transport sector, more particularly in aviation.

Figure 17 - Total Primary Energy Consumption & Final Energy Consumption by Sector, Source: Eurostat



Whilst the conflict in Ukraine had significant impacts on various Member States, Malta has not been directly affected by the disruptions of Russian gas supplies, owing largely to its isolated position whereby it is not interconnected to the trans-European gas network, the existence of a long-term LNG supply agreement and because Malta is not dependent on gas imports from Russia. Nevertheless, the geopolitical context has had a significant impact on the wholesale electricity prices since Malta relies on electricity imports to meet a share of its electricity demand and therefore remains exposed to EU market developments, and in particular the impact of high gas prices on electricity price formation.

Malta's exposure to EU electricity market prices may increase further with the introduction of a second electricity interconnector between Malta and Sicily, Italy.

Malta continues to experience an increase in its population where, as at end 2023, this stood at nearly 563,000[61] inhabitants, representing a 32% increase from the 2011 census. National population projections indicate that Malta's population will reach approximately 610,244 by 2030 increasing the need for energy due to additional buildings, transport and overall energy demand.

In 2023 Malta's GDP totalled 15.5 billion euro, increasing by 5.6% when compared to 2022[62]. Based on national projections it is expected that GDP per capita (in 2015 prices) shall grow from € 26,672 in 2023 to € 29,702 in 2030.

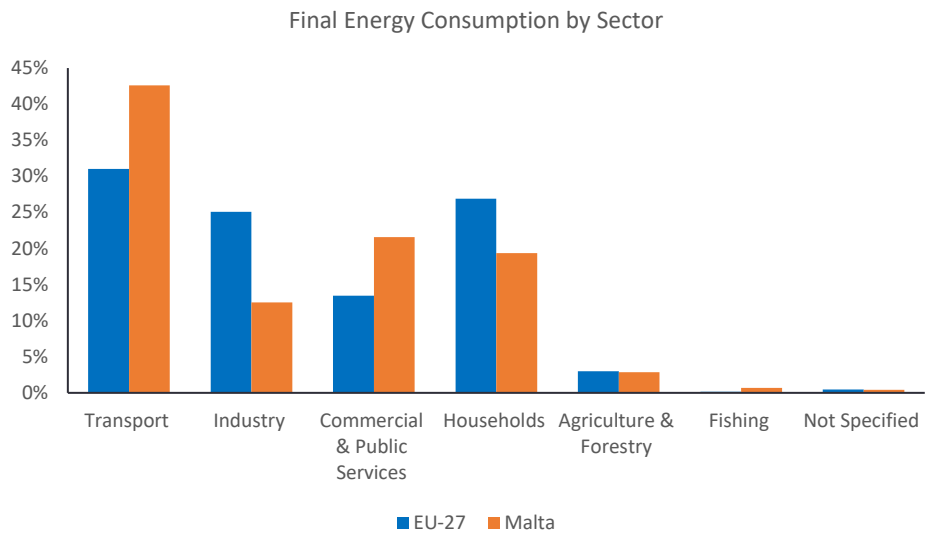
Figure 18 shows the final energy consumption by end-use sector for Malta as compared to the European Union, for the year 2022. Despite recovery from the COVID-19 pandemic, the differences in consumption between the EU and Malta is still evident particularly in the transport sector. Malta's share of final energy consumption in transport is still higher than the EU average. This can still be attributed to the following factors:

- No rapid mass transport systems to date and therefore higher reliance on private transport
- Temperate climate, implying a lower heating demand i.e. heating percentage share of the final energy demand
- Malta being an island at the periphery of the European Union, leads to a larger than average share of aviation as a necessary means of transport
- Malta is primarily a service-based economy (limited carbon intensive industries)

[61] NSO (2024), World Population Day: 11 July 2024. Available at: https://nso.gov.mt/world-population-day-11-july-2024/#:~:text=The%20estimated%20total%20population%20of,compared%20to%20the%20previous%20year

[62] Eurostat (2024), GDP and main components (output, expenditure and income). Available at: https://ec.europa.eu/eurostat/databrowser/view/namq_10_gdp/default/table?lang=en

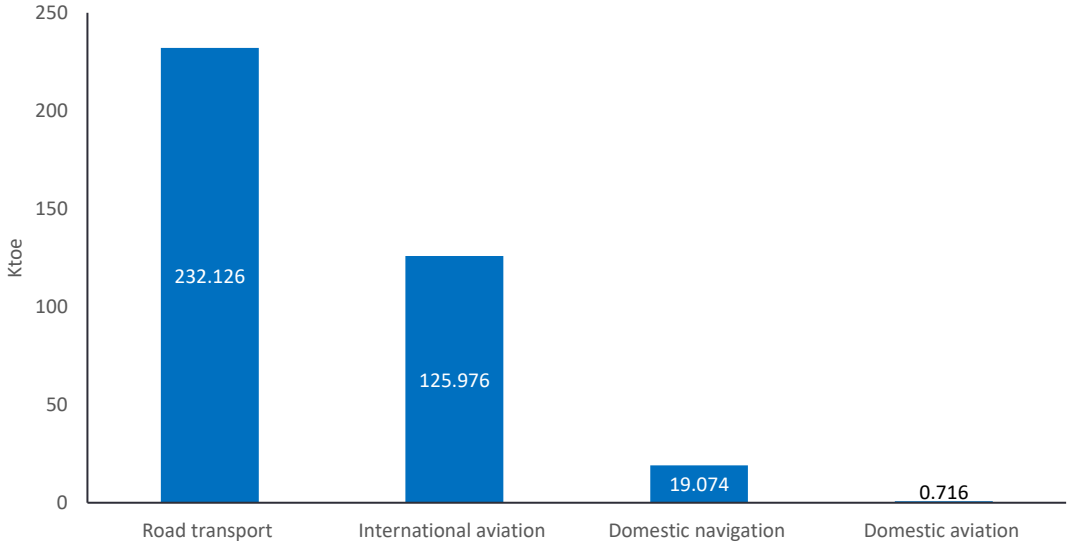
Figure 18 - Final Energy Consumption by Sector EU vs Malta 2022, Source: Eurostat



Transport

In 2022, transport accounted for approximately 43% of Malta's total energy consumption (Figure 19), with road transport contributing to the majority of this share. International aviation was the second largest contributor, making up 33% of the transportation sector's energy use. This higher reliance on aviation can be attributed to Malta's dependence on tourism and the lack of alternative travel options for its citizens, given the absence of a fixed link to mainland Europe. When compared to the EU average, where international aviation accounts for only 11% of the transportation sector's energy consumption, Malta's figure is substantially higher. This discrepancy underscores the challenges Malta faces in implementing energy efficiency measures to reduce the transport sector's consumption. Road transport in Malta still remains heavily dependent on private vehicle use despite the several initiatives taken up by Government to promote alternative means of transport and active mobility.

Figure 19 - Final Energy Consumption by Transport mode



Households

In 2022, Malta maintained its position as having one of the lowest final energy consumption per capita among all EU Member States, registering slightly over half the EU average. Malta's consumption per capita has consistently followed this trend for several years, indicating a sustained pattern of lower energy use relative to other Member States.

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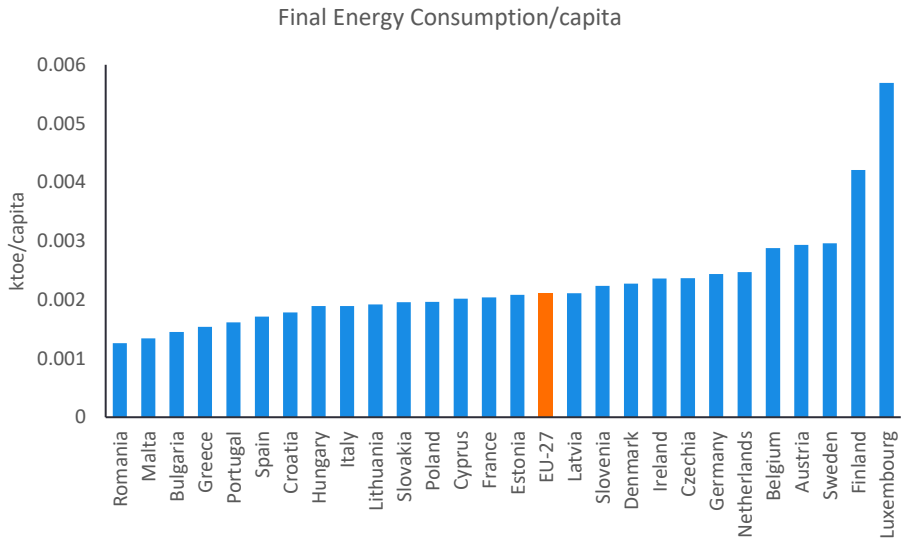
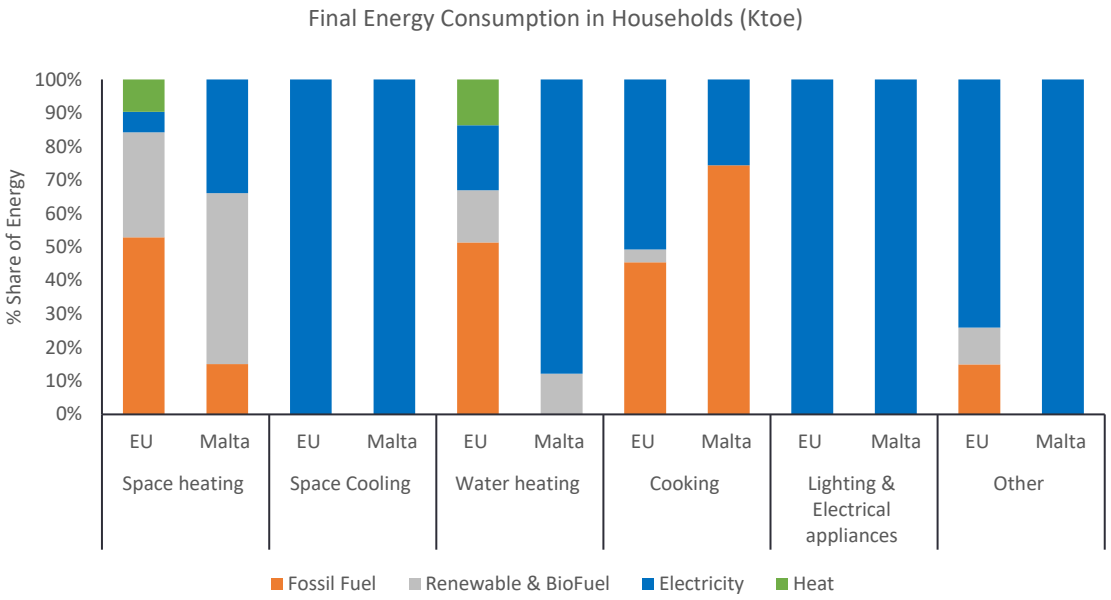
Figure 20 - Final Energy Consumption per capita in 2022



Malta's average consumption per dwelling is well below the EU average and is the lowest amongst all EU Member States. Furthermore, as shown in Figure 21, Malta has a considerably different consumption profile. While the European Union as a whole has the highest share of energy attributed to space heating, Malta has the highest share of energy used for lighting and appliances, followed by water heating, space heating and space cooling.

Figure 21 - Disaggregated Final Energy Consumption by End-Use in Households, 2022, Source: Eurostat



Buildings

The 2021 Census recorded a total of 297,304 dwellings, a 33% increase since the previous Census. This growth averaged 7,354 new units per year, marking a shift towards the types of dwellings being constructed, with a significant portion being apartments. From 2014 to 2023, a total of 69,837 apartments were approved for construction by the Planning Authority, which is the highest among all dwelling types. Despite this, recent data from the National Statistics Office indicates a 13.7% decrease in new dwelling approvals during the second quarter of 2024 compared to the same period in 2023. In addition to residential construction, the non-dwelling sector has also seen substantial development. From 2014 to 2023, a total of 4,693,308 square meters of non-dwelling floorspace was approved by the Planning Authority, encompassing various use categories such as office, retail, food & drink, tourism, leisure, industrial, warehouse, and other uses. The office sector alone accounted for 815,563 square meters, indicating a significant demand for commercial space. However, the trends show fluctuations in construction activity, with the latest data also pointing to a decrease in approved new non-dwelling spaces, suggesting a slowdown in the construction industry.

Heating requirements in buildings in Malta continue to be on the lower end of the scale when compared to other Member States, whereas cooling is provided by heat pump technology, which is already deemed as being one of the most efficient technologies. However, this also means that interventions would need to be performed higher up in the marginal cost curve and are often not viable financially. On the other hand, the changing landscape, whereby a higher share of the population is living in apartments as opposed to single unit buildings, and higher expectations with regards to thermal comfort, means that an increasing number of households are resorting to air conditioning (based on heat pump technology) to achieve the desired thermal comfort level rather than relying on natural ventilation. More frequent extreme heat climatic conditions are also having a bearing on the increase in cooling demand.

Services

Malta's share of final energy consumption by the services sector in 2022 was higher than the EU average, reflecting the local service-based economy. Energy consumption in the services sector increased by 13.9%% in year 2022, accounting for 21.6% of the country's final energy consumption (over 2021) recovering significantly since being hit by the COVID-19 pandemic. There is a trend of relative decoupling between final energy consumption and economic activity, because the positive growth rate in final energy use is less than the growth rate of the gross value added (GVA) of the corresponding sector which is 11.3%. Service-based economies, including ICT, arts and entertainment are generally dependent on low energy-intensive activities. Growth in this sector, is in part explained by the growth in the number of tourist arrivals, which in 2023, stood at nearly 3 million, accounting to an absolute increase of 30% inbound tourists over the same period in 2021[63]. On the other hand, industry accounted for 12.5% of Malta's final energy consumption, compared to the EU's 25.1% average, reflecting the nation's limited industrial base. To promote energy efficiency, Malta has implemented various schemes targeting investment in energy-saving measures within these sectors.

[63] NSO (2024), Regional Tourism: 2023. Available at: https://nso.gov.mt/regional-tourism-2023/

i. The elements set out in point (b) of Article 4

Indicative National Energy Efficiency contribution to achieving Union target

Article 4 of Directive (EU) 2023/1791 concerning energy efficiency requires that Member States collectively ensure a reduction of energy consumption of at least 11.7% in 2030 compared to the projections of the 2020 EU Reference Scenario so that the Union's final energy consumption amounts to no more than 763 Mtoe. Member States are required to make efforts to collectively contribute to the indicative Union primary energy consumption target amounting to no more than 992.5 Mtoe in 2030. The indicative targets for Malta provided by the Commission for Primary Energy Consumption (PEC) and Final Energy Consumption (FEC) in line with the 2020 EU Reference Scenario and the formula set in Annex I of Directive (EU) 2023/1791 are 829 ktoe and 687 ktoe (adjusted to 0.68Mtoe following the application of the "ambition gap mechanism" respectively.

Quantifiable projections developed by Malta are notably higher, resulting in indicative targets for PEC and FEC of 964 ktoe and 803 ktoe, respectively. The discrepancy mainly stems from differences between the sectoral projections in the 2020 EU Reference Scenario and Malta's updated projections which now take into consideration more recent trends and statistics, including for the years between 2018 and 2022.

Malta recognizes the imperative of making its equitable contribution toward the overarching EU-wide target. It is noteworthy to highlight that Malta currently maintains one of the lowest final energy consumption per capita within the European Union. Consequently, while efforts are steadfastly directed towards reducing energy consumption, there are intrinsic challenges and inherent limitations on the extent to which further cost-efficient reductions in energy consumption can be achieved. Malta is steadfast in its commitment to ensuring that such efforts do not unfairly burden its population or impede economic growth. Hence, it is imperative for Malta to strike a delicate balance between pursuing environmental commitments while ensuring that the measures taken are pragmatic and socially and economically sustainable.

Energy savings obligation

Malta's specific characteristics compounded by the small size of the energy market continue to substantially limit the range of measures available to the policy maker to meet the energy savings obligations. This has once again been recognized in Article 8 of Directive (EU) 2023/1791 on energy efficiency, where Malta, together with Cyprus, have a derogation which requires both countries to achieve new savings each year from 1 January 2024 to 31 December 2030 equivalent to 0.45% of annual final energy consumption averaged over the most recent three-year period prior to 1 January 2019. This new target shall supersede the present target of 0.24% as from 2024. Figures for final energy consumption for 2016-2018 are shown in Table 4.

Table 4 - Final Energy Consumption 2016-2018

Year	Final Energy Consumption[64] (ktoe)
2016	583
2017	622
2018	661

The average final energy consumption for the period 2016-2018 amounts to 622.7 ktoe. This translates into an average of 1.49 ktoe of new cumulative savings required each year (based on an indicative linear trajectory) from 1 January 2021 to 31 December 2023 and 2.79 ktoe of new cumulative savings required each year (based on an indicative linear trajectory) from 1 January 2024 to 31 December 2030, reaching a total of 118.7 ktoe of cumulative energy savings by end 2030.

Energy poverty sub-target

The Energy Efficiency Directive obliges Member States to achieve an amount of energy savings at least equal to the proportion of households in energy poverty, as assessed in their NECP. The energy savings can be achieved among people affected by energy poverty, vulnerable customers, low-income households and people living in social housing.

Malta has undergone internal discussions and analysis to adopt a new indicator that better reflects Malta's specificities. Details of the energy poverty indicator chosen by Malta are found in 2.4.4. Based on this indicator, and as outlined in Article 8(3) of the Energy Efficiency Directive, Malta is required to achieve 2.1 ktoe of cumulative energy savings.

ii. *The indicative milestones for 2030, 2040 and 2050, the domestically established measurable progress indicators, an evidence-based estimate of expected energy savings and wider benefits, and their contributions to the Union's energy efficiency targets as included in the roadmaps set out in the long-term renovation strategies for the national stock of residential and non-residential buildings, both public and private, in accordance with Article 2a of Directive 2010/31/EU*

The Long-Term Renovation Strategy (LTRS) for Malta, developed in accordance with Article 2a of the Energy Performance of Buildings Directive (EPBD), serves as a comprehensive framework for improving the energy performance of buildings across the nation. The strategy is grounded in evidence-based estimates of expected energy savings, leveraging energy performance data collected from a large representative sample of the building stock in Malta. It sets ambitious targets for the renovation of

[64] Eurostat (2024), Complete energy balances. Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_c/default/table?lang=en

residential, commercial, and public buildings to achieve higher energy efficiency standards, reflecting Malta's commitment to sustainable development and energy conservation. In the residential sector, Malta's LTRS includes the following targets and initiatives:

- Average delivered energy demand kWh/m²/year by dwellings to be reduced, focusing on space heating and cooling, hot water, and lighting net of on-site renewables.
- Implementation of NZEB (Nearly Zero-Energy Building) standards for new buildings and redevelopments, with regular reviews of nZEB criteria to incorporate technical progress and cost updates.
- Energy efficiency packages for dwellings, offering incentives for measures such as roof insulation, heat pumps, solar water heaters, and higher-efficiency glazing. The aim is to support the most effective solutions according to the characteristics of the dwelling.
- Deep renovation schemes targeting less efficient buildings and historic buildings that require extensive interventions to achieve substantial energy performance improvements.
- Incentives to promote energy generation in buildings, including schemes supporting the installation of PV systems and the use of energy storage systems.

For the public sector, Malta's LTRS emphasizes the government's role in leading by example through various programs:

- Renovating its own building stock to improve energy efficiency.
- Retrofitting measures in public schools, retirement homes, police offices, pool complexes, and other government buildings to meet energy efficiency standards.
- The implementation of Green Public Procurement, which includes energy efficiency standards, to encourage sustainable practices in the procurement process.

The strategy outlines the expected costs and investments required from households, businesses, and the government, with the latter providing financial support to incentivize the transition to more energy-efficient and renewable energy solutions. Moreover, it discusses the broader benefits of such investments, including job creation, skill enhancement, and innovation in the construction and energy services sectors, as well as improved living and working environments, reduced emissions, and strengthened national energy security.

Targets are established for 2030, 2040 and 2050. Table 5 and Table 6 below illustrate a summary of the indicative milestones for dwelling consumption per m^2 over time, split by building type and the expected progression for the average emissions per year for residential and non-residential buildings.

Table 5 - Average net use (kWh/m2/year - indicative expected progression [65] (Long-term renovation strategy 2021 pg. 102 table 7-4)

Year	2018	2030			2040			2050		
	Average use	Average use	Change from Baseline	Change from 2018	Average use	Change from Baseline	Change from 2018	Average use	Change from Baseline	Change from 2018
House	23	17	-34%	-26%	17	-46%	-27%	15	-51%	-34%
Flat	29	25	-20%	-13%	25	-29%	-15%	25	-31%	-15%
Total	27	22	-26%	-18%	21	-37%	-20%	20	-42%	-25%

Table 6 - Total Emissions per year (thousand tonnes CO2) – indicative expected progression [66] (Long-term renovation strategy 2021 pg. 102 table 7-5)

Year	2018	2030			2040			2050		
	Total emissions	Total emissions	Change from Baseline	Change from 2018	Total emissions	Change from Baseline	Change from 2018	Total emissions	Change from Baseline	Change from 2018
Residential buildings	194	118	25%	-39%	78	36%	-60%	50	40%	-74%
Non-Residential Buildings	513	318	-26%	-38%	196	-40%	-62%	120	-31%	-15%

The LTRS outlines a comprehensive plan to renovate public buildings over the period leading up to 2050, with the goal of achieving a highly energy-efficient and decarbonized national building stock. The strategy details the following targets:

For residential buildings, energy efficiency improvements are expected to impact 5% to 6% of the stock per year, encompassing all types of interventions. Specifically, the rate of deep renovation is targeted to be 0.6% per year starting from 2025. Due to the high marginal costs associated with renovations, financial incentives will play a crucial role in mobilizing private sector investments, particularly for achieving very high levels of performance that typically require deeper and more costly renovations.

In the case of non-residential private buildings, the renovation rate from 2021 to 2030 is expected to be 1.1%, with an increase to 3% from 2031 to 2050. This increase will be driven by policies designed to stimulate the adoption of additional energy efficiency measures in existing buildings, such as informational campaigns and incentives, as well as through the implementation of minimum standards for new builds and existing buildings that are rented.

The LTRS also emphasizes the importance of utilizing natural trigger points in a building's life cycle to implement incentives, including financial and non-financial instruments, to encourage renovation at these critical junctures.

[65] *Long-term renovation strategy 2021 pg. 102 table 7-4*
[66] *Long-term renovation strategy 2021 pg. 102 table 7-5*

Furthermore, the definition of Near Zero Energy Buildings (NZEB) has been revised, with new minimum energy performance requirements set to come into effect in 2024. These requirements are more stringent than the current NZEB standards and aim to improve the overall energy performance of buildings, as well as the energy performance of specific building elements and technical systems[67].

The strategy also sets a direction towards increasing the renovation of the building stock by 2050, with a particular focus on public sector buildings. Many buildings occupied by public bodies have architectural or historic value, or are located in historical areas, which may limit the extent of interventions on the building fabric. Therefore, the LTRS indicates that renovations of public buildings should be carried out to the highest levels of efficiency achievable for each particular building. Malta's journey towards a sustainable building is being paved by collaborative efforts between the government and the private sector. The Malta Chamber of Commerce, in partnership with a local entity, has taken a significant step by launching the 'Establishing a Framework for Net Zero Buildings in Malta' project. This initiative seeks to guide the country towards its climate goals by addressing operational carbon emissions from buildings. With a net-zero building in Qormi serving as a model, the project aims to create a blueprint for net-zero office buildings across Malta, which are pivotal in reducing the carbon footprint of business buildings and aiding companies in their ESG compliance[68].

A local bank has refocused its balance sheet towards greener investments, with a particular emphasis on transport, renewable energy, and the circular economy. In collaboration with the European Investment Bank (EIB), the bank has introduced incentives to support customers transitioning to environmentally friendly practices. In the first quarter of 2024 alone, the bank issued €58 million in green loans, demonstrating a robust commitment to sustainable development within the local business community. Moreover, the bank is pioneering a pilot program for green home-loan financing, utilizing Energy Performance Certificates (EPC) to ensure that construction projects meet stringent environmental standards. This initiative is part of a broader strategy to assist businesses in pollutive sectors to develop greener operational models, aligning with the Corporate Sustainability Reporting Directive (CSRD) requirements[69].

The commitment to sustainable development is further evidenced by the achievements of a local infrastructure project developed by the private sector, consisting of office and commercial spaces, which has attained the prestigious LEED® Platinum certification. As Malta's premier example of a green building, Quad Central serves as a beacon of the multifaceted benefits of sustainable construction, influencing future projects and contributing to the nation's environmental goals[70].

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[67] Official Journal of the European Union (n.d), Directive of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_202401275

[68] The Malta Chamber (2024), Establishing Malta's Framework For A Net Zero Carbon Building. Available at: https://www.maltachamber.org.mt/establishing-maltas-framework-for-a-net-zero-carbon-building/

[69] Malta Independent (2024), Green financing – the way forward to sustainable development, Available at: https://www.independent.com.mt/articles/2024-07-10/business-news/Green-financing-the-way-forward-to-sustainable-development-6736262606

[70] https://www.thequad.com.mt/news/quad-central-achieves-maltas-irst-leed-platinum-certification/

In addition to these individual efforts, the Chamber of Architects and the Malta Developers Association have established the National Building Council to impose higher standards across the building industry. This council represents a significant step towards self-regulation, accountability, and the enhancement of industry practices, with a focus on aesthetics, green buildings, and the quality of materials and workmanship[71].

iii. Where applicable, other national objectives, including long-term targets or strategies and sectoral targets, and national objectives in areas such as energy efficiency in the transport sector and with regard to heating and cooling.

Please refer to section 3.1.3 for measures related to the transport sector.

[71] Malta Independent (2024), Chamber of Architects, MDA launch National Building Council; to set higher standards for industry. Available at: https://www.independent.com.mt/articles/2024-02-16/local-news/Chamber-of-Architects-MDA-launch-National-Building-Council-to-set-higher-standards-for-industry-6736258632

2.3 DIMENSION ENERGY SECURITY

i. The elements set out in Article 4(c)

The energy security context under which the Union and its Member States are operating in 2024 is vastly different to that in 2018-2019 when Malta's first NECP was adopted. The update of the NECP comes at a time when the EU and Member States are facing unprecedented energy issues, which have been greatly exacerbated by the Russian aggression in Ukraine. The Union, and to varying degrees respective Member States, have experienced disruptions of supplies of gas from Russia which have led to exceptional action both at EU level as well as by individual Member States to mitigate the situation and ensure sufficient gas imports to cover the winter peak demand. The gas disruption has also driven energy prices to record highs and also contributed towards inflation across the whole Union, and whilst the energy crises has somewhat subsided, it is certainly far from over. Wholesale natural gas prices in Europe peaked in August 2022, reaching levels above 300 €/MWh, which was well above pre-pandemic levels of around 10-20 €/MWh. Following a mild winter, prices started to drop, and continued to slide in 2023, even though they are still higher than pre-pandemic levels. TTF prices fluctuated between just over €22/MWh and just over €40/MWh during the first eight months of 2024[72], and gas market prices are projected to hover at around 35 €/MWh in the longer term.

Malta has not been directly affected by disruptions of Russian gas supplies or the conflict in Ukraine, at least from a security of supply point of view. This is mainly due to the specific characteristics of its energy system. Understanding Malta's distinctive situation amidst the energy crisis is crucial, and it is essential to closely examine the following key elements that define it:

- Malta's lower exposure to security of supply impacts of the conflict in Ukraine and the comparatively lower range of measures and actions available at our disposal
- Isolation from the trans-European gas network due to the absence of a gas connection to mainland Europe
- Absence of gas storage facilities
- Natural gas is only used for power generation as no district heating network to end-users exists as the warmer climate limits the need for heating.
- Natural gas is imported in the form of LNG, which is sourced from the global LNG market. Furthermore, Malta has a long-term LNG supply agreement.
- Malta is not dependent on fossil fuel imports from Russia

Moreover, Malta faces the highest energy demand during the summer period, unlike most of the continental Member States which have highest demand in winter. In 2023, Malta's maximum electricity demand soared to 663 MW, with this peak occurring on 25th July, underscoring the unique seasonal energy consumption patterns of the island[73].

[72] Trading Economics (2024), EU Natural Gas TTF. Available at: https://tradingeconomics.com/commodity/eu-natural-gas

[73] NSO (2024), Electricity Supply 2023. Available at: https://nso.gov.mt/electricity-supply-2023/

Nevertheless, the geopolitical context has had a significant impact on the affordability of electricity prices. Malta relies on electricity imports from Italy to meet a share of its electricity demand and therefore remains exposed to any EU market developments. In particular, Malta is exposed to the fluctuation in energy prices, including the impact of high gas prices on electricity price formation whereby natural gas remains, in most cases, the marginal price-setting technology in electricity markets across Europe. Malta's reliance on the EU electricity market, and thus price variability, is expected to increase further with the introduction of a second electricity interconnector. The energy crisis and the high energy prices, which have peaked during 2022, have brought about a strong reaction from the Union. This quick reaction came primarily in the form of the RePOWER EU Plan, the aim of which is to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition. The RePOWER EU Plan was complemented by a series of complementary temporary emergency legislative acts.

In 2022, Regulation (EU) 2022/1032 dealing with gas storage obligations and Regulation (EU) 2022/1369 for coordinated demand reduction measures for gas were approved. These Regulations created a coordination framework for national gas storage filling and gas demand reduction measures, introduced a possibility for the European Commission to declare a "Union alert" triggering a mandatory 15% gas demand reduction obligation and mandated Member States to update their gas Emergency Plans in line with these developments. These regulations were further complemented by Council Regulation (EU) 2022/1854 focusing on an emergency intervention to address high energy prices adopted in October 2022 and Council Regulation (EU) 2022/2578 establishing a temporary market correction mechanism to protect Union citizens and the economy against excessively high prices. While these emergency legislative acts have been adopted for the purpose of tackling a particular crisis and are therefore temporary in nature, they also have lasting effect and have forced Member States to re-think their objectives and priorities from an energy security point of view. Due to the success of the emergency regulations in mitigating the negative effects of the energy crisis, some of the temporary emergency regulations, such as the gas storage filling obligation, as well as the voluntary gas demand reduction target, have been extended until the end of 2024 and 31 March 2025, respectively[74,75].

Energy security continues to be looked at within the unique context of a geographically isolated and peripheral island Member State with a high import dependency (particularly on Sicily because of the interconnector when it comes to electricity) due to the lack of domestic conventional energy sources and limited on-land renewable energy resource potential. The specific characteristics of Malta's energy system and market, such as its small nature, the existence of a single electricity supplier, the absence of a connection to the trans-European gas network, as well as the projected increase in energy demand and necessity for additional generation and/or interconnection capacity, including flexible solutions continue to be factors which affect Malta's security of supply. Ensuring energy security is crucial for

[74] European Commission (2023), Commission Implementing Regulation (EU) 2023/2633 of 20 November 2023 setting the filling trajectory with intermediary targets for 2024 for each Member State with underground gas storage facilities on its territory and directly interconnected to its market area. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202302633

[75] European Commission (2024), Council Recommendation of 25 March 2024 on continuing coordinated demand-reduction measures for gas (C/2024/2476). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32024H02476

fostering economic stability, encouraging sustainable growth, and improving the standard of living for all of Malta.

Underlying the scenarios being developed for the NECP update, is a projected increase in Malta's population and sustained economic growth. This is expected to lead to an increase in the energy demand which has a direct bearing on the energy infrastructure investment needs to ensure system adequacy. Following the 2021 Electricity Supply Study commissioned by government, a decision was taken to invest in a second electricity interconnector and its first utility-scale Battery Energy Storage Systems ('BESS'). These projects will allow for the integration of a higher share of renewable energy, thus decreasing Malta's reliance on fossil fuels.

More recent macro-economic drivers have become available and were used as inputs in the analytical basis of this NECP update. The forecasts suggest a projected rise in energy demand that surpasses the forecasts used in the 2019 NECP and the 2021 electricity supply study. Another study has been commissioned to reflect this higher expected demand as well as the government's commitment to commission a second interconnector, utility scale battery storage as well as additional onshore PV and offshore renewable energy installations. Malta is planning further investments in its energy infrastructure to meet medium to long-term energy needs. These investments are being carefully assessed to align with the country's energy vision, which is built on five key pillars (energy sustainability, energy affordability, energy security, energy diversification and a consumer centric approach) and leverages Malta's strategic Mediterranean position. As part of the ongoing study, the government is currently evaluating several infrastructure options.

Over the last decade, Malta has transformed its electricity generation mix from one based on heavy fuel oil and gasoil to a more sustainable combination of natural gas, electricity imports via the Malta-Italy subsea connection, and increased use of renewable energy sources. Malta also maintains standby gasoil generation capacity (including dual fired diesel engines) which are available as back-up in the event of an emergency, a feature contributing to Malta's security of supply.

Aware that natural gas is a transitional fuel, Malta's focus has shifted primarily to the deployment of renewable energy sources. Malta's energy security scenario is expected to undergo significant changes with the increasing integration of renewable energy sources. This evolution will be especially marked by the government's commitment to invest in offshore renewable energy technologies. This strategic investment, complemented by ancillary projects like additional interconnectors and energy storage solutions, will not only reduce Malta's dependence on fossil fuels, and thus advancing decarbonisation efforts, but will also diminish the country's reliance on energy imports from third countries.

Malta's high-level objectives in the area of energy security, in the context of the long-term objective of decarbonisation of the energy system as an over-arching principle, can be summarised into the following:

- Continued diversification towards cleaner energy sources and suppliers.
- Increasing the flexibility of the national energy system, including through the roll-out of cost-effective, innovative solutions such as energy storage.
- Reduction of fuel import dependency from third countries through the deployment of indigenous sources of renewable energy, whilst taking into account the specificities of Malta's energy system.
- Installing large-scale battery storage systems.

- Fostering regional cooperation particularly between European and North African countries within the Mediterranean region.
- Periodic contingency planning in the case of supply disruption for the electricity, gas and oil sectors and energy system preparedness.

- Energy security in the context of the long-term objective of decarbonisation of the energy system as an over-arching principle.
- Ensuring affordable and stable energy prices for consumers.
- Ensuring electricity system adequacy.
  Further securing the supply of natural gas, such as through a hydrogen-ready pipeline.

ii. National objectives with regard to increasing the diversification of energy sources and supply from third countries

National objectives related to the diversification of energy sources and supply from third countries can be summarised into the following categories:

- Continue to ensure the capability to source LNG from diverse international sources, in the short-to-medium term
- Pursue options to enable sourcing and delivery of sustainable fuels
- Explore the possibility of interconnections with neighbouring third countries, including those in North Africa.

Natural gas in Malta is used solely for the generation of electricity and currently constitutes the largest share of Malta's electricity generation mix at approximately 66%, in 2022. The only source of natural gas in Malta is LNG, which is imported via marine carriers and held in a Floating Storage Unit (FSU) supplying LNG to Delimara 3[76] and Delimara 4[77] power plants. Malta does not have gas distribution networks or district heating networks and there are no end-use customers of natural gas apart from two electricity producers at the Delimara Power Station. Currently, Malta does not form part of the EU internal gas market as it is not interconnected via a gas pipeline.

LNG is currently sourced from the international market, which provides flexibility in terms of countries of origin. The LNG that has been delivered to Malta at the Delimara facility between 2017 and end 2022 originated from eight different countries, with the highest share coming from South America. Malta does not currently import any LNG from Russia. In the short-to-medium term, Malta's main objective would be to ensure the ongoing capability to source LNG from international sources. The planning and management of LNG deliveries is at present handled through existing contractual arrangements.

Malta is also exploring a hydrogen-ready pipeline project, the Melita TransGas Hydrogen-ready Pipeline ('MTGP'), which has been provisionally listed as an EU Project of Common Interest (2023 list).

[76] Delimara 3 (D3): 8 gas-fired turbines with a maximum rated capacity of 152 MW. 4 of the 8 engines are dual fuel and can also run on gas-oil, supporting security of supply.
[77] Delimara 4 (D4): 205 MW gas-fired high-efficiency combined cycle gas turbine (CCGT) commissioned in 2017.

This project is being explored in the context of a cost-optimality updated study. The pipeline could open the door for Malta to access new sources of green gases, particularly hydrogen originating from renewable sources. Studies are underway to assess feasible sources for the supply of green hydrogen and determine the necessary infrastructure to deliver to Malta, coupled with any additional financial considerations relevant for this project. If implemented, the pipeline will end Malta's isolation from the European gas network and would also have the potential to enable the gasification of the island and contribute to a decarbonised energy system by enabling access to renewable gases (hydrogen/biomethane).

A market research study, communicated to the European Commission as a part of their review process under Article 24 (1) and (2) of the TEN-E Regulation (EU) 2022/869, concerning the MTGP's capability to transport biomethane revealed promising prospects for the biomethane industry in Europe, crucial for the success of a hydrogen and biomethane ready pipeline to Malta. The International Energy Agency has proposed two consumption scenarios: a modest 2.5% biomethane mix in natural gas grids and a more ambitious 10% blend by 2040. The future for the biomethane industry in Europe looks promising. The IEA presented two consumption forecast scenarios. In its most conservative 'Stated Policies Scenario (STEPS)' European biomethane consumption is expected to reach 12 Mtoe (mega tonnes of oil equivalent) in 2040 equivalent to 2.5% of the gas used in natural gas grids, whilst in the Sustainable Development Scenario this increases to a 10% blend in gas grids (IEA, 2020)[78]. The EU Methane Strategy, launched by the European Commission in 2020, emphasises the contribution of biogas and biomethane towards climate neutrality. Furthermore, the anticipated growth of biomethane production in Italy, especially in Sicily, offers Malta the prospect of a nearby, sustainable, and affordable energy source. Projections indicate that by 2030, Sicily could produce approximately 80 million cubic meters of biomethane annually, with an estimated 12 to 18 new plants constructed by then.

Malta also imports all of its fossil fuel requirements for final end use, including biofuels which are blended with fossil fuels by fuel importers of road transport fuels to fulfil their substitution obligation. The procurement of biofuels is the responsibility of the respective fuel suppliers operating in the local market and there are no Government interventions or policies related to diversification or sources of origin, as long as the imported biofuels fulfil the sustainability criteria stipulated within the Renewable Energy Directive.

iii. National objectives with regard to reducing energy import dependency from third countries

Malta's unique geographical location tied with the absence of domestic energy sources (with the exception of indigenous renewable sources) and the specificities of Malta's energy system, make it extremely challenging to reduce energy import dependency in general, including from third countries.

[78]International Energy Agency (n.d.), The outlook for biogas and biomethane to 2040. Available at: https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/the-outlook-for-biogas-and-biomethane-to-2040

In view of this, Malta's objectives with regard to reducing import dependency (from third countries) are interlinked with national objectives focusing on the continued deployment of domestic renewable energy sources and the over-arching long-term goal of decarbonizing the energy system. Establishing energy partnerships with other countries, including third countries is crucial for securing additional renewable energy imports and enhancing energy cooperation.

Notwithstanding such opportunities, reducing energy import dependency specifically from third countries is expected to be achieved upon the completion of the second electricity and gas/hydrogen transmission projects, both with Italy. A second interconnector would reduce Malta's reliance on local fossil-fuel fired power generation whereas the hydrogen-ready gas pipeline would reduce Malta's reliance on LNG imports from third countries.

Nevertheless, given the limited options for cost-effective indigenous sources due to reasons explained in the decarbonisation dimension, Malta's reliance on energy imports is expected to remain relatively high in the short to medium term.

Apart from assessing the level of energy import dependency, including from third countries, the attainment of this objective will also be assessed by looking at the increase of indigenous renewables in the energy system and the resulting decrease in fossil fuel imports. National objectives related to the deployment of renewable energy are described in detail under the Renewable Energy Dimension of the Plan.

iv. National objectives with regard to increasing the flexibility of the national energy system, in particular by means of deploying domestic energy sources, demand response and storage

Investments in grid flexibility services are critical for integrating renewable energy into the grid and ensuring stability and thus are a key enabler to the government's energy vision. Increased flexibility of the national energy system will be tackled through multiple actions:

- Increased deployment of domestic renewable energy technologies and their secure integration into Malta's energy system, coupled with strategies to ensure system stability, particularly considering the grid integration challenges faced by small and peripheral electricity systems for an island like Malta.
- Investments in distributed small-scale battery storage and utility scale battery storage, as well as smart grid technologies and vehicle-to-grid (V2G) technologies.
- Assessment of the potential and applicability of demand response solutions in the local context.

Utility-scale battery energy storage is expected to become an integral part of Malta's electricity system. Battery storage is expected to provide flexibility in terms of the ability of the system to accommodate additional renewable energy capacity, including offshore wind, whilst also being able to provide ancillary services to the electricity DSO. Further information on the battery storage projects and incentives is available in section 3.3.

Due to the lack of a liquid wholesale electricity market and price signals, the potential for demand response in Malta's existing electricity market remains rather limited. There are currently no successful business models for demand response within the local electricity market context. Thus, the electricity market structure is not conducive to the development of demand response. Whilst recognizing the dual benefits that demand response can bring to both consumers (in the form of reduced consumption and lower electricity bills) as well as system operators (through peak reduction, load shifting and grid balancing), the Government will continue to assess potential solutions and applications of demand response which could be successfully implemented in the local electricity market. This includes assessing the potential of both implicit (price-based) and explicit (incentive-based) demand response mechanisms.

Malta already has a high deployment rate of smart meters which are seen as a pre-requisite for the successful implementation of demand response solutions. However, the smart meters and IT system currently in place (which was one of the first deployed in Europe) will require significant upgrades to accommodate the required functionality to deploy effective demand response. Second-generation smart meters are being deployed which will allow the consumer to be more aware of their energy consumption and provide enhanced functionality. This will be done through the consumer energy management system where in-house display systems, smart phones and other devices will provide the consumer with real-time information on their consumption.

Further studies will have to be dedicated to smart energy management systems, as well as investments into the digitalisation of the electricity network (e.g. development of smart grids). Given the increasing rate of electric vehicles, an increasingly viable option for enhancing flexibility in the system is leveraging the capacity of the battery of electric vehicles as a means of storage. The government is actively looking into the potential of V2G technologies (refer to section 3.3 (i) for more details).

Malta aims to have an efficient operating smart grid through the digitalisation of the energy system, which will require the processing of timely and focused data from elements making up the grid. The government plans to increase the connectivity of Malta's distribution network grid, by having wider-ranging installation of 2nd generation smart meters and increasing the flexibility of the national energy system.

2.4 DIMENSION INTERNAL ENERGY MARKET

2.4.1 Electricity Interconnectivity

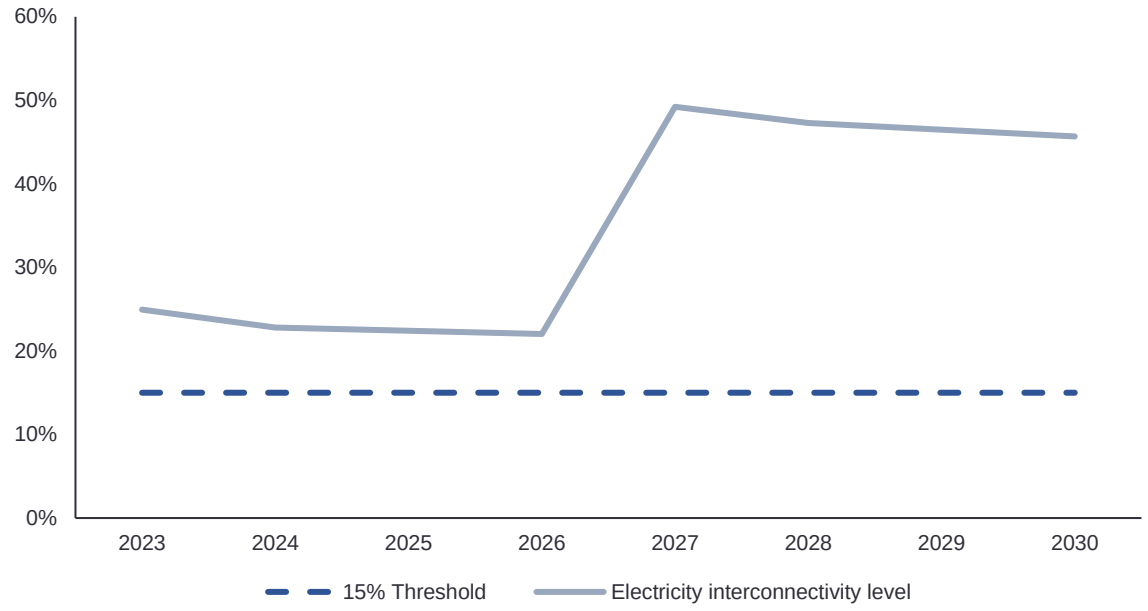
i. The level of electricity interconnectivity aimed for in 2030

The EU has set an interconnection target of at least 15% by 2030 to encourage EU countries to enhance their integration in the internal energy market. The 15% interconnectivity level corresponds to the total net transmission capacity of all interconnectors over Member State's installed generation capacity. The electricity networks in Malta and Sicily (Italy) are currently linked by a 200MW HVAC interconnector, connecting Malta to the European electricity grid, which came into full operation in 2015. This connection contributes to the robustness of the electricity system and hence the security of supply in Malta, while enabling the trading (predominantly for import and balancing) of electricity on the Italian electricity wholesale market. Malta is considered as a foreign virtual consumption/production zone within the Italian market. The interconnector is operated by Enemalta and considered as part of its distribution system.

In 2022, a decision was taken by the Government to invest in a second electricity sub-sea interconnector with Sicily (Italy). This project will increase Malta's cross-border electricity transfer capacity from 200 MW to 425 MW and will ensure that Malta continues to meet the 15% interconnectivity target by 2030. The project will contribute to security of electricity supply and allow for the integration of a higher share of renewable energy, thus decreasing Malta's reliance on fossil fuels.

Malta's electricity interconnectivity level is projected to remain over 15% up till 2030. The Government is currently undertaking an assessment to determine which infrastructure requirements are required in the medium to longer term (post-2030) to ensure the desired level of generation adequacy is maintained. In the area of electricity interconnectivity, Malta's objective until 2030 in the area of interconnectivity is therefore to remain above the 15% EU target. This is largely due to Malta's limited indigenous energy production, which necessitates the country to rely on interconnections to help meet the demand.

Figure 22 - Projected electricity interconnectivity level



The EU has supplemented the goal of achieving a 15% interconnection capacity by 2030 with additional "urgency indicators", each having specific threshold levels. These are:

1. Price differential in the wholesale market exceeding an indicative threshold of €2/MWh between Member States, regions or bidding zones;
2. Nominal transmission capacity of interconnectors below 30% of peak load; and
3. Nominal transmission capacity of interconnectors below 30% of installed renewable generation.

Details on each of the three indicators are provided below.

Indicators of urgency of action:

1) Price differential in the wholesale market exceeding an indicative threshold of €2/MWh between Member States, regions or bidding zones

Malta's electricity system is currently treated as a virtual consumption and production point connected to the Italian electricity network and although there is no liquid wholesale market in Malta in practice Malta forms part of the bidding zone in Sicily whereby the price of electricity imported over the interconnector reflects the clearing price in the Sicilian market.

Enemalta is obliged to dispatch electricity from local generation plants and/or from the interconnector based on their order of economic merit subject to technical and contractual constraints, with electricity from renewable energy and CHP plants, irrespective of their size, benefitting from priority dispatch as long as there is no liquid wholesale market in Malta. The onus to meet all demand, including peak demand, is on Enemalta as the DSO and exclusive supplier of electricity to final customers. Any imbalances between the volumes determined on the day-ahead market in Sicily (Italy)

and actual electricity flows over the interconnector are settled at the prices calculated using the methodology determined by ARERA through its decision 549/2015/R/EEL[79].

In the absence of a liquid wholesale electricity market in Malta, the Regulator (REWS) publishes a proxy for the wholesale electricity market price on an annual basis by estimating the variable cost of meeting the demand forecast for a given year from local fossil fuel generation and imported electricity, excluding that portion of forecasted demand which is not expected to be met by conventional sources or imported electricity. The reference price is used to determine the amount of operational aid provided to PV installations benefitting from a feed-in-tariff and the rate paid to generators exporting electricity to the grid when these are not eligible for any operational support. The proxy is published annually in Schedule 4 of Subsidiary Legislation 545.34 and the methodology was included in the State Aid decision[80] issued in relation to the notified competitive bidding process for the granting of aid to generators producing electricity from RES with capacity of 1MWp or more. However, given the structure of the electricity system in Malta and the absence of a liquid wholesale electricity market, the proxy for the market price is not deemed to be an appropriate indicator to benchmark against the €2/MWh indicative threshold.

This indicator will become applicable should a liquid wholesale electricity market develop in Malta.

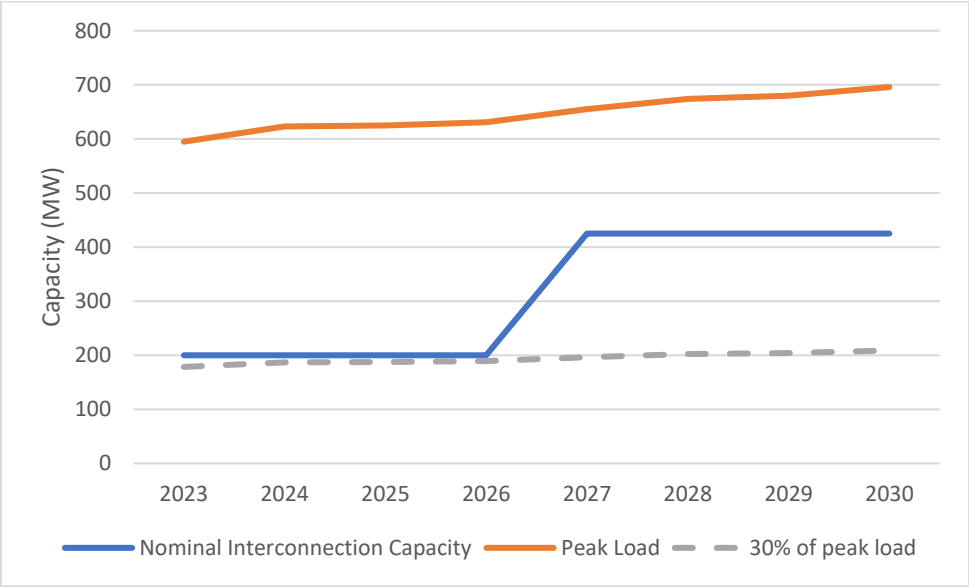
2) Capacity of interconnector in relation to Malta's Peak Electricity Load

Interconnection capacity in relation to the peak load is calculated as a ratio of the nominal interconnection capacity and peak load. It is expected that the interconnection capacity in relation to peak electricity load shall drop to close to 30% of peak load until 2026 but will then be well above this threshold once the second interconnector comes online.

[79] ARERA (n.d.), Deliberazione 20 Novembre 2015: Disciplina degli sbilanciamenti effettivi applicabile all'interconnessione Italia-Malta. Available at: https://www.arera.it/fileadmin/allegati/docs/15/549-15.pdf

[80] European Commission (2016), State Aid SA. 43995 (2015/N) – Malta Competitive Bidding Process for Renewables Sources of Energy Installations, Brussels, 26.8.2016, C(2016) 5423 final. Available at: https://ec.europa.eu/competition/state_aid/cases/261982/261982_1784959_119_2.pdf

Figure 23 - Nominal transmission capacity of interconnections vs 30% of peak load

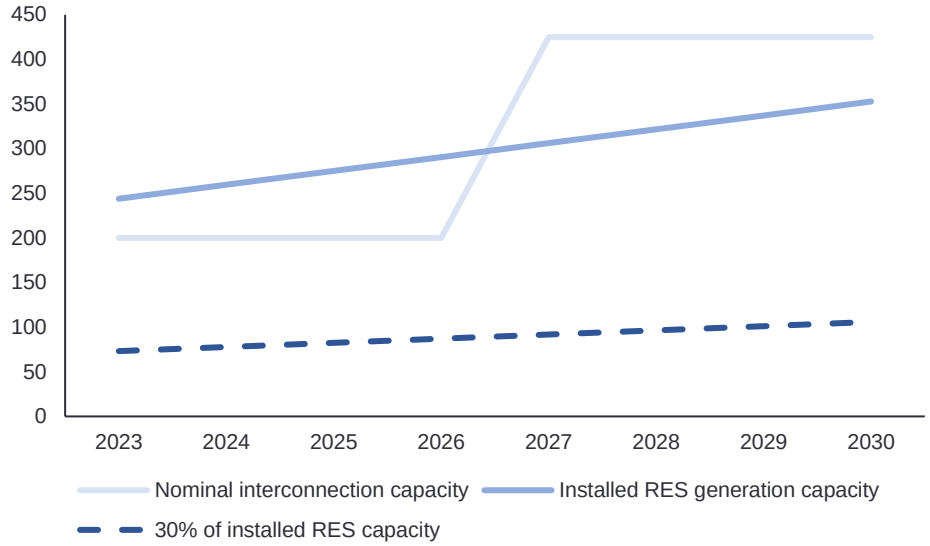


3) Capacity of interconnector in relation to installed RES

This indicator is calculated as the ratio between nominal interconnection capacity and 30% of installed renewable energy capacity. As shown in Figure 24 , with the projected renewable electricity capacity coming online up to 2030, the interconnector capacity is not expected to be lower than 30% of the installed renewable energy capacity for any year until 2030.

In the context of Malta's electricity system, one must note that RES electricity in Malta is almost exclusively generated from photovoltaic systems with limited storage capability and thus although damped by the existing interconnector, significant intermittency is caused by highly variable and localized cloud cover. This is expected to be mitigated by the installation of utility-scale and behind-the-meter battery energy storage systems and the installation of the second electricity interconnector.

Figure 24 - Nominal transmission capacity of interconnector and installed RES generation capacity



With an installed PV capacity of 236 MWp (as of end 2023), transients of circa 95MW were experienced within 30 minutes. As the installed renewable electricity generation capacity grows, these transients are expected to increase proportionally. Peak PV penetration during Sunday afternoons in April of 2023 (when electricity demand is generally lowest) has reached around 57% of demand. In view of the relatively small size of the Maltese grid, such transients are significant and consequential, resulting in interconnector imbalances requiring rapid load shifting, as well as frequent start-up and shutdown of the conventional generating plants. In practice this means that the interconnector capacity needs to handle the full extent of the imbalances, at least until conventional power plants can be ramped up, if spare capacity is available. This scenario also has significant implications for the DSO which in Malta is responsible for balancing the Maltese electricity system, which could be partially mitigated if the electricity intraday wholesale market would allow bids closer to gate closure time.

Apart from the short-term variability of PV systems' generation arising from variable weather, the projected increase in the installed solar PV capacity will also have a significant effect on the operation of conventional generation plants. The planned second interconnector with Italy aims to mitigate this issue, particularly on Sunday afternoons in spring and autumn when solar generation may surpass local demand due to lower consumption and peak PV output.

In view of the small size of Malta's electricity grid and highly variable cloud coverage, additional investments in ancillary and flexible solutions, such as battery storage solutions, may be necessary to mitigate significant rapid variations in PV generation. This variability could have serious implications on interconnector imbalances, as well as load shifting and the required start-up of conventional generating power plants. Ensuring system stability will require significant spinning capacity, utility scale battery storage and/or flexible balancing services over the interconnector.

This intermittency of RES generation is anticipated to intensify with the introduction of offshore renewable energy generators. The ongoing update of the Electricity Supply Study is analysing ways to optimize system costs and enhance the system's ability to accommodate additional renewable energy sources, all while factoring in the economic and technical limitations of the market, existing and planned generators, battery storage and grid infrastructure.

2.4.2 Energy Transmission Infrastructure

i. *Key electricity and gas transmission infrastructure projects and modernisation projects*

Transmission infrastructure

There is no electricity transmission system in Malta and hence no transmission system operator (TSO). Malta was granted derogations pursuant to Article 66 of Directive EU/2019/944 from the requirements of Article 43 (Unbundling of transmission systems operators), Article 35 (Unbundling of DSO), Article 6 (Third party access), and from Article 4 (Free Choice of Supplier). Details about the planned second electricity interconnector are described under point (ii) below.

There are currently no Projects of Common Interest (PCI) related to electricity in Malta. However, the Melita TransGas hydrogen-ready pipeline has received a positive assessment by the Commission pursuant to Article 24 (1) and (2) of TEN-E Regulation (EU) 2022/869, and the Project has retained its PCI status in the 6th PCI list of 2023. The Project was submitted as a candidate for inclusion in the ENTSOG Ten Year Network Development Plan 2024 as a first step to the 7th PCI list selection process of 2025.

Electricity network modernisation projects

Strengthening and broadening Malta's electricity distribution network is essential for addressing the challenges associated with the forecasted energy demand, climate adaptation and the nation's transition towards climate neutrality, which includes higher integration of renewable energy and electrification of the transportation sector.

The DSO is currently undertaking a major network upgrade to enhance the security and reliability electricity infrastructure at all voltage levels. These will include another five major projects involving new distribution centres and/or upgrading of existing distribution centres and a 132kV reinforcement. Given the issues experienced with the distribution network during the month of July 2023 due to impacts from prolonged extreme heat weather conditions, the Government has affirmed its commitment to upgrade the distribution network within the period of 6 years with an investment cost of €160 million.

This investment will be partly funded through the RRF and aims to address internal electricity distribution bottlenecks and to enable further integration of renewable energy by ensuring an adequate grid infrastructure.

Enemalta has invested over €160 million between 2018 and 2023 to upgrade and expand the primary and secondary nodes of the national electricity network as well as to improve the quality of service. In the primary network, upgrades and/or replacement of older equipment works were commissioned to increase the capacity of existing distribution centres. On the medium voltage, several reinforcement projects including new cables and switchgear replacements are ongoing. Numerous works related to improve and increase the low voltage system are currently underway. Throughout the specified period, the DSO has carried out the following projects:

- More than 200 low voltage feeders, this project is still underway. The original objective was 20 per year, but it is expected that this target will be exceeded
- Up to 100 transformer upgrades or switchgear replacement at 11kV voltage level
- More than 100 11kV/400V new substations, with a planned target is of 40 per year
- 12 reinforcements at 11kV voltage level during 2022-2023
- In 2024 alone, 84km of 11kV and 33kV new underground cables through this investment plan have been laid and energised[81]
- New 11kV and 33kV cables as required for the new Naxxar DC have been laid
- Upgrading works at Marsaskala DC, Mriehel DC and Tarxien DC have been completed.

In 2024 alone, the DSO is planning to invest €55 million in its distribution system. Planned works, to be completed by 2030 include:

- A new 132kV link between Maghtab and Kappara
- A new distribution centre in Naxxar and in Siggiewi
- An upgrade of the existing 33kV/11kV Hospital distribution centre in Msida
- An upgrade of the existing St. Andrew's distribution centre in Pembroke
- The commissioning of 15 new 11kV/415V sub-stations and 15km reinforcement, and
- Battery storage equipment.

Natural Gas Transmission Infrastructure Project

The proposal to develop the Melita TransGas Hydrogen-ready Pipeline ('MTGP') connecting Delimara (Malta) and Gela (Sicily, Italy) is still being explored by the Maltese Government, with the proposal for its construction still under consideration. The project has now become fully aligned to the EU Green Deal objectives and the transition to a carbon neutral economy as the pipeline may provide a future possibility to import renewable gases including green hydrogen once the market develops. Its commissioning is dependent on securing funding from the European Union and the development of the hydrogen market (i.e. green hydrogen availability and price).

The Melita TransGas hydrogen-ready pipeline project consists of circa 159 km of onshore/offshore pipeline between Malta and Italy. This pipeline will end Malta's gas isolation, by connecting it to the European Gas Network System, and increase available gas supply capacity as well as security of gas supply. The MTGP is designed with a 22" diameter pipeline that enables bidirectional flows and has a maximum operational capacity of 1.2 bcm/year from Italy to Malta if operated on natural gas, which is equivalent to around 4.2 bcm of pure hydrogen.

If implemented, it would contribute to the decarbonisation of the local power generation and future inland market by enabling the access to renewable gases such as hydrogen and biomethane. The pipeline will be an enabler for Malta to import green hydrogen subject to its availability and the maturity of the hydrogen market. The project will furthermore contribute to market integration,

[81] Enemalta (2024), Enemalta's investment in its distribution network to continue in the coming months. Available at: https://www.enemalta.com.mt/news/text/

competitiveness and improved security of energy supply, whilst removing the emissions from the current LNG supply chain and generate environmental landscape benefits.

The economic viability of the MTGP project could improve over time as the underlying elements that affect the cost of producing green hydrogen—such as technological advancements, production scale, and RES prices—are anticipated to progress in a positive direction. At present, the cost of producing green hydrogen remains high in comparison to other energy sources. However, prevailing trends in the industry suggest a shift towards a more cost-effective alternative. In particular, with an increase in production scale, hydrogen production in Italy is projected to experience significant growth post-2030, primarily driven by advancements in the hydrogen value chain. This is expected to lead to hydrogen supplying approximately 23% of Italy's final energy demand by the year 2050.

A derogation was obtained under the new TEN-E regulation, in order to retain PCI status for the Melita TransGas Hydrogen ready Pipeline ('MTGP') in the next PCI lists (2023-2029) therefore making the project eligible for CEF funding from 2024-2027. The Project is a Project of Common Interest under the 6th PCI list of 2023 pursuant to Article 24 derogation for Malta and Cyprus under the new TEN-E Regulation (EU) 2022/869 by the High-level Decision-Making Body in October 2023 for subsequent adoption of the delegated act with the PCI list. The Project was submitted as a candidate for inclusion in the ENTSOG Ten Year Network Development Plan 2024 as a first step to the 7th PCI list selection process of 2025.

During 2022, the front-end engineering design (FEED) and financial engineering studies for PCI 5.19 were updated to allow the transmission of 100% hydrogen and blends of hydrogen with natural gas. As a result of the upgrade, the CAPEX figure has been revised to €434 million, which includes €3.7 million for EU-funded studies conducted since 2013. The increase in CAPEX is mostly attributed to the rise of inflation, with only €11 million attributed to upgrade the design for the transportation of pure hydrogen. In November 2022, the Italian Single Authorisation Permit (development permit) was obtained for the transmission of natural gas for the Italian part, whereas the development permit for the Maltese portion was obtained in October 2021. The entire pre-application and statutory procedure for obtaining this permit was conducted in close consultation with the Italian TSO, PCI one-stop shop (MASE), the Sicilian Regional Authorities including the Gela Council, as well as the concerned Sicilian stakeholders.

It is anticipated that the project will enhance the reliability, security, and energy efficiency of fuel transportation. The initiative aims to mitigate the current risks associated with supply disruptions caused by severe weather conditions and the technical limitations of the existing LNG supply chain, while also preparing for a potential rise in future demand.

ii. *Where applicable, main infrastructure projects envisaged other than Projects of Common Interest (PCIs)*

Second electricity interconnector

Malta has embarked on the construction of a second interconnector in order to sustain the transition towards decarbonisation and further electrification of its transport fleet, with the aim of diversifying

its energy mix, ensuring resource adequacy and reducing Malta's reliance on fossil fuels This interconnector will link the existing Maghtab terminal station and Ragusa terminal station in Sicily, Italy, having the technical parameters outline in Table 7 below.

Table 7 - Technical parameters for the second electricity interconnector. Source: ICM

Main Technical Parameters			
Type 50Hz – HVAC cable	Approx. route length 122km	Capacity 225MW	Nominal Voltage 220 kV

This interconnector will increase the electricity interconnectivity capacity of Malta with the European electricity network to be able to meet the projected increase in electricity demand resulting from increased population numbers and economic growth, the electrification of the transport sector and the use of onshore power for marine vessels. It will act as an enabler for increased indigenous renewable electricity generation, by providing a buffer to counterbalance for the RES intermittency and enhance the stability and balancing of Malta's electricity grid. Furthermore, this interconnector will increase energy security for Malta, by serving as a back-up in case of failure in the existing electricity interconnector and/or interruption of gas supply to fuel domestic power generation.

The project is therefore an enabler for Malta in its roadmap to reach its 2030 climate and energy targets and its transition to a carbon neutral economy by allowing increased importation of renewable electricity and the optimisation of the local electricity generation mix and is included in the European Ten-Year Network Development Plan (TYNDP) of 2022[82].

In view of Malta's derogations under the Electricity Market Directive (EU) 2019/944 from third-party access, unbundling rules and free choice of supplier, the project is not considered as an interconnecting transmission system part of the TEN-E network, but an extension of the Maltese electricity distribution system with the sole purpose of importing electricity from Italy.

The project is at an advanced design stage whereby the route and protection, both onshore and offshore, have been determined, and the cable sizing and capacity are designed according to the route length and its physical properties. The design contractor, engaged through an open tender procedure, has also designed the transformers, shunt reactors and new gas-insulated switchgear needed for the project. The supplier for the shunt reactor and transformer has been selected following the open tender procedure. This is the first of four tenders related to the interconnector to be adjudicated83.

[82] European Network of Transmission System Operators for Electricity (2022), TR 1085 - Malta-Italy Cable Link No.2. Available at: https://tyndp2022-project-platform.azurewebsites.net/projectsheets/transmission/1085

[83] ICM (2024), ICM issues recommendation for award for the supply and installation of power transmission equipment for the second interconnector. Available at: https://icm.mt/icm-issues-recommendation-for-award-for-the-supply-and-installation-of-power-transmission-equipment-for-the-second-interconnector/

In line with this design, and as a requirement of the development permit, the environmental impact assessment (EIA) and other permitting studies in Malta and Italy, have been compiled by contractors, also engaged through an open tendering procedure. The EIA for Malta was approved in August 2023, with all necessary consultations concluded, and Malta's development permit was issued in January 2024. With regards to Italian permitting, the application for the Italian permit was filed in August 2023, and the Italian Ministry (MASE) initiated the Single Authorisation Decree process in January 2024. The endorsement of VINCA screening was issued by Sicily Region on 1st August 2024. The Italian Ministry of Environment and Energy Security is currently in the process of concluding the procedure for issuing the Single Authorisation Decree.

Onshore power supply infrastructure for marine vessels

The Alternative Fuels Infrastructure Directive (AFIR) as well as the FuelEU Maritime Regulation introduce obligations on both the supply and the demand side for marine vessels to connect to onshore power supply when at berth (assuming the infrastructure is available). While these obligations are expected to ensure that marine vessels operating in the EU continue to reduce their fossil fuel consumption, on the other hand this is expected to lead to a significant increase in electricity demand at the national level, in particular in islands, such as Malta where the reliance on the maritime sector and sea-borne tourism is comparatively high.

There are a number of ongoing projects in Malta focusing on the development of onshore power supply infrastructure, one focusing on the Valletta Grand Harbour and another on the Malta Freeport Terminal. In July 2024, Infrastructure Malta inaugurated a €33 million investment, co-financed by the EU's Connecting Europe Facility on a shore-side electricity project which aims to cut over 90% of the emissions that cruise liners produce when visiting the Valletta Grand Harbour. Shore-to-ship technology allows cruise liners to directly connect with Malta's power grid, with up to five cruise liners being able to use the technology simultaneously. This project will result in improved air quality for 17,000 families in the Grand Harbour area. This is considered a national milestone as Malta is one of the first countries to take up such an initiative.

Preliminary studies indicate that through this project, within 20 years Malta will save up to €375 million in costs linked to the measurable consequences of air pollution, such as impact on health, environment, infrastructure and agriculture[84].

The project is in line with the Government's commitment to decarbonise transport maritime operations within the Grand Harbour as much as possible with the aim to reduce air emissions and reduce the level of noise emissions within the harbour area, thus improving the surrounding environment and quality of life of all persons living and working within the region of the Grand Harbour. The Valletta Grand Harbour is part of the TEN-T Core Network.

[84] Infrastructure Malta (2022), Laying the high voltage cables for shore-to-ship electricity in the Grand Harbour. Available at: https://www.infrastructuremalta.com/news/laying-high-voltage-cables-shore-ship-electricity-grand-harbour

Additional to the Grand Harbour shore-to-ship infrastructure, in 2023, works, including trenching, at the Malta Freeport Terminal for the shore-to-ship project have started. The aim of the project is to ensure cleaner air, less noise and vibration and lead to a reduction of CO2 emissions at the Freeport. The project has a budget of €12 million and is expected to be completed before 2030. It will allow vessels using the Freeport to switch off their engines as soon as they complete the berthing process and make use of onshore power supply[85].

Development of offshore energy

The Government is committed to invest in offshore renewable energy. Detailed information is found in section 3.1.2 Renewable Energy.

2.4.3 Market Integration

i. *National objectives related to other aspects of internal energy market, such as increasing system flexibility, market integration and coupling, smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching, curtailment and real-time price signals*

Due to its specific electricity network characteristics, Malta does not have an electricity transmission system and although the generation sector has been opened to competition there is currently no liquid wholesale electricity market on the island. Enemalta, as sole supplier of electricity on the island, participates in the Italian wholesale electricity market (specifically in the Sicilian bidding zone) for the purpose of purchasing/selling electricity through the interconnector.

Malta's objectives related to the deployment of energy storage, demand response and increasing system flexibility have already been described under section 2.3 (iv) and the respective measures to help achieve these objectives in section 3.3 (i). These efforts are pivotal for seamlessly incorporating renewable energy sources into the national grid while preserving its stability. Increasing the flexibility of the national energy system, including through the roll-out of cost-effective, innovative solutions, such as energy storage is one of the high-level national objectives set out under the Energy Security dimension. Initiatives such as the Marsa North Distribution Centre and the battery storage facilities at Delimara Power Station are clear examples of these efforts. These advancements are expected to play a significant role in the management of the intermittent nature of renewable energy and ensuring a consistent and dependable energy supply.

Malta's primary objective is to establish a highly efficient smart grid characterised by the digitalisation of its energy infrastructure. This will involve the processing of real-time, targeted data from various grid components. Malta is planning to enhance grid interconnectivity, expand the rollout of second-generation smart meters, and increase the connectivity of its national energy system, all of which are geared towards improving the performance and reliability of the national energy system.

[85] Times of Malta (2023), Freeport's €12m shore-to-ship power project begins. Available at: https://timesofmalta.com/article/freeport-12m-shoretoship-power-project-begins.1061166

The size of the Maltese power system and its limited interconnectivity contribute to a significant cost to ensure the desired level of generation adequacy as already recognised by EU Commission's decision SA.45779 which approved availability payments as part of a Power Purchase Agreements and Gas Supply Agreement for the provision of additional generation capacity and gas supply.

Electricity prices in Malta are regulated for all sectors by the national regulator, REWS. Enemalta fulfils multiple roles in the Maltese electricity market: owner and operator of the distribution grid, has the exclusivity of being the sole electricity supplier in Malta, the owner and operator of the interconnector with Sicily, as well as the owner and operator of the emergency back-up generation assets, namely Delimara 2, GT9 and the newly installed temporary emergency power plant. Enemalta is also responsible for central dispatch of electricity.

There are currently no real-time price signals in Malta's electricity market. The retail of electricity is not open to competition[86]. Retail supply must be performed under a license issued by REWS in line with the Electricity Market Regulations, and Enemalta remains the only holder of such a licence in Malta. Except in the case of large developments, meter reading, billing and handling of customer relations are carried out by ARMS Ltd which is a subsidiary company owned and controlled by Enemalta and the Water Services Corporation. Electricity customers remain on a regulated retail tariff intended to cover the net costs related to the operation of the distribution network, in addition to those related to imported electricity, generation and supply activities.

ii. *[If applicable] National objectives related to the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets including a timeframe for when the objectives should be met*

In view of the absence of wholesale electricity trading arrangements, Enemalta is responsible for central dispatch and therefore obliged to dispatch electricity from local generation plants and the interconnector based on their order of economic merit, subject to technical and contractual limitations. RES and CHP plants, irrespective of their size, receive priority dispatch, a policy that will remain until a liquid wholesale market is established. Without these trading arrangements, the current market structure in Malta does not effectively encourage market-based demand response or storage participation due to the lack of market price signals.

The Electricity Market Regulations (Subsidiary Legislation. 545.13), subject to the fulfilment of requirements related to the maintenance of reliability, safety and stability of the distribution system, oblige the DSO to:

- Guarantee the distribution of electricity produced from RES wherever technically feasible and with regard to system stability;
- Give priority to generating installations using RES[87]; and

[86] Official Journal of the European Union (2019), Malta derogations in EU 2019/944: Articles 4 and 6. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0944

[87] This shall be aligned with Article 12 to Regulation (EU) 2019/943.

- Ensure that appropriate distribution systems and market-related operational measures are taken in order to minimise the curtailment of electricity produced from RES.

iii. *National objectives with regard to ensuring that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters*

Enemalta has equipped 99.6% of its consumers with first generation smart meters and has adopted a rising block tariff system that favours the prudent use of energy. Additionally, a second generation of smart meters are being installed which have new functionalities that could allow the consumer to be more aware of their energy consumption. These new meters could be integrated with consumer energy management systems where in-house display systems, smart phones and other devices will provide the consumer with information on their consumption. All new residential electricity services are being installed with a second generation type smart meter. This also applies in situations where first generation meters need to be replaced. Rollout of second-generation smart meters currently stands at around 17.8% of total smart meters installed. Enemalta, in conjunction with the Government, is currently evaluating the available technologies to enable the collection of near real-time data from second generation meters.

Building on this foundation of smart meter technology, the Government is exploring innovative ways to further engage consumers in energy management. Financial incentives, including the energy benefit scheme and the eco-reduction scheme offer financial support to make energy costs more manageable for households. These incentives are designed to promote energy-saving measures and alleviate the economic strain on households with lower incomes, thus making sustainable energy habits more accessible.

There is also a concerted effort to increase renewable self-consumption among consumers with installed PV systems. An increase in the share of renewable self-consumption brings multiple advantages, including alleviating pressure on the electricity grid, especially during peak generation in summer months. Grant schemes for residential PV systems and residential electricity tariffs are designed in such a way that consumers are incentivised to self-consume their generated electricity as much as technically possible. Incentives are also available for the installation of behind-the-meter battery energy storage systems, to further promote renewable self-consumption and allow for peak load shaving. Notwithstanding these incentives, most residential households tend to oversize their PV installation (to maximize their rooftop potential). This became more prevalent with higher efficiency panels and decreasing costs and therefore, in terms of percentage share of self-consumption, it is expected to experience a reduction until there is a large-scale deployment of battery storage.

Objectives and actions concerning renewable self-generation are discussed in section 3.1.2.vi. Objectives and targets regarding energy storage and existing schemes are described in sections 2.1.2.

iv. *National objectives with regard to ensuring electricity system adequacy, as well as for the flexibility of energy system with regard to renewable energy production, including a timeframe for when the objectives shall be met*

National objectives and measures related to the flexibility of the energy system with regard to renewable energy production are set out under the Decarbonisation dimension, Renewable Energy section of the Plan.

Enemalta is responsible to ensure the desired level of electricity system adequacy. Given the small size of Malta's electricity system which includes a gas-fired power plant, a dual-fuel power plant, emergency gasoil-fired back-up plants, an interconnector with Sicily, and several small- and medium-scale PV generators, Enemalta has so far adopted an N-1 approach when establishing generation system adequacy. This means that the system needs to be sufficiently resilient to meet maximum electricity demand in case of loss of the largest piece of power generation infrastructure. Enemalta shall continue to abide by the national objective to maintain the same level of generation adequacy, based on the present approach until such time when further developments of the power system may require an alternative approach.

Malta is highly dependent on energy (gas and electricity) imports, with the only significant indigenous source of energy on the island being renewable energy from solar PV with installed capacity of 241 MW_p by the end of 2023. Due to the inherent intermittency of RES and geophysical limitations on deployment, storage and costs, RES cannot replace all non-variable generation capacity Malta needs and therefore sufficient conventional, flexible, and interconnection capacity is required to complement and provide backup. Although Malta now has a more diversified generation mix, grid stability will become even more important with the deployment of additional intermittent renewable energy sources such as additional on-land PV installations and offshore renewable installations.

A new iteration of the Electricity Supply Study, was carried out in order to provide an updated assessment of the cost-optimal investment solutions for Malta's electricity system, including flexibility solutions to cater for grid stability and to mitigate the intermittency of RES.

Concurrently, Enemalta shall continue to upgrade its sub-stations with transformers integrated with voltage tap-changers, as well as take onboard new technologies which mitigate against current grid integration issues of renewables on the low voltage side and allow further deployment of PV systems on rooftops.

v. *National objectives to protect energy consumers and improve the competitiveness of the retail energy sector*

Competition in the supply of fuels is ensured through existing legislation enforced by the Regulator for Energy and Water Services and the Malta Competition and Consumer Affairs Authority. A number of suppliers are active in this sector. As already explained, the retail of electricity is not open to competition, with Enemalta plc. being the sole supplier of electricity to final customers. Details about policies and measures addressing vulnerable and/or energy poor consumers is provided under Section 3.4.3 iv. and under Section 3.4.4.i.

2.4.4 Energy Poverty

i. *[If applicable] National objectives with regard to energy poverty*

Vulnerable consumers are disproportionately hit by any increase in energy prices. This situation was particularly felt during the recent energy crisis. In response to the challenges faced by vulnerable and energy-poor households, the European Commission (EC) has outlined specific measures within the framework of the revised Electricity Market Directive (EU) 2024/1711. A new Article 28a was inserted whereby MS shall ensure that vulnerable customers and customers affected by energy poverty are fully protected from electricity disconnections, by taking the appropriate measures, including the prohibition of disconnections or equivalent actions. The EU remains committed to implement measures and policies which are tackling energy poverty and safeguarding vulnerable consumers.

The Energy Efficiency Directive refers to the term 'energy poverty' as a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes[88]. Essential energy services to provide basic levels and decent standards of living and health include adequate heating, hot water, cooling, lighting, and energy to power appliances. As heatwaves become more frequent, air conditioning becomes something essential for health, posing additional burdens for those struggling with energy poverty.

Economic stability and social equity are central to Malta's energy vision. Ensuring energy affordability through support measures, financial incentives for renewable energy adoption and energy efficiency measures helps protect vulnerable households and businesses from high energy costs. This inclusive approach promotes social equity and supports economic competitiveness by reducing operational costs for businesses and preventing energy poverty among households. In this respect, the government has adopted a policy of energy price stabilisation. This was achieved through a mix of diversified energy sources, efficiency improvements in the energy generation sector and energy subsidies. This strategic approach not only offers economic relief but also ensures stability for households and businesses alike.

The National Strategy for Poverty Reduction and Social Inclusion 2025-2035[89], published for consultation in 2024, commits to enhancing the welfare of all citizens, aiming to create a society where community cohesion, empowerment, solidarity, and dignity are the cornerstones of collective well-being. Acknowledging the multifaceted nature of poverty and social exclusion, the Strategy sets forth

[88] Official journal of the European Union (2023), DIRECTIVE (EU) 2023/1791 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023L1791

[89] Ministry for Social Policy and Children's Rights (2024), National Strategy for Poverty Reduction and Social Inclusion 2025-2035. Available at: https://socialsecurity.gov.mt/wp-content/uploads/2024/10/NationalStrategyforPovertyReductionandSocialInclusion2025-2035EN.pdf

a holistic approach that extends beyond mere economic measures. It targets a 3.1% reduction in the At-Risk-Of-Poverty and Social Exclusion (AROPE) rate and a 6% decrease in the number of children at risk by 2030. To achieve these goals, the Strategy calls for strategic interventions to improve access to education, healthcare, and employment, while strengthening social support systems. It builds upon previous initiatives, aiming for greater coherence and efficiency in combating poverty and promoting social inclusion. The Strategy is underpinned by five key principles: Thriving Together, Empowerment, Opportunity, Solidarity, and Dignified Quality of Life, all of which guide its recommendations for a sustainable and inclusive society. With a ten-year span and a review process every three years, the Strategy is designed to be adaptive and responsive, ensuring long-term effectiveness in the face of global changes and future uncertainties.

Alongside these policies, Malta has in place several other programs aimed at bolstering support for the most vulnerable segments of society. These initiatives, which will be explored in greater detail in section 3.4.4, underscore the nation's commitment to social welfare.

Energy poverty is a complex issue since it may be a result of a combination of variables including the status of the household, income, gender, knowledge, existing electrical appliances, energy sources and prices among others[90]. Therefore, due to its multi-dimensional concept and cultural sensitivity, energy poverty is not easily captured by a single indicator[91]. Three dimensions of energy poverty have been identified specifically for developed countries: energy costs, income, and the energy efficiency of housing.

Based on an analysis of the local context, local drivers of energy poverty, and data availability, a combination of the following indicators is proposed to assess energy poverty:

- Low disposable income
- High share of energy expenditure in income

The low disposable income indicator refers to the income a household receives from all sources (such as wages, pensions, and social benefits) after excluding taxes, social security contributions, and other mandatory deductions[92]. As disposable income is a key driver of energy poverty, this indicator provides insight into the financial well-being of households by revealing the resources available for basic needs such as energy. It helps identify households likely to experience energy poverty due to low disposable income, thus assessing their socio-economic and living conditions[93]. However, due to the multi-dimensional nature of energy poverty, this indicator should be cross-referenced with others, such as

[90] European Commission (2023), Energy Poverty Advisory Hub Handbook 1: *A Guide to Energy Poverty Diagnosis* (2023). Available at: https://energy-poverty.ec.europa.eu/observatory/publications/epah-energy-poverty-advisory-hub-handbook-1-guide-energy-poverty-0

[91] People Place and Policy (n.d.) Simcock, N./Walker, G./Day, R. (2016): "Fuel poverty in the UK: beyond heating?". In: People Place Policy, Vol. 10: 25–41. Available at: https://ppp-online.org/view-all-volumes/fuel-poverty-in-the-uk-beyond-heating/

[92] European Commission (2023), *Energy Poverty National Indicators: Uncovering New Possibilities for Expanded Knowledge.* Energy Poverty Advisory Hub. Available at: https://energy-poverty.ec.europa.eu/system/files/2024-05/EPAH2023_2nd%20Indicators%20Report_Final_0_0.pdf

[93] ibid

those related to the energy efficiency of dwellings and household energy needs and costs, to comprehensively assess energy poverty.

The high share of energy expenditure in income indicator (also referred to as 2M) measures the proportion of households whose energy expenditure is more than twice the national median, thus assessing the energy costs dimension. This indicator can be based on either income or disposable income and helps identify households with excessively high energy costs relative to their income. While it is a simple metric, it does not differentiate between different energy uses or household priorities, limiting its ability to analyse factors leading to energy-limiting behaviour or overconsumption. Therefore, it is recommended to use this indicator alongside others, such as income levels and energy efficiency of buildings, to accurately identify energy-poor households[94].

In order to calculate the share of households in energy poverty, Malta is opting for a two-step approach: firstly, households with low disposable income are identified, then, among these households, those whose energy expenditure is more than twice the national median will be identified. Households with disposable income below the identified threshold and energy expenditure exceeding the national median twice will be considered energy poor.

To establish a threshold for "low disposable income", the data source for the "Energy Benefit Scheme" is being considered a valid proxy. This scheme in question aims to mitigate the impact of increased water and electricity bills on low-income families, qualifying beneficiaries through an income means test if their total income does not exceed €11,651. This framework is robust for identifying households needing financial support for energy needs, even if the need is not directly due to energy costs. However, some beneficiaries may qualify as humanitarian cases and receive social security benefits like social assistance, age pension, and unemployment assistance, meaning not all households receiving the energy benefit are necessarily energy inefficient or have high energy bills. To address this, data on households receiving the energy benefit was linked with total income and utility expenditure data (excluding LPG) to identify those with a high share of energy expenditure relative to their income.

Through applying the aforementioned methodology, around 3,747 households were identified to fall within the parameters set out by this indicator. This is equal to 1.74% of the household population.

Initiatives aimed at supporting households considered in energy poverty are expected to occur within the context of Regulation (EU) 2023/955 establishing a Social Climate Fund. The primary aim of the regulation is to mitigate the social impacts arising from the EU's update of the carbon pricing mechanism under the Emission Trading Scheme Regulation (ETS), which is set to expand in scope to include the building and road transport sectors. The Social Climate Fund Regulation requires Member States to submit a Social Climate Plan (SCP) to identify policies and measures aimed at assisting vulnerable households, vulnerable transport users and vulnerable enterprises. These groups are expected to face significant impacts from increased energy expenses as GHG emissions from buildings

[94] European Commission (2023), Energy Poverty National Indicators: Uncovering New Possibilities for Expanded Knowledge. Energy Poverty Advisory Hub. Available at: https://energy-poverty.ec.europa.eu/system/files/2024-05/EPAH2023_2nd%20Indicators%20Report_Final_0_0.pdf

and transportation are incorporated into the scope of the ETS. The first SCP, which will build upon the objectives outlined in the NECP update, must be presented to the European Commission by Member States by June 2025.

As defined in the SCF regulation, transport poverty is individuals' and households' inability or difficulty to meet the costs of private or public transport, or their lack of, or limited access to transport needed for their access to essential social-economic services and activities taking into account the national and spatial context. Increases in transport prices will affect negatively individuals and/or households who are not able to have access to affordable transport options given their low disposable income.

Measures, schemes and initiatives are in place to tackle issues energy and transport issues of vulnerable households. Further details regarding the aforementioned measures can be found in section 3.4.4.

2.5 DIMENSION RESEARCH, INNOVATION AND COMPETITIVENESS

i. National objectives and funding targets for public and private research and innovation relating to the Energy Union

Malta remains committed to enhancing research, innovation, and competitiveness. This commitment is evidenced with the formal launch of an updated National Research and Innovation Strategic Plan for the period until 2027.[95] This new strategy seeks to place a greater emphasis on embedding research and innovation in society, aiming to ensure a strengthened governance framework, to foster a knowledge driven economy that prioritises quality of life, resilience and sustainability, especially in recent global challenges such as the COVID-19 pandemic.

The Strategic Plan is aligned with the national economic vision and seeks to enhance synergy between economic development and R&I, particularly through increased investments and a focus on green and digital transitions. It sets forth a mission-oriented approach up to 2027, aiming to build a strong R&I framework supported by both public and private sector investments.

Key to the strategy's success is the prioritization of R&I in national budgeting and economic planning, as well as strong advocacy for R&I at the highest levels of government. The plan advocates for a multipronged approach, targeting investments strategically to address urgent needs and opportunities within the R&I sector. It also stresses the importance of gender balance and diverse representation in R&I governance to ensure an inclusive and equitable R&I landscape.

The plan is structured around five principal goals:

- Goal 1: Strengthen R&I Governance and priority setting: highlighting the need for government to take action on the PSF final Report with an emphasis on recommendations relating to governance and championing of R&I.
- Goal 2: Local Ecosystem Development: this goal is surrounded on the upscaling efforts to boost local ecosystem development. Focusing on actions targeting academia public-private linkages, support structures and internationalisation and actions targeting industry.
- Goal 3: Enhanced Directionality through Missions and Smart specialisation: aims to enhance the directionality of research and innovation by adopting a mission-oriented approach. This approach seeks to closely align R&I activities with the national economic strategy and the broader EU policy direction, such as the Green Deal and climate neutrality targets. The goal is to address key economic and societal challenges, including environmental and climate change, health, competitiveness, and security, through targeted research and innovation missions.
- Goal 4: Mainstreaming R&I in Public Policy: The objective is to enhance resilience, foresight, and swift policy responses by promoting science literacy, awareness, and engagement across society. This will lead to more informed and effective policymaking. Actions to be implemented by 2027 include fostering innovation through public procurement, encouraging

[95] Ministry for Education, Sport, youth, Research and Innovation (2024), "Malta's National Research and Innovation Strategic Plan 2023-2027". Available at: https://parlament.mt/media/127203/pq17648.pdf

PhD holders to work in the public sector, developing R&I skills and capabilities, and ensuring gender mainstreaming in R&I initiatives.

- Goal 5: Strengthening R&I Implementation Structures: This goal supports the recommendations from the PSF Peer Review, which emphasize the need for improved collaboration among all parties involved in R&I funding and the establishment of an efficient monitoring system to track progress and outcomes.

This plan is designed to address immediate vulnerabilities from the pandemic and secure Malta's long-term sustainable development through Research and Innovation.

Reflecting the impact of similar initiatives carried out in the past, the 2023 EIB Investment Survey provides valuable insights. It reveals that 30% of Maltese firms have developed or introduced new products, processes, or services as part of their investment activities in 2022, which is slightly below the EU average of 39%. Additionally, 68% of firms in Malta have utilized at least one advanced digital technology, a figure that is nearly identical to the EU average of 70%. Furthermore, the National R&I monitoring Report 2019-2020[96], which tracks the implementation of the previous R&I strategy for the period 2014-2020, shows that Malta has met some of its R&I objectives. In 2019 the number of PhD holders as a percentage of active population nearly doubled from 2016 in real terms, and the number of researchers (expressed in full-time equivalents, FTE) target was surpassed in 2018 and continued to increase in 2019.

A key component of the National R&I strategy is the introduction of a new "Smart Specialisation Strategy 2021-2027", which places a strong emphasis on the sustainable use of resources to address climate change. Central to this strategy is the goal of harnessing local sources of renewable energy to diversify Malta's energy portfolio with cleaner alternatives. Key initiatives include investing in infrastructure for laboratories and equipment, enhancing personnel training, and fostering collaborative projects between private and public entities.

Adopted at the close of 2021, the Smart Specialisation Strategy 2021-2027, delineates six key areas of smart specialisation to support Malta's Cohesion Policy for the 2021-2027 period, particularly in the Research, Technology, Development, and Innovation (RTDI) sector. Notably, five of these identified specialisation areas have direct or indirect ties to the Energy Union and the decarbonisation initiative. These areas include:

• Sustainable Use of Resources for Climate Change Mitigation and Adaptation, with a focus on net-zero carbon buildings, renewable energy generation and energy storage solutions, resource efficiency in industry and turning waste into a resource.

• Smart Manufacturing, with a focus on sustainable manufacturing and flexible automation.

• Marine & Maritime Technology, with a focus on the valorisation of marine resources and maritime technology.

• Aviation and Aerospace, with a focus on avionics, composite materials and development of new technologies for maintenance of new products.

[96] Ibid

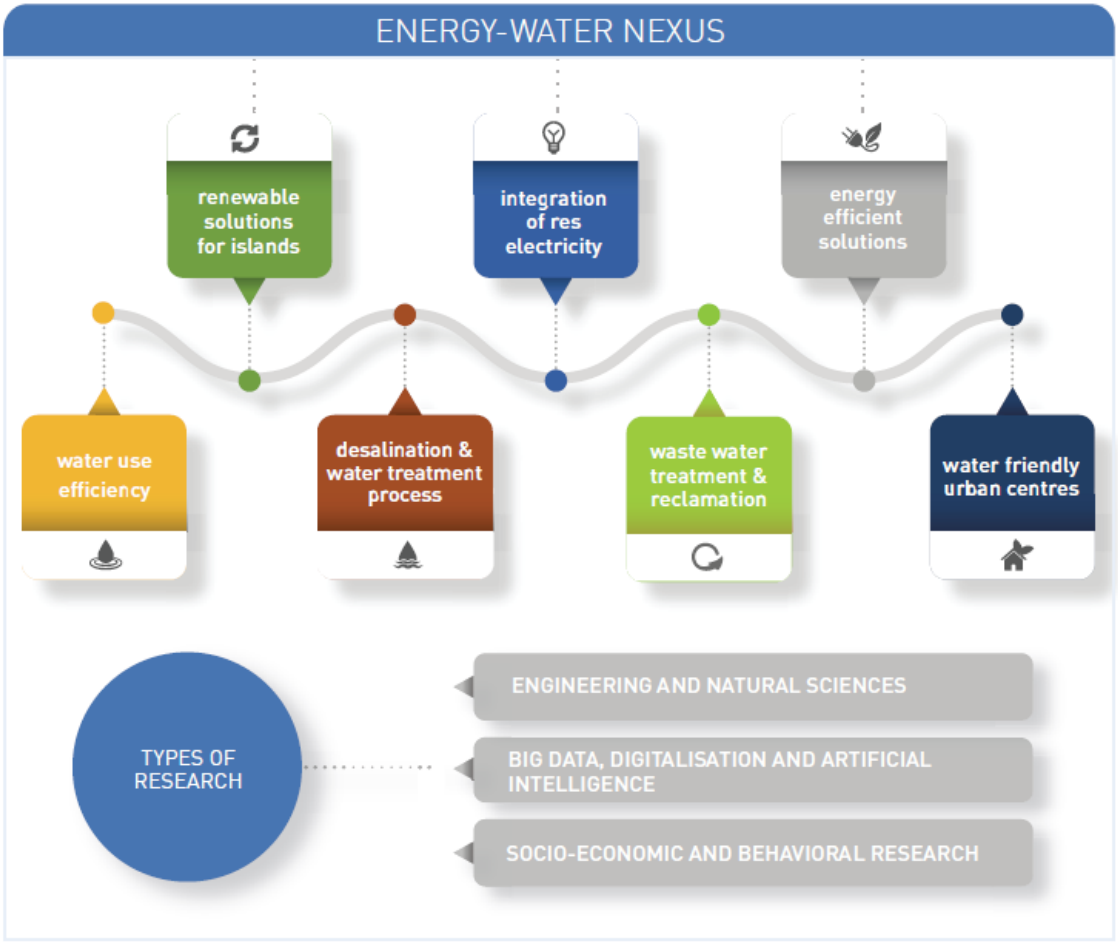
• Future Digital Technologies with a focus on big data and data analytics, open data, smart space applications, human-centric applications, digitizing industries and sustainable use of resources or climate change mitigation and adaptation.

The European Green Deal is recognised as an opportunity provider for more investments towards research and innovation for a greener and more digitized economy. In fact, the National Strategic Plan recommends a targeted focus on a set of well-defined missions which contribute through research and/or innovation to resolving key economic and societal challenges, including environment and climate change, health, competitiveness and security". The same Strategic Plan also recognises the role of thematic ad hoc policies and strategies in delivering the key objectives of the national overarching strategy. One of these ad hoc strategies is Malta's National R&I Strategy for Energy and Water 2021-2030.

Malta's National R&I Strategy for Energy and Water 2021-2030

Malta's objective for R&I within the context of the Energy Union are identified in the National Strategy for R&I in Energy and Water 2021-2030 published in June 2020. This is the first national sectoral-specific R&I Strategy and covers the period 2021-2030. During this ten-year period Malta shall endeavour to continue supporting and bolstering R&I initiatives relating to the dimensions of the Energy Union, specifically those which address national policy priorities and challenges, and those which contribute to national competitiveness and economic growth. In the first NECP three thematic areas, specifically related to dimensions under the Energy Union were identified, these included: Renewable Solutions for Islands, Integration of RE Electricity, and Energy Efficient Solutions. These thematic areas were eventually adopted within Malta's R&I Strategy within the context of an Energy-Water Nexus after consultation with experts and stakeholders as shown in Figure 25 below.

Figure 25 - Priority areas for R&I activities during the ten-year period of the National Strategy for Research and Innovation in Energy and Water (2021-2030)



This Strategy also seeks to strengthen and increase coordination and cooperation on R&I projects between the public sector, research institutions and business enterprises, while ensuring complementarity with national and EU policies, avoiding duplication, and enhancing synergies. In order to reach the previously outlined objectives, the Strategy envisages the development of a Supporting Framework which includes the creation of a Research and Innovation in Energy and Water (RINEW) Platform, to act as the primary tool for the coordination of its implementation (refer to Section 4.6 (i) for further details). This Supporting Framework also includes the creation of support mechanisms including financial support to incentivise R&I.

The government has periodically increased its budget allocations towards research and development in the energy and environment sectors increasing from €177,134 in 2019 to € 1,274,000 in 2023[97]. This trend is part of a broader pattern of R&D investment across various sectors. In 2022, Malta's total R&D expenditure reached €105.3 million, accounting for 0.6% of the GDP. Labour costs continue to constitute the majority of R&D expenditure at 71.3%, with capital expenditure representing 9%. The

[97] NSO (2024), Research & development in Malta: 2022. Available at: https://nso.gov.mt/research-development-in-malta-2022/

distribution of R&D expenditure in 2022 across different research categories—51% in basic research, 24.8% in applied research, and 24.1% in experimental development—remained consistent with the previous year[98].

ii. [Where available] National 2050 objectives related to the promotion of clean energy - technologies and, where appropriate, national objectives, including long-term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy and carbon-intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure

The country is exploring a range of clean energy technologies, such as offshore wind and solar power, flexibility solutions such as battery storage and is investing in the necessary infrastructure to support the electrification of energy-consuming processes. Studies are underway to identify cost-optimal options for electricity infrastructure and to develop strategies for decarbonizing the industry and service sectors. Malta is also considering the potential of biofuels and green hydrogen as sustainable energy options. Despite this Malta does not have 2050 objectives related to the promotion of clean energy technologies and specific decarbonisation targets for energy and carbon intensive industries

iii. Where applicable, national objectives with regard to competitiveness

Malta does not have specific national objectives with regard to competitiveness. That being said, the National Strategy for Research and Innovation in Energy and Water (2021-2030) prioritises support for research activities which contribute towards the competitiveness of enterprises developing or adapting ad-hoc solutions for Malta and countries or regions having similar characteristics. Such home-grown products may also have the potential for scaling up and replication, thus multiplying the inherent added-value of such research and enhancing its potential contribution to increasing industrial competitiveness.

3 POLICIES AND MEASURES

3.1 DIMENSION DECARBONISATION

3.1.1 GHG Emissions and Removals

The first NECP of 2019 for Malta was finalized at a time when the country's overarching long-term decarbonisation strategy was still being crafted. As a result, the original NECP did not fully represent the potential impact of various policies and measures on the GHG emissions and removals component within the decarbonisation dimension of the NECP. Furthermore, the original NECP focused on the 10-years ahead (with an outlook towards 2040) whereas the LCDS has a timeframe up until 2050 and therefore sets out PAMs which contribute to the overarching goal of achieving climate neutrality. Since then, significant progress has been made, and this section has been substantially updated to reflect the comprehensive strategies outlined in the now-published LCDS.

Moreover, the updated section captures a suite of additional initiatives that the Government has embarked upon to mitigate emissions post the publication of the LCDS. These initiatives represent Malta's strengthened commitment to reducing its carbon footprint and aligning with the EU's ambitious climate targets. Policies and measures affecting GHG emissions linked to any of the other dimensions or the renewable energy component of the decarbonisation dimension are described in detail in the relevant sections of this report.

Sectors falling within Emission Trading Scheme (ETS)

Within the ETS framework in force, only power generation falls within its scope. Policies and measures addressing GHG emissions mitigation potential within this sector mainly target uptake of renewable energy systems, introduction of a second electricity interconnector with Sicily, together with improvements in energy efficiency. These policies and measures are outlined in sections 3.1.2 and 3.2.

Sectors falling within Effort Sharing Regulation (ESR)

Transport

The transport sector is a key contributor towards Malta's emissions profile within the ESR as it contributed to practically half of the ESR emissions in 2022. Therefore, measures within this sector are considered key for Malta to further accelerate the decarbonisation and the achievement on the national target of –19% by 2030. These policies are outlined in section 3.1.3.

Waste

The waste sector contributed around 13% to total ESR emissions in 2022. The emissions generated are primarily through landfilling of waste. As part of the efforts to be taken in this sector Malta has embarked on the following projects and initiatives that will be reaping emission abatement potential over the coming period until year end 2030 as they target to divert waste away from landfills:

High Bio-Waste Capture

The investment in the construction of an Organic Processing Plant aimed at diverting waste away from landfills, will be treating organic waste mainly collected from household and commercial entities all over the Maltese Islands. Biowaste plays a key role in sustainable waste management. The project therefore aims at improving waste management in Malta by reducing the amount of biodegradable waste sent to landfill. Through this plant, the organic waste shall be transformed into compost to be used on agricultural fields and biogas will be generated and transformed into heat and electricity. The projected capacity of the plant is estimated to be a maximum of 74,000 tonnes per year of biowaste and is expected to be commissioned by 2030.

Waste-to-Energy Facility

The development of a Waste-to-energy (WtE) facility in Malta is deemed a significant investment that complements the existing and planned waste management infrastructure. The waste-to-energy plant will support Malta's efforts in reducing landfilling of waste in line with the EU targets. Therefore, it will also contribute towards the reduction of emissions from landfilling once it becomes operational. The plant is designed with multiple line facilities, utilising two separate moving grates connected to the same turbine. Each line will accept 12 tonnes (total of 24 tonnes) per hour of material resulting in a net electricity generation between 14 to 16 MW and heat input to the boiler will be between 20MWth and 33.33MWth.

The infrastructural set-up will be located adjacent to existing landfills and other waste management facilities within the Maghtab complex.

The additional investment in incineration pre-sorting and the skip management facility (SMF) will allow for the extraction of resources from waste prior to delivery to the WtE plant. This is also a priority and will be the *modus operandi* of the national waste operator. Coupled with the recent introduction of important policy tools, mainly mandatory waste separation and the introduction of differentiated gate fees, it is envisaged that organic and dry recyclables stream will significantly be diverted from the mixed waste collection to the selective collection system. Thus, the national waste operator is investing in the necessary infrastructure to pre-sort such streams (black bag and mixed bulky waste) through the necessary investment in the Malta North Plant and the setting up of the SMF.

Waste prevention measures

The Waste Management Plan (2021-2030) has been adopted in a manner that maximises the resource value from waste through holistic waste management solutions, adopting a collaborative approach whilst fostering behavioural change through the progressive adoption of various economic instruments. Waste prevention is another key priority area for the improved effectiveness of the management of waste. There is an array of measures in the waste prevention programme which is part of the national plan. These include amongst others awareness raising campaigns, incentives for waste reduction as well as other policy initiatives that will provide for a much-needed shift in consumption behaviour. This in turn will contribute towards reducing emissions from landfill.

Gas extraction from landfill

This will treat the gas extraction of the landfill following the closure of the present landfills in operation. The main aim is to increase extractions points and thus biogas generation throughout the landfill once the landfill has been closed with installation of new gas system.

This project will incorporate the drilling and necessary pipework for the construction of biogas wells and the incorporation of a new Combined Heat and Power (CHP) and Regenerative Thermal Oxidizer (RTO). A secondary RTO is required to handle the eventual increase in poor-quality biogas generation and to upgrade the existing RTO capability at the gas plant.

Agriculture

Due to the small size of the agricultural sector in Malta, its contribution towards generation of GHG emissions is around 7% of ESR emissions. Given that food security is essential for Malta as an island member state, this economic sector remains important for the livelihood of the economy as evidenced during the recent challenging periods. Having said this, policies and measures to reduce emissions are still envisaged within this sector in line with those included in NECP 2019 and supported as well through Malta's CAP strategic plan.

Indeed, there are opportunities for farms to reduce GHG emissions directly and indirectly from better land management, such as reducing the use of chemical fertilisers, improve housing and management of manure, and improving efficiency of use of organic fertilisers, as well as contributing to climate mitigation through energy efficiency measures.

Ensure sustainable irrigation for crops

Ensuring sustainable irrigation for crops will be targeted through the on-farm productive investment intervention as support may be directed towards the purchase of smart irrigation systems that are more efficient, amongst others.

Use animal and agricultural waste and residues as a resource

This need will be addressed through the off-farm infrastructure intervention, which will contribute towards the complete disconnection of farm waste from the sewage network through concrete measures aimed at achieving compliance with UWWTD. Support shall ensure that farm waste is treated as a resource by transforming it as a fertiliser to be reintroduced as an input in agricultural value chains.

Reduce use of chemical N-fertilizers and other inputs with similarly high carbon footprint

Malta's Action Plan for Organic Food[99] is based on a vision that offers consumers high quality local organic food from farming and aquaculture, whilst driving sustainable income for Maltese and Gozitan producers. This will result in the diversification of local organic production, more access to organic produce in retail stores and markets to meet rising domestic demand and strengthen ecosystem around the organic food sector in Malta. The National Action Plan for Organic Food also focuses on promoting organic food production for public health, climate change mitigation and biodiversity protection aims.

In line with the European Commission's 'Farm to Fork' Strategy, the EU has set a target of 25% of its agricultural land being organic by 2030 while also substantially increasing organic aquaculture by the same year. Malta's share of organic production should reach 5% of total cultivated area by 2030, up from 0.6% of organic agricultural land in 2023. This target is also in cohesion with the National Food Strategy that is currently being developed for Malta and other national strategies that support organic production and consumption. The planned measures are listed below.

- Providing tailored financial support for organic farming conversion and maintenance.
- Incentivising landowners to lease out agricultural land for organic farming.
- Driving organic farming in protected horticulture.
- Supporting on-farm productive investments; organic farm start-ups; and off-farm processing of organic products.
- Providing for training, mentoring, and advisory services in organic farming.
- Facilitating access to plant protection products for organic farming.
- Encouraging operators to shift to organic production and certification through aid schemes for organic aquaculture.
- Facilitating the permitting process for operators in organic aquaculture.
- Strengthening the role of the Ambassador for Organic and Sustainable Food.
- Assessing the organisational capacity, capability and infrastructure needs of the responsible authorities.
- Promoting the set-up of an organic forum and website.
- Investing in advisory, knowledge and information systems for the organic sector.
- Establishing dedicated data initiatives to collect, analyse, and disseminate data on the organic food sector.
- Organising and engaging in promotional activities to increase awareness and demand for organic food, including low-trophic and organic aqua-cultured food.
- Assessing the feasibility of designating 'biodistricts' and 'biotrails' through pilot projects.
- Developing channels for the direct selling of organic food.
- Facilitating access to local organic products by the HoReCa industry.
- Promoting the set-up of organic producers' organisations.

Assess the feasibility of Methane-inhibiting vaccines

[99] Ministry for Agriculture, Fisheries and Animal Rights (2023), Malta's Action Plan for Organic Food 2023-2030. Available at: https://agriculture.gov.mt/wp-content/uploads/2023/11/organicActionPlan.pdf

From a policy perspective Malta is very much in favour of a methane-inhibiting vaccine. Nonetheless understanding of the effectiveness and viability of this vaccine is still ongoing. Malta will continue to monitor such developments including from a financial feasibility point of view.

Manure and slurry management

Departing from what was until a while ago common practice, the Maltese government is committed to implement a plan for the complete disconnection of livestock manure from the sewage network. This plan outlines the construction of three slurry treatment facilities—two on the main island of Malta and one on Gozo. These facilities will process farm slurry into solid and liquid fractions, with the solid fraction being treated for use as a soil enhancer or for other products, and the liquid fraction treated according to Directive 91/271/EEC and Regulation (EU) 2020/741.

Until the plan is fully implemented, a short-term solution has been employed, directing farmers to deliver slurry to the Sant'Antnin Facility Treatment (SAFT) for pre-treatment. This has led to a significant increase in the amount of slurry treated at SAFT, with figures for 2023 showing a fourfold increase compared to 2022. The full implementation of this temporary measure began in June 2023, with the quantities of slurry delivered to SAFT indicating a positive trend towards managing the issue. The government is now progressing with the long-term solution, identifying sites for the waste plants and drafting the tender for their construction. Concurrently, Malta is actively working to address an infringement proceeding by the EU Commission (No. 2016/2142), with the aim of remedying the situation without further delay. The commitment to comply with the UWWTD by the end of 2026 underscores the government's dedication to environmental stewardship and sustainable agricultural practices.

Aquaponics and vertical farming

The Government remains committed to evaluating the economic viability of aquaponics and vertical farming, considering both cost-effectiveness and the potential impact on the rural landscape. While these innovative technologies have demonstrated agronomic and environmental superiority over traditional farming methods—yielding higher productivity and sustainability—they raise concerns when developed on agricultural land due to their effect on the rural aesthetic and potential land uptake. It is crucial for relevant authorities to conduct thorough assessments to determine whether such systems should be permitted in agricultural areas or if alternative locations would be more appropriate.

Aquaponics and vertical farming, which merge aquaculture and hydroponics, are resource-efficient solutions ideal for densely populated regions with limited land availability. They conserve water through closed-loop systems, reduce the need for synthetic fertilizers and pesticides, and minimize transportation emissions by enabling local food production. These systems are particularly advantageous in urban and industrial areas, where they align with the "farm-to-table" concept and pose minimal visual impact on the infrastructure.

However, the introduction of these systems into rural areas can disrupt the traditional landscape, introducing structures that may not blend with the natural environment. The Agriculture Directorate

supports the advancement of these technologies but emphasizes the need for congruent policy directions. Infrastructure related to aquaponics and vertical farming should be financially incentivized only if developed on agricultural land in rural areas, while being regulated by planning policies to ensure harmony with the landscape.

The SIMTAP project exemplifies the government's initiative to promote sustainable food production systems that reduce resource consumption and environmental impact. This project aligns with Measure 1.106 of the Electoral Manifesto, which advocates for public-private partnerships in innovative agricultural systems like aquaponics and hydroponics, including those aimed at export markets. However it must be noted that careful planning and policy development are necessary to ensure that these technologies are integrated sensitively into the landscape, whether in rural or urban settings, to support Malta's sustainable agriculture and food production goals.

In addition to these initiatives, the Government recognizes the potential of integrating solar panels into greenhouse operations, distinguishing them from large-scale solar farms. Solar panels on greenhouses serve a dual purpose: energy production and supporting sustainable agriculture. They offer a seamless integration into the agricultural landscape, leveraging solar power to enhance crop growth and improve farm economics. The unique combination of energy production and agronomic benefits makes solar panels on greenhouses a distinct and valuable investment opportunity. Investments in Agrivoltaics should focus on agronomic production, with energy generation as a by-product.

Modification of ruminant diets

The proposed measure aims to address enteric methane emissions in Malta's dairy sector through various strategies, including i) enhancing the digestibility of forage, ii) optimizing the fat content in cattle diets and iii) exploring the use of nitrate as a feed additive. However, Malta's reliance on imported feeds presents challenges in implementing these dietary changes due to issues of availability and cost. The high cost of feed is already a significant burden for local livestock farmers, and further increases could threaten the sector's viability.

Concerning the use of nitrate as a feed additive, Malta, along with other Member States, is actively working to mitigate nitrate pollution from agricultural sources through national Nitrates Action Programs. In Malta, the application of nitrates is regulated by a fertiliser plan, which is a scientifically approved model that dictates the permissible amount of manure based on the nitrogen concentration for different livestock species. Introducing nitrate additives in feed complicates the monitoring of nitrogen levels in manure and poses a risk of groundwater contamination.

Locally, the sole supplier of dairy cattle feed in Malta has been working to optimize the fat content in cattle diets, which affects milk quality. However, it is unclear whether this optimization has led to reduced enteric emissions. Any studies or trials conducted should involve the relevant Competent Authorities, including the agriculture directorate responsible for monitoring nitrogen applications, as well as the animal health and welfare departments to ensure no detrimental effects on livestock.

Malta is exploring alternative ruminant diets that could balance production performance with progress in reducing methane emissions, aligning with the EU's drive to lower methane gases. To support this goal, Malta is undertaking a nationwide trial to supplement the entire dairy cow herd's feed with

methane-inhibiting additives. This initiative aims to achieve significant reductions in emissions and enhance the climate-friendliness of Maltese milk, contributing to the long-term sustainability of the dairy sector.

Common Agriculture Policy

The Common Agricultural Policy (CAP) Strategic Plan for Malta, under the Multi-Annual Financial Framework 2021-2027, is a cornerstone of EU funding for the agricultural sector, with a total budget of approximately EUR 166 million. This plan is a continuation and evolution of the support provided by previous CAP measures, including direct payments and schemes, and is designed to complement other EU-funded interventions and investments.

Aligned with the new European Policies and Regulations for this period, the CAP Strategic Plan for Malta is dedicated to achieving three overarching objectives: fostering a smart, competitive, resilient, and diversified agricultural sector to ensure long-term food security; bolstering environmental protection and climate action to meet the Union's environmental and climate commitments, including those under the Paris Agreement; and strengthening the socio-economic fabric of rural areas.

The CAP Strategic Plan, endorsed by the European Commission in December 2022, will utilize resources primarily from the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). These funds will target the agricultural sector's needs, focusing on environmental and climate objectives, new technologies and digitization, fair income for farmers and workers, improved rural conditions, and enhanced farm resilience. Additional commitments will support organic farming, animal welfare, the apiculture sector, eco-schemes, sustainable agricultural practices, and young farmers, contributing to national green targets in harmony with the European Green Deal, Farm to Fork Strategy, and Biodiversity Strategy.

Under Pillar 1, direct payment schemes such as eco-schemes will reward farmers for adopting environmentally beneficial practices. These include dedicating land parcels for biodiversity, using certified disease-resistant planting materials, and implementing Integrated Pest Management (IMP) to reduce pesticide use.

Pillar 2 focuses on rural development, with environmental and climate-related management commitments. It supports the conservation of indigenous species, the mechanical control of weeds in vineyards and orchards, the maintenance of non-productive trees, the introduction of bee boxes, and the implementation of soil management plans. These interventions aim to enhance biodiversity, soil health, and carbon sequestration, thereby mitigating climate change. The organic farming scheme under Pillar 2 offers payments to farmers transitioning to or maintaining organic farming practices, which are known to reduce greenhouse gas emissions and promote soil carbon storage. Investment schemes, such as on-farm productive investments, encourage modernization and environmental performance improvements, with a substantial budget allocated for a wide range of interventions. Knowledge exchange programs will disseminate information on sustainable practices, resource efficiency, and environmental protection. Off-farm productive investments support projects beneficial to agriculture, including farm waste treatment and the distribution of New Water, with significant funding allocated for these initiatives.

Lastly, the conservation and sustainable use of genetic resources investment supports actions like establishing a local gene bank, ensuring the preservation and sustainable utilization of Malta's unique plant and animal species.

Industrial Processes and product use

The IPPU projections are based on a stock flow approach of F-gases. The GHGs identified as being emitted by this sector are CO2, HFCs and SF6, as reported in the national inventory under the categories: Soda Ash Production and Use, Carbide Production, Use of N2O for Anaesthesia and Consumption of Halocarbons and SF6. Since most of the sectors are relatively minor, projections are solely based on the refrigeration and air-conditioning sector, which covers more than 95% of the whole sector. This ESR sector is particularly relevant to Malta as it includes emissions from f-gases of air conditioning units and contributes to around 18% of ESR emissions. Due to its hot climate, both society and the economy depends on this technology. There is no alternative of a climate neutral technology to air conditioning units for cooling in Malta. It is envisaged that national authorities will continue to improve effectiveness in the enforcement of the requirements under the F-Gases Regulation including to ensure that used up F-Gases are properly disposed of once they reach their end-of-life status.

3.1.2 Renewable Energy

i. Policies and measures to achieve the national contribution to the binding 2030 Union target for renewable energy and trajectories as referred to in point (a)(2) Article 4, and, where applicable or available, the elements referred to in point 2.1.2 of this Annex, including sector- and technology-specific measures

Malta is fully committed to increase its ambition and make a greater contribution to the new Union 2030 renewable energy target. The national circumstances affecting RES deployment explained in section 2 mean that achieving this goal requires the extension of the existing policy framework and the development of new initiatives, policies and measures together with the exploration of innovative technologies and solutions. The government is determined to fully harness all technically and economically viable indigenous renewable energy sources and provide support to the private sector. Malta recognizes the importance of exploring new initiatives and considering emerging technologies to expand the national renewable energy share. As part of Malta’s commitment to increase the share of renewable energy, apart from extending the emphasis on established technologies and sources such as solar PV, renewable water heating technologies, biofuels, heat pumps and bio-waste to energy, Malta is also committed on supporting investment in offshore wind and solar farms.

<u>Share of RES in Electricity</u>

Solar PV

Solar PV continues to be the most viable and robust form of indigenous sources of RES. In 2021, the total amount of PV installations was of 30,559 installations, while 2022 and 2023 saw a further increase

in installations to 32,015 and 33,369 PV systems, respectively. In 2023, the overall energy generated from PVs in Malta accounted to 309 GWh, an increase of 6.7% when compared to 2022. By the end of 2023, the overall PV nominal capacity exceeded 241 MWp[100], corresponding to an increase of 8.3% over 2022.

The total net cumulated capacity as at end of 2023 is shown in Table 8.

Table 8 – PV capacity as at end of 2023

	Capacity in kWp in 2023
Total capacity	241,124
<40kW	127,494
40kW - 200kW	24,769
200kW up to less than1MW	65,986
>=1MW	22,875

In light of further potential for increasing the energy generated by solar PV, the Government intends to continue providing PV schemes and feed in tariffs to further promote the installation of PV systems by households and the commercial sector. Support for solar PV systems smaller than 40 kWp is regulated through Subsidiary Legislation 545.27. The framework supports the installation of new solar PV installations and is currently available in the form of operating aid, and also in the form of a grant on capital investment for households.

In terms of capital grant schemes available for households, the most recent PV grant scheme is the one launched in 2024[101], provides the following options for investments:

1. 50% of eligible costs up to a maximum of €2,500 per system and €625 /kWp for a PV system with standard solar inverter;
2. 50% of eligible costs up to a maximum of €3,000 per system and €750 /kWp for a PV system with hybrid inverter;
3. 80% of eligible costs of the Battery Storage up to a maximum of €7,200 per system and €720/kWh plus 80% of eligible costs of the Hybrid/battery inverter up to a maximum of €1,800 per system and €450/kWp for a Hybrid/Battery inverter and battery; and
4. 80% of eligible costs of the Battery Storage up to a maximum of €7,200 per system and €720/kWh for battery storage only.

[100] NSO (2024), Renewable Energy from Photovoltaic Panels (PVs): 2023. Available at: https://nso.gov.mt/renewable-energy-from-photovoltaic-panels-pvs-2023/#:~:text=During%202023%2C%20the%20harvesting%20of,cent%20on%20the%20previous%20year.&text=The%20stock%20of%20PV%20installations,the%20Gozo%20and%20Comino%20region

[101] Regulator for Energy and Water Services (2024), "2024 Renewable Energy Sources Scheme". Available at: Regulator for Energy and Water Services > en/sdgr/581-2024-renewable-energy-sources-scheme (rews.org.mt)

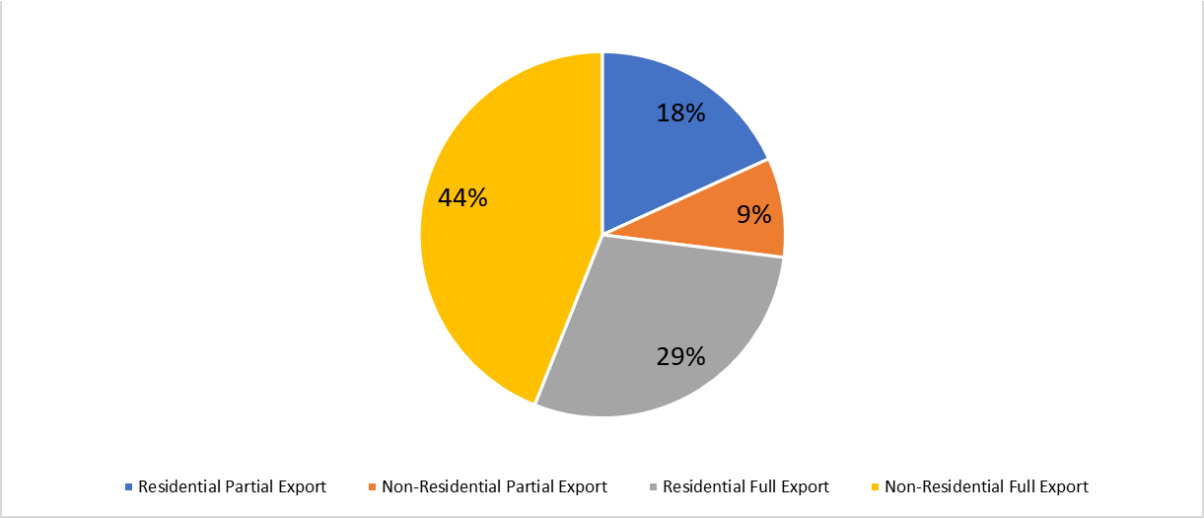
The second and the fourth option could be applied for together. Owners of PV installations installed on residential premises (even those that do not benefit from any aid on the PV system i.e. no feed-in tariff or grant) and connected to the grid for at least 6 years may apply for the third option.

In 2024, support for PV systems with a capacity of at least 40kW is in the form of a two-way contract for difference through a competitive bidding process. For RES installations with capacities ranging from 40kWp to 200kWp and from 200kWp to 1000kWp, with a call schedule that foresees the launching of four separate bidding opportunities in 2024, one for each capacity range. The available capacity for each category is determined by reducing the average bid capacity over the past three calls by 10%, with a maximum combined capacity of 15MW available. By September 2024, the bidding sessions resulted in the award and commitment through a contract of 4.2MW. For RES installations with a capacity of 1000kWp or greater, a single bidding session was held in 2024, with an allocation of 38 MW available of which 26.75MW were awarded and committed through contract. These competitive bidding sessions are governed by Subsidiary Legislation 545.39.

Existing schemes supporting the installation of PV systems cater for the option of self-consumption of renewable electricity in both the residential and non-residential sector. Under existing legislation, the applicant may opt to sell all electricity generated by the PV system to the DSO irrespective of any share consumed on site (full export) or export only the surplus electricity (partial export). Furthermore, in the case where the installation operator does not apply for support, Regulation 4A of SL 545.27 ensures that solar PVs may be installed primarily for self-consumption and that any surplus electricity is supplied to the DSO at the proxy for the market price. The increase in average PV installation size in the residential sector is leading to a higher share of electricity injected in the grid. Meanwhile, the introduction of behind-the-meter battery energy storage systems, is expected to gradually increase the portion of self-consumption in the residential sector.

In 2022, systems on partial export generated 27% of total electricity generated from solar PV (Figure 26). This figure goes up to 37% if one were to exclude third party installations which export all generated electricity. Additionally, if one were to include renewable electricity consumed on site also by those who opt for a “full export” agreement, the share would rise to 44% (Yr 2022). As the support period for several PV systems has come to an end, it is expected that most of these will switch to a “self-consumption” billing option (partial export).

Figure 26 - Electricity production in 2022 from PV systems on full vs partial export by sector (residential (RSD) vs non-residential (Non-RSD)),%



Since the introduction of support schemes in the form of feed-in tariffs, Malta's regulatory framework supported self-consumption and ensured that there would be no legal, financial or technical barriers to renewable self-consumption. Systems which prioritise self-consumption face no additional charges when selling their excess production of renewable electricity to the grid. Self-consumption is promoted as a way in which consumers can offset their consumption of electricity from the grid (in real time) and thus, reduce their electricity bills.

The Government will continue to promote renewable self-consumption of electricity from solar PV systems and ensure that no discriminatory or disproportionate procedures and charges apply.

Although the structure of the Maltese electricity system, with only one electricity supplier (Enemalta is designated as the exclusive electricity supplier in Malta), as well as the limited space available for the deployment of PV installations, can be considered as barriers for the setting up of renewable energy communities, the legal framework originally established for co-operatives, also lends itself for renewable energy communities.

The government remains committed to strengthen efforts to maximise potential of RES in electricity. Within its RRP (RE Power chapter), the government committed to introduce legislative instruments to mandate the installation of solar panels on new buildings and shortened timelines for the application and permit granting procedures of renewable energy installations on greenhouses and renewable energy projects.

A system of fast track permitting, taking the form of a notification process, was adopted by the Regulator (REWS) for PVs less than or equal to 16 Amps per phase to facilitate the installation of such systems and their connection to the grid. In line with Article 16 of Directive (EU) 2018/2001on the promotion of the use of energy from renewable sources, Malta has adopted a simplified procedure for repowered systems.

PV systems larger than 16 Amps per phase require an authorisation and a licence to operate from the REWS prior to construction and connection to the grid. In order to maintain the integrity of the grid,

applicants are requested to commission a grid connection study to be carried out by the DSO to ensure that the system is seamlessly integrated into the network. The grid connection study is performed free of charge for systems below 60A/phase or having a capacity not exceeding 40kWp. The DSO has published a manual detailing the process flow for the processing of applications for grid connections of distributed RES to facilitate the process in such cases[102].

The permitting framework has been reviewed, and legislation and planning guidelines have entered into force requiring the installation of solar panels on new residential and non-residential buildings that reach their maximum allowed height set out in Local Plans and Development Control Design Policy, Guidance and Standards (Annex 2) approved by the Planning Authority (except for buildings in Urban Conservation Areas and scheduled buildings). This measure is also a milestone of Malta's revised Recovery and Resilience Plan. For new buildings which reach local plan height limitations and have adequate solar irradiance (no shading) but want to pursue the PV installation elsewhere, it is being proposed that the developer makes a mandatory energy contribution towards a central RES fund, potentially linked to a solar farm allocation. The policy proposes that new buildings which reach local plan height limitations, which are likely to be shadowed or are limited due to design, are at present exempt, but will be required to invest in alternative (off-site) RES in the future.

Private companies and citizens have an important role in the development of local renewable energy capacities. In parallel, the Government is increasing its efforts to ensure that public rooftop spaces are fully utilised, where possible. The cost-optimality analysis aimed at determining the most economically efficient levels for new buildings have shown that incorporating solar-based renewable sources is financially and economically feasible. The amount of energy generated from these renewable sources depends on factors such as the available roof area and the height of the building. The inclusion of PV panels is listed as one of the requirements in the recently updated version of Technical Document F[103], applicable as from July 2024 for all new and majorly renovated buildings, thus further promoting the adoption of PV panels. The introduction of Technical Document F is a move in the right direction with regards to renewable energy, closely linked to new policies concerning mandatory RES installation in buildings reaching maximum height.

INDIS Malta Ltd, as the largest industrial land administrator in Malta and Gozo, actively promotes sustainability and is exploring opportunities for the installation of photovoltaic (PV) panels on its industrial roofs. Furthermore, in recognition of global environmental concerns, INDIS encourages new and expanding businesses to embrace sustainable practices in their construction projects and to incorporate renewable energy technologies. It will also continue to work towards potential collaboration between the government and stakeholders to support the industrial community to keep investing in clean energy solutions.

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[102] Enemalta (2018), Enemalta process flow for the processing of applications for grid connection of distributed renewable energy sources, (RES). Available at: https://www.enemalta.com.mt/wp-content/uploads/2018/08/Enemalta-process-flow-for-processing-applications-for-grid-connection-of-distributed-RES.pdf

[103] Buildings and Construction Authority (2024), Technical Document F Part 1 : Dwellings Minimum Energy Performance and Building Envelope Requirements. Available at: https://bca.org.mt/wp-content/uploads/2024/01/Technical-Document-F-Part-1.pdf

The Government has introduced a scheme aimed at promoting renewable energy adoption among voluntary organizations. Eligible entities were presented with the opportunity to receive a fully funded PV system for their facilities. Participants could choose from two system configurations: the first being a twelve-module PV system with a 3.6kWp capacity, including an inverter, installation, testing, and commissioning; the second, a more extensive twenty-four-module system with a 7.2kWp capacity, paired with a three-phase inverter and encompassing full installation services. These options were made accessible through a series of four calls, demonstrating the Government's commitment to fostering sustainable energy practices in the voluntary sector.

To further promote the use of Renewable Energy within Public Buildings, PV panels and batteries were installed within 2 Local Councils. Both Pilot Projects were completed in March 2023. One of the aims of these Pilot Projects is the promotion and provision of information to the general public. For this reason, information screens were installed in both Local Councils to further promote sustainability[104].

It is important to note that renewable electricity in Malta is prevalently generated from photovoltaic panels. This means that the generation profile does not benefit from complementarity from other renewable sources. Already with the installed capacity Malta's electricity system may be meeting more than half its demand by PV in certain hours, and therefore would need to be able to sustain rapid changes in supply caused by cloud cover. This effect is bound to become more pronounced as PV deployment increases further. This was one of the reasons that led to the decision to invest in utility scale battery storage which, together with the interconnector, should assist in stabilizing the grid during high variable insolation intervals. Information on these investments can be found under the Energy Security and Internal Energy Market dimensions.

Battery Storage

Apart from the two utility-scale Battery Energy Storage Systems (BESS), the Government is also supporting the investment of smaller-sized distributed energy storage. The Government's efforts to extend its financial support to further increase the deployment of solar PV technology and promote self-consumption, since 2021, households are also eligible to benefit from a scheme to install a battery storage system in conjunction to their PV system. The scheme aims to increase consumers' flexibility in their ability to store excess renewable electricity generated by PV systems instead of exporting to the grid. By the end of 2023, there were 775 behind-the-meter battery storage systems installed, with a capacity of 6.03 MWh. More information on this measure is included in Section 3.3.i.

Biogas

In 2022 alone, the overall energy generated from biogas from waste in Malta was 15.06 GWh, amounting to less than 1% of the overall electricity generated. The commissioning of a new Organic Processing Plant is expected by 2030. Within this plant, organic waste from households and commercial entities will be treated and converted into compost and biogas. The organic processing

[104] TVM News (2023), Mellieħa and Paola councils first to use solar power for their building. Available at: https://tvmnews.mt/en/news/mellieha-and-paola-councils-first-to-use-solar-power-for-their-building/

plant will be designed to treat a maximum of 74,000 tonnes per annum, which at an estimated 120 Nm^3/t of waste input, will generate 20.98 GWh/y in electricity and 19.75 GWh/y in heat, when working at full capacity. In addition, as outlined in the NECP in 2019, a decision to commission a new waste-to-energy thermal treatment plant within the Maghtab complex was taken. These facilities will incinerate non-otherwise treatable or recyclable waste thereby enabling recovery of energy from the waste as well as a reduction in the volume of the waste that ends up in the landfill. This is not expected to contribute to Malta's RES share.

Offshore Renewable Energy Generation

As part of Malta's forward outlook and ambition in increasing the share of renewable energy from indigenous sources, the Maltese Government is focusing on the development of offshore floating renewable energy potential. This follows Malta's commitment towards climate neutrality and its broad goals pursuant to article 14(1) of the TEN-E Regulation (EU) 2022/869 of developing 350MW of offshore renewable energy by 2050.

In 2021, the Government enacted the Exclusive Economic Zone Act (Cap 625 of the laws of Malta). This legislation allows Government to designate, adjacent to Malta's territorial waters, EEZ areas within the limits of Malta's potential EEZ without prejudice to Malta's final EEZ designation. In May 2022, the Maltese Government issued a Preliminary Market Consultation (PMC) for The Proposal of Economic Activities within Malta's Exclusive Economic Zone. This enabled the Government to gauge the level of interest by potential investors including for offshore renewable energy projects within Malta's potential EEZ.

Government has enacted through Parliament various legislations to regulate activities in EEZ areas or environment protection areas outside Malta's territorial waters. Most of the laws of Malta currently only apply up to the territorial waters and therefore it was necessary to extend the applicability of certain laws to exclusive economic zone areas or environmental protection areas, in accordance with the provisions of the 1982 United Nations Convention on the Law of the Sea (UNCLOS), and the Malta EEZ Act. Such amendments to the legislation give both the Government and the operators the necessary legislative framework to conduct such operations. In view of Malta's limited land area, the Maltese government is investigating the possibility to exploit the country's potential for a far larger exclusive economic zone (EEZ) in the surrounding waters, beyond the 12NM territorial waters.

In October 2024, the Ministry for the Environment, Energy and Public Cleanliness (MEEC) launched the National Policy for the Deployment of Offshore Renewable Energy[105]. The Offshore Renewable Energy Policy seeks to enable the offshore potential of the Mediterranean. The Policy provides a first step towards the development of a necessary framework for the deployment of renewable energy technologies within Malta's potential EEZ. The policy is technology-neutral and supports the implementation of offshore renewable projects, mainly wind and solar, in areas lying beyond the territorial waters and within Malta's potential EEZ. It provides a comprehensive framework to promote investment in renewable energy, direct potential investors towards efficient renewable technologies,

[105] Energy Water Agency (2024), National Policy for the Deployment of Offshore Renewable Energy. Available at: https://energywateragency.gov.mt/wp-content/uploads/2024/10/MEE-National-Policy-23_-DIGITAL-_final-5.pdf

promote R&D, and innovation, and aims to ensure that offshore energy potential supports the country's energy security. The policy also seeks to complement the regulatory and implementation framework, which will support investors in materialising their offshore projects, reducing the time from concept to commissioning by assisting directly through effective governance and monitoring.

This policy document complements the success of onshore photovoltaic rooftop and solar farms policies, contributing further to the green energy transition in line with the EU legislative packages of the European Green Deal, Fit-for-55 initiatives and the REPowerEU plans.

Cognisant that floating offshore solar lags behind floating wind in terms of technology maturity, in January 2024, the Maltese government, through REWS, launched a Preliminary Market Consultation (PMC) for the development of near offshore floating solar farms[106]. The PMC seeks to assess market readiness for floating solar technology, specifically photovoltaic farms, and has identified a potential site four nautical miles off the coast of Malta, near Delimara, though prospective developers could propose alternative sitesThe initiative will help evaluate investor interest and support technical studies for a future call for proposals.

There are numerous benefits to floating solar farms, such as maximising the use of available space without competing for valuable land resources, enhanced solar panel efficiency due to water's reflective nature, lower operating temperatures, reduced environmental impact, and minimal visual intrusion. These farms can be placed closer to shorelines to reduce transmission losses and are adaptable to different water depths. Investing in floating solar technology is seen as a step towards energy diversification, reducing reliance on external energy sources, and positioning Malta as a leader in sustainable energy. The PMC has received 13 proposals from local and international operators, reflecting strong investor interest. These are being reviewed by a committee of technical experts.

In December 2024, the government has launched a public call to businesses interested in building the offshore wind farm. A pre-qualification questionnaire has been issued, allowing private companies to register their interest and demonstrate their technical and financial capabilities. The information from the questionnaire will be used to shortlist the top five candidates for the next stage: an invitation to participate in dialogue with Interconnect Malta, the government entity overseeing the process. The companies will then present their 'Best and Final Offer' before a winning bidder is decided.

Renewable Energy Share in Heating & Cooling

It is worth noting that the transition towards a higher share of renewable heating and cooling through heat pump technology is already well-established and is not expected to require specific Government interventions as it is currently the predominant technology for spatial cooling. The current share of RES-H&C is made up of different technologies, which apart from the heat generated by the bio-digesters referred to above, also includes solar water heaters, heat pump water heaters, air-to-air and air-to-water heat pumps and biomass imports.

[106] Regulator for Energy & Water Services (2024), Floating Solar Technology Preliminary Market Consultation. Available at: https://rews.org.mt/#/en/pmc/276

Renewable Water Heating Technologies

Given the high solar intensity prevalent in Malta, solar water heaters (SWH) are considered a viable source of RES. In the case of multi-family buildings, which is the most common household type, there is limited roof space for such technology to service most of the tenants; thus heat pump water heaters (HPWP) are considered as a viable alternative.

The Solar Water Heater Grant Scheme has been renewed, giving applicants the opportunity to claim up to 75% of the total eligible cost, up to a maximum of €1,400. An additional grant of €500 is provided after 5 years to cover the maintenance costs. The Heat Pump Water Heaters scheme aims to provide an alternative technology to solar water heaters, especially for households which do not have available roof area. Applicants are refunded 50% of the costs of the heat pump water heater itself, capped at €1000. This was increased from €700. The roof insulation and double-glazing scheme (detailed in section 3.2), the solar water heater scheme, and the heat pump water heater scheme, are currently allocated a total budget of €1,000,000 per annum.

Apart from the increase in support for these investments, the Government also simplified the application process, such that the beneficiary would receive an immediate clearance to proceed with the purchase of "approved" SWH/HPWH, removing potential downtime of a water heating unit in an already habitable dwelling. The increase in support for these technologies, along with an educational and awareness raising campaign to entice households to invest in such technologies by highlighting the benefits of SWHs/HPWHs, was intended to increase the annual uptake from around 400 units to 800 units over the period 2021-2030 as projected in the first NECP. Despite all these efforts, the actual number of SWHS and HPWHs installed through the grant schemes in 2021 and 2022 was 498 and 633 respectively, falling short of the projected target. There could be several reasons which contributed towards a shortfall in the target uptake. However, it is clear that retailers prefer to push PV systems rather than SWH and customers see more value in a PV installation which is practically maintenance free and provides savings which are easily identifiable in the electricity bill. Furthermore, HPWHs in Malta are not typically integrated with a spatial heating system. Buildings are rarely fitted with central heating systems in view of the low heating requirements in Malta. Therefore, HPWHs are installed to replace small (typically 60 to 80 litres) electric boilers, and although more efficient, come at a significantly higher cost.

Air-to-Air Heat Pumps

Reversible air-to-air heat pump technology is well-established in Malta and considered by many to be essential for thermal comfort. As a result, the number of air-to-air heat-pumps is projected to increase without the need for policy intervention. The Commission Delegated Regulation (EU) 2022/759 of 14 December 2021 amending Annex VII to Directive (EU) 2018/2001 of the European Parliament and of the Council as regards a methodology for calculating the amount of renewable energy used for cooling and district cooling gives Member States details on how to calculate RES-cooling from heat pump technology. This methodology was used to quantify the amount of renewable energy used for cooling in Malta and was included as part of Malta's 2030 RES contribution.

Renewable Energy Share in Transport

Biofuels

Importers of EN228 petrol and EN590 diesel fuels to be released in the inland market used in road transport are subject to a substitution obligation which requires them to blend an increasing share of biofuels in the volumes of fuel placed on the market, with the aim of meeting the targets set in S.L. 545.17. The existing fuel supplier obligation gradually increases the obligation of biofuel blending on importers of petrol and diesel from 10.5% in 2021 to 14.0% in 2030, by energy content, as a share of renewable energy supplied for final consumption in the road transport sector. The obligation additionally requires importers of petrol and diesel to increase the share of advanced biofuels from 0.1% in 2020 to 3.5% in 2030, with the share in 2022 and 2025 being 0.2% and 1.0% respectively. This reflects the obligation that was set out in Article 25 of Directive (EU) 2018/2001. Malta is currently assessing the new fuel supplier obligation included in the revised Renewable Energy Directive (Directive (EU) 2023/2413) in view of its expanded scope and increased ambition. The new target obliges Member States to choose one of the following options:

- a binding share of at least 29% of renewable fuels and renewable electricity within the final consumption of energy in the transport sector in 2030;
- a binding target of 14.5% reduction in GHG intensity in transport by 2030, compared to the baseline set out in Article 27(1), point (b), in accordance with an indicative trajectory set by the Member State.

The revised Renewable Energy Directive also establishes a binding sub-target of 1% in 2025 and 5.5% in 2030 for advanced biofuels and biogas produced from the feedstock listed in Part A of Annex IX and of renewable fuels of non-biological origin (RFNBO) in the energy supplied to the transport sector. Within this target, there is a minimum requirement of 1% of RFNBO in the share of renewable energies supplied to the transport sector in 2030. The percentage shares include energy supplied to all transport modes, that is including aviation, maritime and road transport. For Malta and Cyprus, the Directive caps the international aviation and maritime sectors at 4.12% and 5.00% of the Gross Final Consumption of Energy (GFCOE) respectively.

Electric Vehicles

Policies and measures addressing the electrification of vehicles are outlined in detail in Section 3.1.3.iii.

Other initiatives

Malta's first green bonds program issued by the Water Services Corporation (WSC) in 2023 demonstrates the Corporation’s commitment to environmental sustainability and responsible finance. Valued at €25 million and spanning ten years with a 4.25% interest rate, these bonds align with the UN's Sustainable Development Goals and the EU's Green Deal. Proceeds will fund eco-friendly projects within the Corporation, including a cutting-edge reverse osmosis plant in Gozo, solar farms for renewable energy, wastewater treatment plants, and network enhancements. This initiative tackles water challenges, promotes job creation, and economic growth. The certified Climate Bonds Initiative ensures that funds benefit environmentally impactful projects.

Article 15a of Directive 2024/1711, known as the Electricity Market Directive, introduces a concept termed "energy sharing." This directive mandates that MS ensure that active customers, have the right to share renewable energy amongst themselves, such that renewable electricity exported to the grid by one party can be used to offset consumption by one or more other parties. This adjustment must occur within a timeframe that does not exceed the imbalance settlement period. The provisions concerning energy sharing are required to be incorporated into national law by July 2026.

ii. Where relevant, specific measures for regional cooperation, as well as, as an option, the estimated excess production of energy from renewable sources which could be transferred to other Member States in order to achieve the national contribution and trajectories referred to in point 2.1.2

While recognising the importance of these transfers, the Government does not foresee the purchase of RES credits for the remaining periods leading to 2030. Development of indigenous renewable capacities will continue to be prioritised, whilst seeking opportunities for regional cooperation.

In this context, Malta has embarked on a number of projects and initiatives that are fostering intra-regional collaboration and that will enable the further deployment of renewables. One such project includes the construction of another 225MW interconnector between Malta and Sicily. This project is expected to be fully commissioned before 2030, doubling the electricity interconnectivity of Malta with the European grid.

In the spirit of promoting regional cooperation, in May 2023, Malta together with eight other Mediterranean countries participated at the Med9 Energy Ministerial meeting in Malta and signed a joint statement that seeks to turn the region into a hub of green energy. The Med9 countries agreed that the Mediterranean can become a centre of renewable energy investments, with a focus on offshore renewables and new energy interconnections between the EU and non-EU Mediterranean countries, in efforts to facilitate European investment in green energy. Since the MED9 summit, Malta has signed a Memorandum of Understanding with third countries, further strengthening its commitment to enhanced regional cooperation in the energy and electricity sectors. More details about regional cooperation can be found within section 3.4.2 (ii).

iii. Specific measures on financial support, where applicable, including Union support and the use of Union funds, for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling, and transport

The Government plans to extend existing support schemes and is also considering new opportunities for support to RES generation.

In line with Article 4 of Directive (EU) 2018/2001, the Government plans to extend existing support schemes, in the form of EU/national capital grant incentives and operating aid for the promotion of

electricity from RES, in order to increase penetration of RES, with a focus on solar PV and renewable water heating technologies.

With regards to solar PV, while costs are decreasing, national projections denote that there will remain a need to address financial barriers in the residential and non-residential sector. The LCOE of residential PV systems is likely to remain higher than the proxy for the market price of electricity until 2030, indicating that few consumers would invest without financial support. This is the same for the commercial systems for which, based on current projections, the LCOE will not reach grid parity until the end of the projected period; this is largely on account of the associated high costs for land/rooftop rent and/or grid connections. Furthermore, it is likely that the financial and technical barriers experienced by those consumers who have not yet installed a PV system are likely to be higher than those who have already invested in this technology.

Thus, the Government intends to maintain financial support schemes to encourage the deployment of renewable energy. The grant and operating aid for the promotion of electricity from RES will continue to be revised on a regular basis to ensure a reasonable return on investment and avoid overcompensation as system costs and electricity prices evolve, while taking into account all relevant costs.

It is being estimated that, on average, an additional estimated €10.9 million annually will be required to support for the installation of new PV systems and support existing systems until 2030These estimates are sensitive to the evolution of electricity wholesale prices. For instance, should the proxy for the market price of electricity diverge from projections, the budgetary impact of support schemes would change depending on whether the Government would be required to bridge a larger or smaller cost gap.

The ERDF Programme for Malta 2021-2027 currently specifies 'Pilot projects addressing wind renewable energy' under Specific objective: RSO2.2. "Promoting renewable energy in accordance with Renewable Energy Directive (EU) 2018/2001[1], including the sustainability criteria set out therein (ERDF)". It is being proposed that these ERDF funds are repurposed, to be used for important research studies and surveys for the design and development of the large-scale offshore wind farm project. These studies would include geophysical, environmental, and geotechnical marine surveys and post-survey assessments of the export cable marine route corridors from Delimara to the Offshore Substation connecting to the offshore Wind Farm and the offshore wind farm itself and LiDAR studies (Floating Offshore Light Detection and Ranging equipment).

iv. Where applicable, the assessment of the support for electricity from renewable sources that Member States are to carry out pursuant to Article 6(4) of Directive (EU) 2018/2001

According to article 6.4 of the Renewable Energy Directive, "Member States shall, at least every five years, assess the effectiveness of their support schemes for electricity from renewable sources and

their major distributive effects on different consumer groups, and on investments." Member States are required to provide an update of this assessment in the NECPs and progress reports. Malta is currently developing this assessment.

v. Specific measures to introduce one or more contact points, streamline administrative procedures, provide information and training, and facilitate the uptake of power purchase agreements

RES generators and Combined Heat and Power plants rated up to 16Amps per phase are only required to submit a simple notification to the Regulator for Energy and Water Services. Therefore, the aforementioned systems are exempted from requesting and obtaining an authorisation prior to installation and from obtaining a licence to generate electricity from the Regulator for Energy and Water Services. They are also exempted from the requirement to request a grid study from the DSO.

Simplified development planning permit granting procedures for small scale renewables and renewables self-consumers have long been in place: for example, rooftop PV installations have simpler development planning permitting procedures (with restrictions, such as in Outside Development Zones (ODZ) or on scheduled or older buildings with conservation value). The most favourable permitting procedure, known as the Development Notification Order (DNO), is applicable to specific situations:

- Any PV installation in industrial zones, whether ground-mounted or not.
- Roof-mounted PV installations in the Development Zone.

The DNO process is faster and simpler compared to other planning regulations. For rooftop PV projects, no notification to the Planning Authority is typically needed, except for scheduled buildings or older buildings with conservation value, where height restrictions apply.

From a development planning perspective, all project submissions, consultation replies, and information from architects are accessible online through the Planning Authority's electronic portal. The Development Permit Application (DPA) report is also made available on the portal. The project's approval will be determined by the Board. The public is welcome to attend the PA Boardroom in person or follow the meeting online. All PA procedures have been digitized since 2017.

The Regulator for Energy and Water Services has also launched a digital platform to consolidate the procedures associated with the grid connection, metering and licensing/authorization of the RES generator.

Additionally, there are ongoing efforts to establish a single point of contact. There will be one coordinated contact point which will be a joint set-up with the necessary entities.

To date, there have been no requests to issue of Guarantees of Origin from producers generating electricity from RES since most of the electricity from RES either receives support or is produced for own consumption. In Malta there is only one supplier of electricity and all customers in the same category are required to pay the same regulated tariff. The supplier publishes the electricity fuel mix composition of the electricity supplied, including the renewable component for the information of the

customers. The electricity fuel mix calculation is based on metered data and the electricity fuel mix composition is published on the supplier's website[107].

Presently, Malta's renewable support schemes are financed through national budget and not through contributions by customers in their electricity bill.

In accordance with Directive (EU) 2018/2001, the Government has issued a tender to assess the regulatory and administrative barriers to long-term renewables PPAs and to promote the uptake of such agreements.

RES Acceleration Areas

As per Article 15c of Directive (EU) 2023/2413 (REDIII), by February 2026 Member States are required to adopt one or more plans designating renewables acceleration areas for one or more types of renewable energy sources. These areas may include specific land, sea or inland water areas. The areas should be particularly suitable for the purpose of developing RES projects, on the basis that the deployment of a specific type of renewable eneryg source is not expected to have a significant environmental impact. The Plans designating such RES Acceleration areas shall be subject to an environmental assessment, and if they are likely to have a significant impact on Natura 2000 sites, to an appropriate assessment. Individual RES projects located in such areas will benefit from accelerated permit-granting procedures. Relevant national authorities and entities have initiated discussions on the establishment of such areas, which is expected to build upon existing spatial planning initiatives at the national level.

The Planning Authority's Spatial Plan for the Environment and Development (SPED), established in 2015 includes a policy framework that supports RES expansion. The SPED highlights that the Coastal Zone and Marine Area shall maximise the potential for sustainable socio-economic growth and renewable energy infrastructure. Any promotion of large-scale renewable energy infrastructure should be done in a manner which minimises user conflicts, does not accelerate coastal erosion, protects biodiversity and cultural heritage, safeguards landscapes while maintaining their visual and public access, and increases resilience to climate change impacts. Notably, SPED Strategic Policy Map 3 identifies marine areas with RES potential up to 12 nautical miles, and SPED Policy CO1 endorses RES development.

The current policy framework in SPED is included in:

- SPED Strategic Policy Map 3 which indicates potential for RES at sea up to 12nm
- SPED Policy CO1 which indicates support for RES development

[107] Enemalta (2024), Fuel Mix for Energy Distribution. Available at: https://www.enemalta.com.mt/environment/fuel_mix_for_energy_distribution

Preferred areas for PV installations are also identified in the Planning Authority's Solar Farm Policy (2021) which earmarks suitable locations for the establishment of solar farms. This policy outlines various site categories, including:

- Large-scale rooftops within designated zones,
- Spacious open areas within appropriate zones, where dual use of the site is reasonably feasible,
- Areas designated for development in strategic or subsidiary land use planning policies, encompassing Areas of Containment (AoC's), garage industry sites, and Small and Medium Enterprise (SME) sites,
- Other sites within industrial activity zones, such as construction plants,
- Officially disused landfills,
- All quarries, particularly those in flatter regions like Mqabba/Hal Kirkop and Mqabba/Qrendi/Siggiewi, considering improved visual integration, provided they are not located within, partially within, or adjacent to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) and are currently operational, inactive, or disused. Quarries restored before the adoption of this policy are ineligible for solar farm development.

The Development Control Design Policy Guidance and Standards 2015 (DC15), supports and encourages the inclusion of PV modules and solar water heaters within the design of buildings, particularly at roof level.

Separately, the Development Notification Order (DNO), also provides for the most favourable permitting procedures, applicable to specific situations (excluding scheduled buildings, buildings with conservation value, where height restrictions apply):

- Any PV installation in industrial zones, whether ground-mounted or not.
- Roof-mounted PV installations in the Development Zone.

vi. Assessment of the necessity to build new infrastructure for district heating and cooling produced from renewable sources

Malta does not have any district heating and cooling networks. The third comprehensive assessment on heating and cooling was carried out in 2024. Information regarding the outcome of the assessment is elaborated in Section 4.3. ii on the current potential for the application of high-efficiency cogeneration and efficient district heating and cooling.

vii. Where applicable, specific measures on the promotion of the use of energy from biomass, especially for new biomass mobilisation taking into account:
-Biomass availability, including sustainable biomass: both domestic potential and imports from third countries
-Other biomass uses by other sectors (agriculture and forest-based sectors); as well as measures for the sustainability of biomass production and use

Biomass is imported to Malta in small volumes and mostly used for heating purposes by households. It is foreseen that biomass imports in the future will remain stable and no specific measures are foreseen to promote the use of energy from biomass.

3.1.3 Other Elements of the Dimension

i. Where applicable, national policies and measures affecting the EU ETS sector and assessment of the complementarity and impacts on the EU ETS

As of 2023, Malta had a combined nominal electricity generation capacity from fossil fuel of 556.6 MW[108], prevalently running on natural gas (effective available capacity depends on season and maintenance schedule). Apart from the electricity generation sector, Malta has no other large-scale industrial installations falling under the scope of the Emissions Trading Scheme Directive.

Insofar as aviation is concerned, Malta is the administering Member State of the EU ETS in respect of aircraft operators with a valid operating licence granted by the Civil Aviation Directorate (Transport Malta), and those operators that are licenced by non-EU Member States, or that do not require an operating licence, and for whom Malta has been identified as being the Member State with the greatest attributed emissions from flights performed by that operator. For the period 2017 to 2023, aircraft operators administered by Malta and eligible for free allocation amounted to only three. The updated rules on emissions trading in the aviation sector will bring about the phasing out of free allowances for this sector by 2026. This agreement increases the stringency of the existing system, which has covered aviation since 2012.

The scope of the EU ETS has been extended to include CO2 emissions from large ships (above 5000 gross tonnage), regardless of the flag they fly. The extension covers all emissions from ships calling at an EU port for voyages within the EU (intra-EU) as well as 50% of the emissions from voyages starting or ending outside of the EU (extra-EU voyages), and all emissions that occur when ships are at berth in EU ports. This EU-wide policy initiative is expected to impact Malta particularly given that as a small island member state it relies heavily on transhipment for goods and services including food items. It is envisaged that this policy initiative will lead to socio-economic implications and possibly inflationary pressures as the higher costs are likely to be passed on to the end consumers. Having said this, the Maltese authorities are gearing up their administrative set-ups to be able to implement this initiative together with the other EU member states' authorities.

The ETS2 (Buildings and Road Transport) is a new separate emissions trading system for fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing ETS). It complements policies covering these sectors by ensuring cost-efficient emissions reductions and a more level playing field for decarbonisation in these sectors. This "upstream" system regulates fuel suppliers rather than households and car drivers. Malta acknowledges that, in the framework of the EU's collective transition towards climate neutrality together with meeting the 2030 climate objectives (as enshrined in EU law), the ETS-BRT is designed to direct EU citizens towards making greener and cleaner choices. Moreover, provided that Malta lacks viable rapid mass transport alternatives despite the level of urbanisation this is not expected to lead to significant emission reductions. This is the ultimate objective of the ETS-BRT. It is evident that the reality Malta faces in terms of infiltration of electric vehicles onto its highly particular market requires further significant

[108] REWS (2024), Annual Report 2023. Available at: https://www.rews.org.mt/#/en/a/20-annual-reports

support and policy measures. This is the only way to effect change in terms of emission reductions from the road transport sector by 2030.

ii. Policies and measures to achieve other national targets, where applicable.

Not applicable.

iii. Policies and measures to achieve low emission mobility (including electrification of transport)

Malta's national Transport Master Plan is currently being updated and extended to 2030 in line with the 2050 National Transport Strategy. The 2030 Transport Master Plan comes at a time when Malta is experiencing robust post pandemic recovery, continued economic growth, population growth, and record employment levels, with demand for transportation needs and energy steadily increasing.

The Master Plan provides an overview of the actions being undertaken within the transport sector taking into account current and future needs. In this regard, the plan seeks to identify the right policy mix of measures whilst ensuring that economic progress and infrastructure development move steadily while managing the effect of transport on the environment, public health, and climate change.

The revision takes a comprehensive look at all modes of transport, including inter-modality for both freight and passenger transport. For these purposes, the National Transport Model (NTM) will be updated in order to reflect the current and forecasted economic and social scenarios and to inform policy and provide an integrated transport analysis. The model will be an update of the 2025 National Transport Model and will be used for the testing and appraisal of transport scenarios and provision of transport forecasts to refine the National Transport Strategy and develop the updated Transport Master Plan for Malta. The model will assist the Government's work by producing outputs for more detailed local or project models as input into the engineering design process, economic and financial analysis, environmental assessment, and for monitoring of current and future projects.

Malta's strategies and initiatives in relation to air quality recognise the transportation sector as a contributor to air pollution. The actions outlined in these initiatives are aimed at enhancing sustainable transportation, thereby also addressing the issue of reducing greenhouse gas emissions from the transportation sector. The Air Quality Plan (AQP)[109] for Malta has recently been published. This plan encompasses a range of measures designed to comprehensively address mobility challenges through sectoral initiatives that differentiate between household mobility needs and business operations mobility needs. The measures issued for public consultation evolve around encouraging a change in behaviour, including promoting reduced use of private vehicles in conjunction with promoting increased use of environmentally friendly public transportation services such as free public transport, as well as transitioning to cleaner fuels for the vehicle fleet. The AQP focuses on a number of transport related policies with the aim of improving air quality, notably sustainable mobility, infrastructural and

[109] Environment Resources Authority (2023), Air Quality Plan. Available at: https://era.org.mt/wp-content/uploads/2024/03/Air-Quality-Plan2023.pdf

traffic management, ongoing studies, regulatory measures, and spatial planning. Therefore, the implementation of such plans and programmes will be included in the final NECP update as complimentary to the other policies and measures outlined in chapter 3.

As set out in Malta's first NECP, a number of measures have been implemented to achieve low emission mobility and incentivise the uptake of EVs in the local fleet. These measures are expected to be extended, strengthened where possible and complimented with new measures in the period leading up to 2030 and beyond, in line with other national policies.

Additionally, as at the date of this report the Ministry for Transport, Infrastructure and Public Works is undertaking further stakeholder discussions on the implementation of a number of measures primarily aimed at alleviating pressures on traffic congestion, but which could also reduce carbon emissions from land transport. Measures that could have relevance to the NECP targets include off-peak service provision; a feasibility assessment of the introduction of a cargo ferry service from Valletta to Gozo (current option is for cargo to travel by land to Cirkewwa to take the ferry to Gozo); adding and modifying public transport routes, as well as direct and circular buses to selected locations/ hubs; parking solutions such as Park & Ride Facilities; longer-term measures to reduces the number of driving licenses; and the implementation of the national walking/ cycling strategy.

Electrification of Transport

Electrification of vehicles is one of the identified priority areas at EU level in order to achieve the increased overall EU ambition to reduce climate emissions by 55% by 2030. Malta has also identified the electrification of vehicles as a key measure to reduce emissions from the transport sector in its LCDS. Within this context, the Maltese government is intensifying its efforts to make the equivalent GHG emission savings of 65,000 electric vehicle equivalent by 2030. The below list outlines additional policies and measures related to the transition towards electrification of vehicles:

- Roll-out of EV publicly accessible charging points
- Legislative obligations and incentives for private charging pillars
- Electrification of Public Sector Vehicle Fleet
- Work Plan of Cleaner Vehicles Commission
- Assessment of the vehicle-to-grid systems

Electrification of vehicles

The Government's commitment towards the reduction of GHG emissions from the transport sector includes an array of measures particularly related to the electrification of the transport fleet that aims to enable the transition towards zero emission vehicles. These measures are being planned in line with various external and internal factors particularly the ban on sale of Internal Combustion Engine Vehicles in line with regulation of the European Parliament and of the Council amending Regulation (EU) 2019/631 as regards strengthening the CO2 emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition, supply considerations and the price convergence element.

Electrification of land transport remains an important tool to reduce emissions in road transport. In order to incentivise the take up of electric vehicles, €50.3 million[110] from Malta's Recovery and Resilience Fund (RRF) have been allocated over the span of 3 years, for a total of 5,600 grants, to instigate a wider shift towards electric mobility and reduce emissions emanating from the road transport sector. These funds will assist in promoting the uptake of new electric vehicles in the private sector, including the commercial sector, through grant schemes. The schemes support the purchase of new passenger and goods carrying vehicles, minibuses/coaches, quadricycles/motorcycles and pedelecs. The scheme was launched in January 2022 and is to run through a rolling call up to 2025[111].

Malta currently offers an advantageous scheme in terms of incentivising the modal shift to EVs and a number of measures have been taken to achieve this throughout the years. Following the grant package that was launched in 2018, the Government relaunched the scheme in the 2025 Budget and is now offering a €8,000 grant to those purchasing a new EV. An additional scrapping scheme of €1,000 is available to those opting to deregister a vehicle of any category which is older than 10 years from its year of manufacture. This scheme was welcomed by the public, and in 2022 alone, over €28.4 million worth of applications have been received with 1,139 applications for new EVs, 893 applications for used EVs or plugin hybrids, 110 applications for LPG conversions and 2,264 applications for low and medium performance vehicles (new L category).

As a result of an investment of around €28 million in incentive grants in 2022, 1,381 electric/plug-in hybrid vehicles and 1,378 pedelecs/motorcycles were registered until the end of December 2022. In 2023 Government increased the investment to €29m, €15m available from the RRF and €14m from national funds. This resulted in the registration of new electric vehicles and plug-in hybrid vehicles surpassing that recorded in 2022 in the same period. By the end of March 2023 there were a total of 6,221 registered electric vehicles, and 3,304 plug-in hybrid vehicles on our roads. A total of 9 financial initiatives in the form of grants were launched in the beginning of 2023.

Roll-out of EV Publicly accessible charging points

To support the electrification of transport systems, around 6,500 charging points are estimated to be required to be installed by 2030. This transition towards electrification of ICE vehicles across the nation will impact all stakeholders, from government to industry and the private sector, civil society and citizens. Such infrastructure will be adequately supporting the uptake of EVs on a national scale. Around 360 charging points are already installed around the Maltese islands. A further 1,200 charging points will be funded through the Cohesion Fund, achieving a total of 1,500 points by 2025.

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[110] European Commission (2024), Malta's recovery and resilience – Supported projects: Nation-wide investment scheme. Available at: https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/maltas-recovery-and-resilience-plan/maltas-recovery-and-resilience-supported-projects-nation-wide-investment-scheme_en#:~:text=The%20EUR%2050.3%20million%20investment,also%20includes%20incentives%20for%20scrappage.

[111] Transport Malta (2024), "Purchase of New Electric Vehicles 2023". Available at: https://www.transport.gov.mt/land/sustainable-transport/financial-incentives-2023/new-electric-vehicles-6188

Legislative obligations and incentives for private charging

By virtue of Legal Notice 134/2020 new non-residential buildings and those undergoing significant renovation and having more than ten parking spaces must include at least one recharging point as defined in Directive 2014/94/EU of the European Parliament and the Council. Additionally, ducting infrastructure, such as conduits for electric cables, must be installed for at least one in every five parking spaces to allow for future installation of recharging points for electric vehicles. This requirement applies when the car park is located inside the building and renovation measures involve the car park or the electrical infrastructure, or when the car park is physically adjacent to the building and renovation measures include the car park or its electrical infrastructure.

Moreover, according to the Maltese Subsidiary Legislation 623.01, by January 1, 2025, requirements for the installation of a minimum number of recharging points in all non-residential buildings with more than twenty parking spaces will be established.

In the case of new residential buildings and those undergoing significant renovation with more than ten parking spaces, ducting infrastructure for electric cables must be installed for each parking space to enable the future installation of recharging points for electric vehicles.

Furthermore in 2021, the Electricity Supply Regulations (S.L. 545.01) were amended to reflect preferential electricity tariffs for EV charging in residential and non-residential premises. Off-peak consumption tariffs for EV charging apply from Mondays to Saturdays between midnight and 6am and between noon and 4pm. The off-peak tariff applies all day on Sundays.

Electrification of Public Sector Vehicle Fleet

As part of the Government's commitment to lead by example and transition towards greener mobility, 250 EVs will be introduced as part of the public sector vehicle fleet and improve the efficiency of current operations through the concept of ridesharing between the various ministries and government departments. The aim is to see a change in mobility management in the Maltese Public Service through the procurement of a cleaner fleet of government general-use vehicles. This is also in terms of Reform C2-R6 of the RRP which is namely: Enhanced mobility management in the public service. The reform shall be implemented by 2030. In addition, government, through the adoption of the 2nd Green Public Procurement National Action Plan, made the criteria for the product group Transport mandatory, for all procurement in scope. These criteria are applicable to all vehicles for ordinary use, emergency vehicles and special vehicles. This Policy initiative is supporting the public sector to transition towards a lower GHG intensity within its fleet mainly through electrification of its vehicle fleet.

Electrification of vehicles in the services and industry sectors

The Government also recognizes the importance of reducing emissions from specific sectors including the services and industry sectors in line with the objective of moving towards climate neutrality. Malta already provides assistance and supporting measures within the RRF framework as outlined in previous sections and shall continue exploring innovative measures assessing the challenges that are currently hindering significant progress in this regard both from a demand and supply perspective.

The recently launched Green Mobility Scheme is strategically aligned with other initiatives that support the green transition in the transport sector. It offers financial incentives, including grants and tax benefits, to encourage this transition. Eligible participants can apply for assistance to invest in the necessary recharging infrastructure for vehicles that are crucial to their business operations, and for the leasing of clean or zero-emission vehicles.

This scheme offers support for the procurement, installation, and commissioning of private recharging infrastructure equipped with smart charging features, which are necessary for businesses to recharge its commercial vehicles. Financial assistance may come in the form of a grant that covers up to 100% of the interest paid during the first three years on a loan backed by the Malta Development Bank or a recognised financial institution for eligible costs. Alternatively, a tax rebate may be awarded, calculated as a percentage of the eligible costs incurred.

In terms of support for leasing commercial vehicles, the scheme provides tax credits for leasing clean or zero-emission commercial vehicles for a minimum of twelve months. The support can extend to cover the leasing costs for up to thirty-six months from the start of the lease agreement[112].

Assessment of the Vehicle to Grid systems

Enemalta and the MEEC are actively studying the introduction of flexibility services as part of Government's effort in modernizing the electricity grid and preparing it for future developments. Details are found in section 3.3 (i).

Scrappage Scheme

Malta is committed to move away from ICE vehicles and electrify its fleet. A number of measures which have been identified in the LCDS are also expected to contribute towards Malta's energy savings target. A generous grant scheme to incentivise the purchase of electric vehicles by private individuals, voluntary organisation and undertakings is already in place. The grant scheme was maintained for 2025 and offers grants of €8,000 for the purchase of EVs, which can be bolstered by an additional grant of €1,000 if the purchase is combined with the scrappage of a vehicle older than 10 years (from its year of manufacture). Funds under Malta's Recovery and Resilience Plan have been allocated to support the scheme with the aim of accelerating further electric vehicles take up by the private sector within the period of the Plan.

Malta is currently conducting a study on the potential to introduce further financial differential incentives to reduce the average age of vehicles, as well as introducing further fiscal measures and incentives to favour the purchase and use of clean fuel vehicles. By 2030 Malta intends to continue providing financial incentives for the scrappage of older vehicles to promote commercial fleet renewal to cleaner vehicles, as well as review the current approach to providing incentives that promote

[112] Malta Enterprise (2024), Green Mobility Incentive Guidelines. Available at: https://maltaenterprise.com/sites/default/files/Green%20Mobility%20Scheme%20-%20Incentive%20Guidelines%20%28V%201.0%29_1.pdf

Malta's clean vehicle fleet renewal and update as necessary to increase the uptake of zero emission vehicles in the country by 2030. The total amount of vehicles which availed themselves from the scrappage scheme between 2022 and 2024 was 3,719.

Shore-to-ship projects

There are a number of ongoing projects in Malta focusing on the development of onshore power supply infrastructure, one focusing on the Valletta Grand Harbour and another on the Malta Freeport Terminal. In 2020, Infrastructure Malta launched a 33.2million EUR shore side electricity project which aims to cut over 90% of the air pollution that cruise liners produce when visiting the Valletta Grand Harbour. These cruise liners will instead connect directly to the national grid. Work on the first phase of the project covering the Northern Part of the Grand Harbour and Boiler Wharf has been completed and was officially launched in July 2024. The project covers the Northern part of the Grand Harbour and included the preparation of the required infrastructure and installation of equipment that amongst other included, frequency converters, transformers, and switch gears in line with existing standards.

The second phase will extend the provision of on shore power supply to other quays, which are also used by Ro-Ros. The project aims to cutting cruise liners' CO2 emissions by approximately 40%. The Phase 2 Project which is expected to be initiated in 2024 will cover the Southern part of the Grand Harbour and will extend the power network to other areas namely, Ras Ħanżir, Laboratory and Magazine Wharves as well as two quays located within the Palumbo Shipyard and Mediterranean Maritime Hub (MMH).

Preliminary studies indicate that through this project, within 20 years Malta will save up to €375 million in costs linked to the measurable consequences of air pollution, such as impact on health, environment, infrastructure and agriculture.

The project is in line with the Government's commitment to decarbonise transport maritime operations within the Grand Harbour as much as possible with the aim to reduce air emissions and reduce the level of noise emissions within the harbour area, thus improving the surrounding environment and quality of life of all persons living and working within the region of the Grand Harbour. The Valletta Grand Harbour is part of the TEN-T Core Network.

In 2022 a tender was issued for a shore-to-ship power system at the Malta Freeport Terminal on North Quay Terminal 1 and 2. The aim of the project is to ensure cleaner air, less noise and vibration and lead to a reduction of CO2 emissions at the Freeport. The project will ensure that by 2026, cargo ships using the specific quays within the Freeport that are undergoing the works for the installation of onshore power supply, will switch off their engines as soon as they complete the berthing process and make use of onshore power supply. The project will cost around 13 million EUR and will be co-financed through the Just Transition Fund.

Modal shift towards alternative means of transportation

National Free Public & School Transport Service

Over the span of five years, Malta has introduced progressive schemes to promote use of public transport. The Government launched free use of public transport for youths and students between 16-20 years old, persons with disability and individuals over the pensionable age in October 2018. As from end 2022, nation-wide free public transport service was provided to all 'Tal-Linja' card holders (data as at 2023 shows 479,667 holders). The table below reflects the total number of Passengers using Public Transport across a 10-year period showing a significant increase year-on-year.

The implementation of free public transport has had a noticeable impact on passenger levels. After a decline in passenger trips during 2020 and 2021 due to the Covid-19 pandemic, the numbers rebounded significantly. In November 2022, the number of passengers matched that of November 2019, and in December 2022, it surpassed the December 2019 figures by over 2%. The introduction of the free service is anticipated to result in fewer cars on the roads, reduced traffic congestion, and average annual savings of €300 for daily bus commuters.

From January to March 2023, 181,873 passengers took advantage of the free transport measure, generating nearly 12.34 million passenger trips. The total passenger trips for 2023 are projected to exceed 67.4 million, marking a 37% increase from 2022 and a 17% increase from 2019, which previously held the record for the highest number of passenger trips.

Table 9 – Total Number of Passengers using Public Transport 2021-2022[113]

	NO. OF PASSENGERS
2012	34,030,681
2013	39,438,822
2014	43,687,135
2015	42,160,228
2016	43,253,238
2017	48,053,045
2018	53,467,404
2019	57,409,385
2020	33,776,664
2021	35,207,174
2022	49,222,424

[113] NSO (2024), Transport Statistics 2023 (Reference year 2022). Available at: https://nso.gov.mt/themes_publications/transport-statistics-2022-2/

From October 2022 until 15th July 2024, the government has allocated €46,716,365 to subsidize Malta's public bus trips, underscoring its commitment to promoting sustainable transportation.

Complimenting this measure, free school transport is being offered to all state and non-state school students, attending compulsory schooling (from Kindergarten 1 to Year 11) with over 33,000 students benefiting from this scheme as of 2024[114]. Parents and legal guardians can apply for free school transport before the new scholastic year begins. Students in state schools are assigned to pre-designed routes serviced by vans and coaches, catering to defined geographical areas known as colleges. Each college comprises several schools within a designated area. Non-state school transport is organized by service providers contracted by Government and is mostly serviced by vans. Non-state schools do not have designated geographical areas. The government plans to continue offering this service annually and to improve its effectiveness by enhancing quality and efficiency, reducing the number of routes, and optimizing economies of scale.

Landing Infrastructure

The Government remains focused on upgrading and enhancing its ferry infrastructure to meet the needs of commuters and tourists alike. The government is prioritizing ferry transportation to reduce the circulation of private road vehicles through the provision of accessible maritime routes between coastal towns thus reducing land-based transport emissions.

Works on the quay structure at the ferry landing site in Bormla has been concluded, with ferry trials expected to take place soon, while that at the ferry landing in Sliema was completed in March 2024[115]. In addition to these works, a pedestrian lift at San Salvatore bastions, connecting Valletta's Peacock Garden to the Marsamxett ferry landing is currently being constructed[116]. These projects, which are financed through both national and European funds, are intended to improve the quality of the ferry service by providing better accessibility, sheltered waiting areas, enable a safer and easier embarkation and make the service more reliable throughout the year.

Improved maritime transport connectivity

For the past few years, Malta has been facing numerous challenges in relation to its inland transport system, due to an increased demand for personal mobility and the use of private cars. The road network is heavily congested, which is negatively impacting the economy, the environment and the residents' quality of life. Considering Malta's small size and the current traffic situation, a prolonged substantial increase in the number of private cars on the roads is not a sustainable option. In spite of

[114] TVM News (2024), Education Minister states that school transport will remain free. Available at: https://tvmnews.mt/en/news/education-minister-states-that-school-transport-will-remain-free/

[115] Infrastructure Malta (2024), New Sliema ferry landing facilities. Available at: https://www.infrastructuremalta.com/news/new-sliema-ferry-landing-facilities

[116] Grand Harbour Regeneration Corporation (2023), Works on a vertical access lift to the Marsamxett ferry landing underway. Available at: https://ghrc.gov.mt/works-on-a-vertical-access-lift-to-the-marsamxett-ferry-landing-underway/

the improvement and developments in in the public transport system, a large part of the population continues to prefer the use of private cars.

Encouraging the use of existing intermodal transport and introducing further options could help Malta to achieve a higher level of sustainability and increased efficiency. Considering that a significant part of the population lives in close proximity to the sea, waterborne transport is highly underutilized both in Malta and Gozo. The Southern Harbour and Northern Harbour regions are the most densely populated and the most congested areas, thus introducing marine nodes in these localities alone could have a significant impact. The proposal to create new connections between seaside localities in Malta and Gozo has a significant potential to positively impact the country. The benefits include but are not limited to the reduction in emissions generated by road transport, reduction in loss of productive and leisure time of residents and improved efficiency in Malta's economy.

As part of the Government's vision to promote collective maritime transport and providing connections between different modes of public transport, a new ferry landing site in Buġibba is currently being constructed. The investment will consist of the demolition and rebuilding of the existing dilapidated main breakwater infrastructure, the construction of an integrated ferry landing place featuring the addition of a mini-breakwater for the safe harbouring of maritime activities, a slipway, jetty, sheltered waiting facilities for commuters, gangways and fenders. These interventions will render the ferry service more reliable and therefore more attractive to users as an alternative mode of transport and a viable commuting option. The ultimate goal is for our country to have a quick and clean ferry service connecting these places, which includes various destinations around the Island. Studies show that the number of people willing to use the ferry as a clean and alternative mode of transport to the private vehicle augurs well for the market to put forward bids for offering such ferry services in the interest of the Maltese and Gozitan public so that the people can begin benefitting from these new connections.

Fast passenger ferry link between Malta and Gozo

A fast-ferry link between Malta and Gozo has been introduced to compliment the conventional ferry services operated by the Gozo Channel. This service has been welcomed by both locals and tourists as it has facilitated commute between the two islands. In fact, during its first year of operation the service has catered for 627,493 passengers (from June 2021 till July 2022) and additional trips covering more hours are seasonally included to suit the demands of its users. In 2023, the fast-ferry service between Valletta and Mgarr transported 693,361 passengers.

Free Grand Harbour Ferry Service

In 2023, Government has launched free Ferry Service within the Grand Harbour. By integrating different transportation modes, the use of existing infrastructure can be optimised, thereby improving the capacity of each mode and reducing the strain on road networks. This integration enhances the overall efficiency and attractiveness of public transport, thus encouraging take-up whilst reducing reliance on private vehicles and encouraging active mobility. This, in turn, eases the strain on parking infrastructure in congested urban areas. It also contributes to a reduction in air pollution and

greenhouse gas emissions. Following Cabinet approval on 18 October 2023, the “free ferry service to personalised travel card holders (Tallinja Card)” was officially launched on 15th January 2024.

Active Transport

The National Cycling Strategy was issued for public consultation in November 2023 and is designed to promote cycling as a sustainable mode of transport in Malta. Recognizing the spatial constraints of our islands, the strategy aims to address the specific needs and concerns of cyclists by enhancing the safety of our road infrastructure and fostering the integration of bicycles and pedelecs. To achieve this, a coordinated approach is essential, with all stakeholders cooperating to cultivate a robust cycling culture. The strategy also underscores the critical role of dialogue with various entities and authorities to ensure that new developments are equipped with cycle parking, cycling infrastructure, and pedelec charging facilities. In alignment with these objectives, the recently published white paper on the Strategy for Health-Enhancing Physical Activity[117] highlights the current deficiencies in Malta's infrastructure. It points out the absence of safe walking and cycling paths, as well as micro-mobility options, which are pivotal in establishing a strong bicycle culture. Together, these strategic documents underscore the need for comprehensive measures to transform Malta's transportation landscape into one that is more conducive to cycling and other forms of active mobility. The new Transport Master Plan for 2030 shall aim to publish the National Cycling Strategy and Action Plan and expand to cover walking and micromobility in a new Active Mobility Strategy.

Complimenting the already integrated cycle lanes in major road infrastructure projects on the TEN-T Network and beyond, in October of 2022 the Government announced its commitment to invest a further €35 million by 2029 to create a network of clean urban transport infrastructure (covering 50-60km) connecting various areas of the country in order to further promote a multimodal shift in mobility.

The National Cycling Strategy and the accompanying Action Plan, which are being finalized, are central to this vision. They are designed to cater to the needs of cyclists within the spatial constraints of the islands and to encourage cycling by enhancing road safety and integrating bicycles and pedelecs. The strategy sets out to increase awareness, improve cycling skills, ensure a connected urban environment, improve safety conditions, develop a cycling culture, and establish strong cooperation networks.

The current projects within the Grand Harbour area, including the completed Msida coast project and the ongoing Pieta coast project, are examples of the government's efforts to facilitate active mobility. These projects, along with the regeneration of the dilapidated Sally Port quays and other works in Cottonera, are transforming urban spaces into pedestrian-friendly areas.

The first phase of the Connections for Safer Active Mobility (CSAM) Project focuses on the SUMP area, creating a 3km active mobility infrastructure that connects key nodes like Valletta and the Sea Passenger Terminal. This phase is part of a broader plan to connect the Northern and Southern areas

[117] Ministry for Health and Active Ageing (2024), A Strategy for Health-Enhancing Physical Activity consultation document. Available at: https://health.gov.mt/wp-content/uploads/2024/08/HEPA_strategy_document_2025_2030.pdf

of the Grand Harbour, enhancing the walking and cycling experience through new and upgraded infrastructure.

In addition to infrastructure development, the government has incentivized the electrification of vehicles, including pedelecs and e-bikes, with grants totaling €2,929,091 for 1,046 vehicles and €360,592.94 for 343 pedelecs in 2022. These measures align with the government's policy to promote healthier lifestyles and its ambition to make Malta a walking and cycling nation by 2025. The National Cycling Strategy, the Action Plan, and the CSAM project collectively aim to transform Malta's transportation landscape into one that prioritises active mobility and sustainable living

Alternative fuels

Assessment of the potential deployment and usability of hydrogen for transport

Aware of the increased importance of Hydrogen as a potential core contributor for the transport sector, in 2022 the Ministry for Transport, Infrastructure and Capital Projects requested assistance from the European Commission's DG Reform under a Technical Support Instrument to undertake initial assessments on the use of hydrogen in transport. The study provided the Ministry with a situation analysis of the potential use of Hydrogen in all modes of transport in Malta and information on the various uses of hydrogen in transport with examples of best practices in other states, insights into infrastructural and operational aspects and furthermore provided an opportunity to have stakeholder meetings on this subject. The study assessed the financial and economic feasibility of hydrogen in transport based on technical options related to import or local production of hydrogen, across road, maritime and aviation. While there were a couple of options that were considered economically feasible, these are dependent on a significant number of uncertainties including the eventual implementation of a hydrogen ready pipeline and on the availability and cost of green hydrogen. Moreover, technology uncertainties/developments also create several uncertainties that require more detailed assessment especially for the maritime and aviation sectors where hydrogen did not seem to be the most prominent future alternative fuel at the time of the study. Due to its already high population density and spatial constraints, land limitations are a critical factor for Malta. This includes potential controversies of fuel stations taking up land outside the development zones, which become more relevant for a hydrogen station to avoid densely populated areas due to the "proximity risk". Notably, this "proximity risk" introduces constraints that are unique for Malta and less relevant for other EU member states and poses additional limitations in the implementation of hydrogen mobility/ infrastructure projects.

Since hydrogen mobility is currently non-existent in Malta, the report remains a useful point of reference for any future considerations for provision of this fuel as well as the necessary infrastructure for its provision.

Roads Infrastructure Network Improvements

The continuous upgrades of various projects on the TEN-T network aim at reducing congestion at traffic bottlenecks that lead to an increased overall average speed (and consequent reduction in fuel consumption and GHG emissions). One example of such projects is the Marsa Addolorata Project – completed in 2021. This project involved the construction of a multi-level intersection with seven flyover structures, 12 kilometres of new lanes, 3.5 kilometres of footpaths and cycle lanes, two

footbridges, bus lanes, a 380-space car park, 15 kilometres of underground networks and extensive landscaped areas with thousands of new trees.

Kappara Junction –The regional road section in Kappara formed part of the original strategic TEN-T road network and had been previously identified as a major traffic bottleneck. Works on the Kappara junction were completed in 2017.

A number of traffic bottlenecks have been addressed through various developments such as the Kirkop Tunnels and Airport Intersection Project, improving also access to Malta International Airport and the Malta Freeport, two strategic locations for several sectors of the Maltese economy. This project has provided for safer facilities for alternative modes of travel and now includes new footpaths and improved public transport amenities as well as new cycle lanes and safe cycle routes that complement the cycle lanes and the cycling and pedestrian bridge at L-Avjazzjoni Avenue and the segregated cycling and walking track at San Tumas Road and Hal Qormi Road, which were developed during the last three years. The roundabout's new design also includes safer pedestrian and cycling crossings.

The €11-million investment in the Luqa Junction Project, now nearing its completion, will replace this locality's principal roundabout with a multi-level junction facilitating quicker and safer connections between Qormi, Luqa, Santa Lucija, Marsa, Gudja the Airport, and the Kirkop Tunnels. The project incorporates pathways, pedestrian crossings and a new segregated cycling and pedestrian path along Il-Kunsill Tal-Ewropa Road. Furthermore, it will create a new recreational open space with easy pedestrian access from the centre of Luqa.

In October 2022, the opening of the Mriehel Underpass created an uninterrupted link between L-Imdina Road, Balzan and Mriehel Bypass. This two-lane 60-metre underpass is located beneath the new roundabout, eliminating the traffic lights at this important junction between Balzan, Birkirkara and Mriehel. Through an investiment of € 7.4 million on this new tunnel, the main eastbound traffic flows from L-Imdina Road, Balzan, towards the Mriehel Bypass (Royal Malta Artillery Avenue) and is grade-separated from the other flows converging at the newly built roundabout. Furthermore, it is covered with the new roundabout and its approaching lanes, pedestrian and cycling crossings. This augments the positive impacts of the Central Link Project in Attard, Balzan, Birkirkara and Mriehel by reducing traffic volumes, the Mriehel Underpass Project enabled the introduction of safer pedestrian and cycling crossing to link Birkirkara, Mriehel and Balzan with Il-Hofor Road, a rural road leading to Zebbug and Qormi. These roundabout crossings will further improve the connections of the four-kilometre cycling and walking infrastructure developed through the Central Link Project in Ta' Qali, Attard and Balzan.

As part of the Central Link Project, two new lanes have been built to create an uninterrupted route in the opposite direction, westbound from the Bypass towards Balzan and Attard. By eliminating the principal eastbound (through the new tunnel) and westbound flows from the new roundabout, it has become quicker and safer for road users travelling to other nearby destinations, including Mriehel, Birkirkara and Zebbug (from Attard, Balzan and Lija).

A project upgrade in the southbound carriageway of the Mriehel Bypass and upgrading the existing junction leading to the Mriehel Industrial Estate will upgrade 1.5-kilometre of crash barriers and motorcycle strips, upgrade the existing stormwater system and build 800-metres of new footpaths as well as the complete rebuilding of L-Intornjatur Road, replacing the existing stormwater tunnel, upgrading its underground networks and resurfacing the road. A safety upgrade of € 5 million along

both carriageways of the Mriehel Bypass and upgrading the existing junction leading to the Mriehel Industrial Estate will introduce a total of 4.5 kilometres vehicle restraint systems on both sides of the road. Previously open culverts along the southbound carriageway were roofed and made way to introduce 800 metres of new footpaths. Most of the works, which are being done at night to minimise the impact on traffic flows, comprises 940 metres of stormwater pipes replaced and upgraded to alleviate flooding problems as well as the complete resurfacing of both carriageways at the Mriehel Bypass comprising of over 26,000 square metres of geogrid sheets with self-adhesive, reinforcing all layers beneath the newly asphalted surfaces.

A major investment of €5.4 million has addressed the traffic bottleneck in St Andrews Road, Swieqi, by transforming a restricted dual carriageway with two traffic light junctions into a safer connection by introducing two hairpin turns to allow vehicles to cross over without stopping the opposing flow, drastically improving vehicle flow in this junction. Furthermore, a stretch of road in front of the Park and Ride Area up to the Red Cross premises (before the junction at Triq Profs Ganado) will accommodating an additional lane and introduced a new shared pedestrian/cycle lane in the form of a raised footpath to make room for a new multi-mobility link in the area. A new physical central reserve system to increase road safety and avoid head-on collisions will be incorporated. The redesigned junction in Triq Profs Ganado and Triq Sant'Andrija will transform the existing entry into a safer and more organised intersection which through a traffic model study will address the projected vehicle increase for the coming years.

The road corridor extending from the Sa Maison area of Msida to the Tal-Qroqq Skatepark roundabout is one of the country's principle network nodes, connecting Valletta and the Grand Harbour region with the northern and southern regions of the island. Over 4,500 vehicles go through the Msida Creek traffic lights junction every hour to travel to and from Valletta and other nearby localities. This investment of approximately €18 million, includes the redesign and reconstruction of the traffic lights junction connecting, the upgrade of a number of nearby junctions with other roads leading to and from Gżira, Sliema and Ta' Xbiex. The proposed road design will eliminate traffic light waiting times and reduce travel times and accident risks along this arterial route, improving air quality in this part of Msida and other nearby residential and recreational areas.

Over and above the building of a new flyover to replace the Msida Creek traffic lights junction and safer facilities for alternative modes of travel, including a new cycling and walking track, the project will also provide for a major upgrade and embellishment of the surrounding areas with new recreational zones.

The new open spaces and recreational zones being created by this project, will include a new 2,200 metres squared piazza in front of the Parish Church and a seawater channel, the latter also forming part of a plan to prevent flooding. This 220-metre channel will be surrounded with pathways in a landscaped area designated for relaxation in a serene environment.

The new 200-metre long bidirectional flyover proposed in this project will directly link Triq il-Marina with Triq Mikiel Anton Vassalli, to reduce the impact of this through traffic on the nearby recreational and residential areas and promenades of Msida. By replacing the traffic lights with a grade-separated intersection, this project will increase the efficiency and capacity of this node, whilst reducing the existing high levels of air and noise pollution caused by long waiting times.

The upgrade of this important network node forms part of Malta's ongoing commitment to improve the quality, efficiency, safety and sustainability of Malta's land transport infrastructure, and to provide the necessary capacity to overcome existing challenges and meet future requirements. A Road Scheme Upgrade Assessment and a Road Safety Audit demonstrated that this upgrade will sufficiently cater for the requirements of current and future road transport demands.

Public transport connections along this route where the bus service is widely used will improve. Wider pavements, along with a part of the new segregated cycling and walking track by the seafront, that eventually will connect Tal-Pietà with Ta' Xbiex and Triq il-Wied tal-Imsida as well as Pelican pedestrian crossings will contribute to safe active mobility.

A new solar-covered parking lot with 100 spaces will also be developed, whilst the area surrounding the Workers' Memorial will be transformed into a landscaped green area, adjoining the existing public garden which will be extended. The landscaped zone and public garden will cover a total area of 4,500 m^2. The new project plans include a comprehensive underground stormwater system to alleviate the area's flooding problem that has been dragging on for decades.

In addition to works on Malta's arterial and distributor roads network, by January 2023, 1,057 residential roads/projects have been completed, approximately 75% of its total 1,400 planned residential roads projects. These works involve widening, construction and re-organisation of road infrastructure that provide better and safer access for cyclists and pedestrians to further encourage active mobility in our local communities. Another 104 projects are ongoing and Infrastructure Malta plans to maintain its current rate of 200 road projects per year until all planned road works are completed.

Other Policies & Measures

Sustainable Urban Mobility Plans (SUMP)

The first SUMP in Malta was developed for the city of Valletta and covered the years 2006-2012. Building over the achievements of this first SUMP, the Northern and Southern Harbour Regions SUMP has been published in December 2022 and extends over 27 localities surrounding Valletta.

The SUMP process includes a thorough dialogue with stakeholders as well as expert consultation and results in a compilation of existing actions, measures and future measures, that together contribute to the overall vision of an improved quality of life and mobility for residents and commuters to the area, and in making the region safer and more attractive to tourists. The measures in the 2022 SUMPS have been categorized under four core pillars:

1. Incentivise alternatives to car use
2. Transition to cleaner transport
3. Optimise the (current) transport ecosystem
4. Optimise provision of goods and joint services.

Following the publication of this SUMP, the next steps will focus on implementation (foreseen to take place within 5-10 years) and monitoring. Finally, the intention is to extend this exercise to all the remaining regions of the Maltese Islands.

Over the period 2019-2020, a pilot project where the delivery of goods from a number of entities to Valletta was organised through the use of a shared electric vehicle was conducted. In total, 7 small businesses delivered goods from their premises in Ta' Qali Crafts Village to various souvenir shops in Valletta by sharing an electric van. This short-term pilot project was found to be successful, and its outcome was used to inform the SUMP for the Northern and Southern region.

Low Emission Zone Study

As announced in the 2019 NECP, the Government has continued to study the possible introduction of Low Emission Zones in Malta with a view to improve air quality and lower emissions, particularly in the Grand Harbour area. A project to study a potential LEZ designated areas is being carried out with its outcome potentially enabling the possible introduction of LEZ in the Grand Harbour area, especially in areas with high traffic and poor air quality.

Development of a real-time journey planner

Public transport in Malta has made significant progress in innovating its user interface and experience. The Malta Public Transport has implemented a real-time journey planner through the 'Tal-Linja' Mobile app providing travellers with the possibility of planning all their bus routes and real-time tracking of buses. The current journey planner, whilst not intermodal, has undergone extensive development. The intention is to further develop this to provide a more enhanced experience. As part of the Transport Master Plan measures for 2030, the Government shall continue to support public transport operators to integrate ticketing and journey planning information.

Smart Parking System for Valletta

One other measure that was implemented with the aim of reducing congestion, emissions and pollution was that of the smart parking system in the Hastings parking area in Valletta. In 2021, a monitoring system that informs commuters going into Valletta whether there is parking available within the Hastings car park has been implemented. Cameras have been installed in the upper area of Hasting parking. Such cameras do not capture footage but solely map the area. In the lower and middle parking areas, a system of sensors has been installed on the ground surface where availability is determined based on whether the sensor is covered (with a parked vehicle) or not.

The real-time information is transmitted to a vehicle monitoring system (VMS) installed at St. Mark's Street, visible from the Valletta ring road. This enables commuters to either head straight towards the parking, or to avoid the area and look at alternative sites when the parking is full. Therefore, emissions have been decreased by reducing needless circulation of vehicles in search for a parking place within the car park when there is no availability. As part of the Transport Master Plan measures for 2030, the Government shall carry out an assessment of parking provisions in Malta and develop a comprehensive national parking / travel demand management strategy, which includes the utilisation of smart parking technology as part of a wider on-street parking reform.

Urban transport and urban logistics

Malta is the most densely populated country in the EU with about 1,693 inhabitants per square kilometre as of 2022[118]. There are over 18,000 vehicles for each square kilometre of road in Malta[119] and 70,000 cars are driving in one direction or another during peak hours. As of 2022 Malta has a total of 439,000 vehicles registered, of which 378,000 are cars, vans, buses and trucks[120].

The Government is engaging with stakeholders so that a number of services on Maltese roads are not provided in the morning and afternoon peak hours. It is proposed that in view of traffic safety, the reduction of emissions and in order to rationalise traffic flow during peak traffic hours, commercial and heavy vehicles will not be allowed to travel during the peak hours.

The expected result of this new approach is the decongestion of streets and roads during peak hours. Average vehicle speed – including that of public transport – will increase especially in the Northern and Southern Harbour Area with an improvement of air quality and lower emissions GHG emissions overall. The implementation of the measure will be monitored and periodically assessed.

Sustainable Multimodal Intelligent Transport Hubs Project

Ongoing implementation of the 2025 Master Plan relates to a number of measures falling under the Sustainable Multimodal Intelligent Transport Hubs Project known as SMITHs Project. The main objective of the SMITHs initiative is to encourage a modal shift from private car use to collective, sustainable & alternative low-carbon transport modes, improve air quality& reduce GHG emissions.

SMITHS is expected to facilitate inter-modality and address cleaner air through the introduction of various intermodal choices by upgrading the inner-harbour ferry network; introducing safe shared routes particularly for cyclists along selected residential/urban areas whilst promoting cycling as a clean and sustainable mode for commuting; developing segregated cycling lanes and pedestrian paths along the road network; by introducing a new multimodal hub in Gozo including a park and ride facility operated by clean collective modes of transport and by further extending the national electric vehicle charging network across Malta and Gozo. ITS systems shall be integrated into one platform to provide real time information which will be relayed through a number of real-time information tools. The projects also includes an Information Campaign will be launched to promote a behavioural shift in transport practices.

[118] Eurostat (2024), Population density by NUTS 3 region. Available at: https://ec.europa.eu/eurostat/databrowser/view/DEMO_R_D3DENS__custom_10822572/bookmark/table?lang=en&bookmarkId=9daaf3b7-86a3-40fc-9171-fcd05d859892

[119] NSO (2024), Transport Statistics 2023 (Reference year 2022). Available at: https://nso.gov.mt/themes_publications/transport-statistics-2022-2/

[120] NSO (2023), Motor Vehicles: Q4/2022. Available at: https://nso.gov.mt/motor-vehicles-q4-2022/

Integrated Transport Management System (ITMS) Platform

The Integrated Transport Management System (ITMS) Platform brings together various already-existing operational systems with the aim of providing improved availability and quality of information which can ultimately be used to decrease the level of congestion on the roads and lead to reductions in GHG emissions. By facilitating information on for example, the public transport system, the efficiency of this mode of transport can be improved and this will contribute towards an increased modal shift where motorists will be more encouraged to opt for public modes of transport instead of using their own privately owned cars. The platform will be also supporting the implementation of delegated regulations under Directive 2010/40/EU, whereby accurate data on infrastructure, safety, traffic and travel data should be made available to users such as transport authorities or service providers. Malta intends to increase the use of the ITMS platform and implement ITS technologies across the public transport network to support efficiency and punctuality of public transport services. An increase in the intelligent use of ITMS to improve the safety and efficiency of the transport network is also foreseen, as well as the development of an in-house capability by Transport Malta for data analytics (including big data and adequate staffing for data management) within 1 year to better support internal decision making and information available to external stakeholders. The measures shall include the need to increase Transport Malta (TM)'s data analytics capacity, so that TM can analyse data from traffic sensing technology (used in ITS) which will see the utilisation of ITS for bus priority (at junctions) and improvement of safety and efficiency.

Permanent Link between Malta and Gozo

Enhanced connectivity between Malta and Gozo holds significant importance within the economic, social, and environmental context of the islands. The government remains committed in evaluating the feasibility and viability of establishing a permanent link between Malta and Gozo through various studies related to the proposed initiative. These studies will also analyse and consider a range of external elements and circumstances that can influence the realisation of this permanent connection between the islands.

iv. Where applicable, national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels

Malta, as part of the EU, has committed within the international fora "to accelerate efforts towards the phase down of unabated coal power and phase-out of inefficient fossil fuel subsidies". Bearing in mind Malta's specificities, there are no plans to phase out any energy subsidies at this particular juncture, while remaining committed to, inter alia, encourage the adoption of technologies that can help reduce greenhouse gas emissions.

Domestic Voluntary Carbon Offsetting Market

Malta is currently assessing the potential to set up a voluntary carbon offsetting fund whereby companies can participate by purchasing carbon credits to achieve climate neutrality to compensate

for their residual emissions. In this manner, companies will be given a chance to voluntarily contribute towards the decarbonisation of its company profile by investing either on site or else in other auxiliary projects that benefit the environment overall and which most importantly contribute towards either decarbonisation pathways, carbon capture technologies or infrastructure as well energy efficiency solutions amongst other possible investments that the voluntary carbon market will be geared towards incentivising. In case of public projects, funds collected will be going towards the replenishment of the climate action fund which will be the receiver of the income generated from the selling of voluntary carbon offsetting market (VCM)certificates at the moment there has been progress related to the governance architecture which is an important pillar to ensure transparency and accountability of the carbon credits sold on the market by issuers. This measure will bolster CSR in Maltese companies while at the same time raising capital mass to invest in climate action.

As part of the overall implementation strategy, it is expected that the technical discussions and assessments that are still to be computed, such as a detailed cost-benefit analysis on the VCM's feasibility and uptake from the private sector will be carried out, will be completed by the end of 2024. This will also need to be coupled with the required legislation that lists down the conditions and approaches taken to calculate emission abatement from the various activities that will be allowed. Following this period, a twelve-month additional period will be warranted to set up/contract the necessary international platform to have everything in order to begin accepting listings from either governmental entities/private entities to enable transactions to be placed, create a single selling point and surrendering of VCM certificates system which digitalises all transactions as well as train the respective personnel to monitor and manage the local platform.

3.2 DIMENSION ENERGY EFFICIENCY

i. Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b and Article 20(6) of Directive 2012/27/EU and to be prepared in accordance with Annex III to this Regulation

The Energy Efficiency Directive (EED), specifically under Article 8, mandates Member States to set up of energy efficiency obligation schemes or the implementation of alternative policy measures. These initiatives are designed to drive energy savings within different sectors of the economy through the adoption of measures, such as programs that support energy efficiency improvements in households and industries, or financial incentives that encourage energy-saving investments. This section will provide an overview of the range of policy measures that Malta has deployed to comply with Article 8 of the Energy Efficiency Directive.

Transport

Malta is committed to move away from ICE vehicles and electrify its road fleet, as highlighted in Malta's LCDS. A number of measures which have been identified in this strategy are expected to contribute to the energy savings obligation target.

As previously mentioned, a generous grant scheme to incentivize the purchase of electric vehicles by private individuals, voluntary organisation and undertakings is already in place. The grant scheme was relaunched in the 2025 budget and offers grants of €8,000 for the purchase of EVs, which can be complimented with an additional grant of €1,000 if the purchase is combined with the scrappage of a vehicle which is older than 10 years from its year of manufacture. Funds under Malta's Recovery and Resilience Plan have been allocated to support the scheme with the aim to introduce 5,600 electric vehicles within the private sector.

Apart from the EV grant scheme, grants were also available for the purchase of plug-in hybrids. This package of schemes was welcomed by the public, and in 2022 alone, over €18 million worth of applications were received for both used and new EVs and Plug-in Hybrid vehicles (PHEVs).

Furthermore, as part of the Government's commitment to lead by example and transition towards greener mobility, 250 EVs will be introduced as part of the public sector vehicle fleet and improve the efficiency of current operations through the concept of ridesharing between the various ministries and government departments. The aim is to see a change in mobility management in the Maltese Public Service through the procurement of a cleaner fleet of government general-use vehicles (GUVs). This is also in terms of Reform C2-R6 of the RRP which is namely: Enhanced mobility management in the public service. The reform shall be implemented by 30 June 2025. In addition, government adopted the 2nd green public procurement (GPP) action plan (2021-2027) which includes the transport sector as one of its mandatory product groups. This policy initiative will support the public sector to transition towards electrification of its vehicle fleet.

Following a two-year pilot project which started in 2019 within the Public Sector, the Remote Working Policy was introduced in October 2021 aiming to achieve new work-life balance while also introducing

the concept of remote workspaces. Following this transition period, certain policy changes were made to better reflect today's realities. The main changes which started as from April 2023 are the retention of already present measures such as the Reduced Hours, the improvement of Remote Working and the introduction of new measures such as the Flexi-Hours and the Flexi-Week.

The objective of the remote working policies is to improve work-life balance while also prioritising energy efficiency. The measures will enable the reduction in the number of vehicles on the roads, particularly during peak hours, which will eventually contribute towards less journeys, reduced fuel consumption and emissions and alleviate traffic congestion.

The Government is supporting also the decrease of private vehicle use through a number of transport measures and investments. These include measures to further encourage the use of smaller vehicles for urban mobility such as pedelecs and L category vehicles (e.g. mopeds, motorcycles, tricycles and quadricycles). Investments in transport infrastructure include footpaths, pedestrianised areas, widened sidewalks, cycling lanes, bicycle parking facilities, bike charging points as well as traffic management systems and associated signage.

Complementing the free public transport measure, which is explained in detail in section 3.1.3, the Government is also offering free school transport to all school students attending public, church and private schools, with over 29,900 students registering for this service for the scholastic year 2021-2022.

Industry and Services

Promotion of energy efficiency in industry and the services sectors is addressed through a number of schemes and initiatives.

<u>The Investment Aid Scheme</u>

Through this initiative[121]the government aimed to support businesses in facilitating investments in technological solutions providing higher energy efficiency and which contribute directly towards a reduction in energy requirements of its beneficiaries. The support came in the form of a cash grant or a tax credit (which can be utilised against tax payable by the beneficiary) or a combination of both. Initiated in 2018, the program offered assistance in accordance with the upper limits permitted by the regulations on State Aid.

<u>Smart and Sustainable Investment Grant</u>

The Smart and Sustainable Investment Grant[122] supports business in their investment to incentivise the adoption of more digital and environmentally sustainable business practices. The investment grant provides financial aid by funding up to 50% of eligible costs, capped at €100,000 per project. Eligible projects must aim for sustainability or digitization with a minimum investment of €10,000. Additional

[121] Malta Enterprise (2018), Investment Aid for Energy Efficiency projects. Available at: https://www.maltaenterprise.com/support/energy-efficiency-projects

[122] Initiated in 2018, the program offered assistance in accordance with the upper limits permitted by the regulations on State Aid.

tax credits up to €40,000 are available for projects meeting specific criteria, such as investments in Gozo or those supported by an energy audit. The *de minimis* aid limit is €300,000 over three fiscal years. Investments should focus on aiming for at least a 10% CO2 reduction and must be implemented within a year of approval, with a three-year maintenance commitment.

Water Management

The biggest challenge in the Maltese water sector is the scarcity of natural freshwater. Malta has the lowest freshwater availability per capita in the EU. Even if these natural water resources are used sustainably, they are still not enough to meet national demand and therefore the production of alternative (non- conventional) water resources is a necessity. In view of this, Malta has developed a water management framework based on the conjunctive use of water demand management and water supply augmentation measures.

At present, the provision of water services accounts for approximately 6% of the total national electricity demand. This is mainly used for water production, particularly due to the use of sea-water desalination plants which account for around 65% of the total production of potable water. Malta is well-aware of the interdependency between energy and water and that the provision of the two has to be considered in a holistic and economic manner if sustainability is to be achieved. In this regard, the Water Services Corporation, the Government owned water utility company, is carrying out projects in the primary water network and the wastewater treatment plant to improve system efficiency and reduce the electricity consumed per unit of water delivered. These measures are estimated to result in an investment of circa €38.6 million.

Following a significant upgrade supported by EU funds, the Sant'Antnin Sewage Treatment Plant (STP) has increased its wastewater treatment capacity by an additional 600 cubic meters per hour. The €7.5 million refurbishment included replacing outdated aeration systems with robust, stainless-steel parts, and installing advanced magnetic bearing turbo-compressors. These advancements have elevated the efficiency of wastewater treatment at the facility through cutting-edge technology, aligning with the Corporation's commitment to bolstering its environmental sustainability[123]. Also underway is a retrofit of the 500,000 p.e. Malta South wastewater treatment plant with the same energy efficient turbo-compressors, estimated to reduce the annual aeration energy requirement by over 2.5 GWh, 2026 onwards.

The national water and wastewater utility has invested in PV farms covering its infrastructure with an installed 3.45 MW peak generating over 5.5 GWh per annum of renewable energy exported to the grid. A Green Bond funded extension of this project will be increasing the output to a 7,24 MW peak by the end of 2025, corresponding to a projected generation of 11 GWh. This figure translates to 7% of the utility's present total energy demand.

Water Demand Management (water efficiency) also leads to energy savings as it results in lower volumes of water moving in the urban water cycle. At national/regional level, distribution network

[123] Water Services Corporation (2024), Sant'Antnin Sewage Treatment Plant (STP) is now treating an additional 600 cubic metres of wastewater per hour, following the completion of a major EU co-funded upgrade of the plant. Available at: https://www.linkedin.com/feed/update/urn:li:activity:7236377054126997505/

leakage identification and control is the most effective measure to optimise the effective use of water. Leakage management in Malta resulted in a reduction of around 40% of municipal water demand over a 15-year period. Demand management measures are also important at the level of the user. Domestic water consumption in Malta stands at around 17 million m^3 p.a. which amounts to an average daily consumption per person of around 110 litres.

Recognizing the importance of this issue, the Energy and Water Agency launched a comprehensive national campaign aimed at increasing public awareness about the optimized and efficient utilization of water resources, with the goal of fostering a change in the public's water conservation habits. To engage with a broad audience, the agency employed a multifaceted communication strategy that included creating a targeted campaign, advertising through traditional media channels, educating via alternative media platforms, and hosting a variety of events to raise awareness among the general public. The Energy and Water Agency also carries out household visits, including in vulnerable households, where technical personnel are tasked with helping residents understand energy and water usage and provide tailored energy conservation tips. Such households are also provided with water saving kits which provide all the necessary information on water conservation (also as part of the aforementioned campaign). To date, around 88,325 water saving kits have been distributed.

Households

In view of the widespread use of efficient heat-pump technology for cooling, and to a lesser extent, heating, no government intervention is necessary to promote their deployment. Therefore, savings resulting from such actions cannot be accounted towards the energy savings obligation. Furthermore, in reflection of the temperate climate and the general preference to use natural ventilation when possible, households have typically low energy bills and so there are limited cost-effective interventions for savings in households, and such interventions are therefore typically limited to renovations and the installation of renewable energy technologies.

To boost the adoption of small-scale renewable energy solutions in homes, including solar water heaters and heat pump water heaters, the grant programs were restructured in 2021. These initiatives, aimed at promoting energy-efficient appliances within the residential sector. Upon approval, for the Solar Water Heater, applicants will receive a reimbursement covering 75% of the expenses incurred, inclusive of VAT, capped at €1,400. Furthermore, a supplementary grant of €500 is allocated after a period of 5 years to assist with maintenance expenses, provided that a receipt from the supplier is presented[124]. Under the Heat Pump Water Heater (HPWH) scheme[125], approved applicants receive a reimbursement covering 50% of the expense for the Heat Pump Water Heater, inclusive of VAT, with a maximum limit of €1,000. Despite the more generous grant provided, however, data for 2022 and 2023 shows that the increase in uptake still falls short of the figures targeted in the 2019 NECP. Since

[124] REWS (2024), 2021 Solar Water Heater Scheme. Available at: https://www.rews.org.mt/#/en/sdgr/465-2021-solar-water-heater-scheme-active

[125] REWS (2024), Heat Pump Water Heater Scheme. Available at: https://www.rews.org.mt/#/en/a/151-heat-pump-water-heater-scheme

these schemes are cross-sectoral and contribute to Malta's renewable energy target, they are described in more detail under Section 3.1.2 of the Plan.

Energy poverty

The Government is targeting energy poverty, as outlined in Article 8(3) of the EED, through a number of initiatives, some of which are already in place. One such scheme specifically targets vulnerable households, offering a tailor-made approach to address their unique energy needs. This scheme is designed to alleviate energy poverty and improve living conditions by providing energy-efficient technologies. The scheme is managed by the Energy and Water Agency in collaboration with the Financial Services for Social Welfare Technical experts offer advice to these households on how to lower energy & water consumption, where possible. If merited, the scheme provides for the replacement of old and inefficient appliances with new energy-efficient models at no cost. Another measure includes the energy savings resulting from the deep renovation of the Zabbar Social Housing project, which could also contribute to meeting the sub-targets outlined in EED Article 8. The government has made significant efforts in this area; however, additional initiatives are being considered as part of the development of the Social Climate Plan.

Government leading by example

The Government of Malta is committed to lead by example and is implementing a number of projects and measures in order to promote energy efficiency and achieve energy savings. Apart from the transport measures, such as the electrification of the Government fleet, shared mobility and remote working[126], amongst others, Malta will continue its efforts to roll-out energy efficient street lighting. Malta is committed to replace 34,000 lamps from the present lighting luminaries to LEDs before 2030.

Furthermore, electricity tariffs continue to incorporate a built-in mechanism which promotes end-use savings. This includes a "rising block tariff" and an eco-reduction mechanism. These mechanisms incentivize end-users to reduce consumption below an established threshold and deter high consumption by applying higher tariffs as consumption increases.

Through an investment under the Maltese Recovery and Resilience plans, two schools shall achieve near carbon neutral state with increase in the use of renewable energy whilst improving the learning environment within these schools through the optimisation of indoor health, air quality and comfort. The investment shall consist of the renovation, including retrofitting, of two public schools (St Benedict College Għaxaq Primary School and Gozo College Nadur Primary School). Once renovated, the school buildings will use 60% less energy and emit 60% less carbon dioxide than before.

The Government has also built the first climate neutral public school locally, St. Theresa College Msida Primary School, complying with standard requirements of high-energy efficiency, taking into account resource efficiency, climate adaptation measures, the adoption of digital technologies and

[126] Government of Malta (2023), Malta: Recovery and Resilience Plan. Available at: https://fondi.eu/wp-content/uploads/2023/11/Malta-Recovery-and-Resilience-Plan-2023-7.11.2023.pdf

affordability. This is meant to serve as a pilot project for future investments and to showcase the optimisation of indoor health, air quality, high energy efficiency, low carbon emissions and extensive use of renewable energy systems. Equal access for persons with disabilities shall also be ensured. The investment consists of the construction of a near carbon neutral pilot school amounting to a total area of approximately 14,499m2, with a capacity of 500 students, 40 classes, a childcare centre able to take approximately 120 children, a library (capacity of 300 people), a hall that shall also be available for the community (capacity of 300 people), ad a parking area below the school on two levels with a capacity of 180 vehicles[127].

A retrofitting investment is underway within a public hospital in efforts to improve the energy efficiency while reducing energy demand in a public building. This provides a model for other similar buildings. In addition, the investment is aimed at improving the well-being of the patients and increase the service quality level. The investment shall consist of the renovation and retrofitting of at least 5,600m2 of the Mount Carmel public hospital. The renovation shall achieve a reduction of primary energy demand (PED) of at least 30%.

In recent years, the Maltese government has made significant investments to improve the energy efficiency of hospital operations. The Mater Dei Hospital (MDH), the largest government-run hospital on the island, stands out for its comprehensive range of services and advanced medical equipment. The government has supported MDH in implementing an energy efficiency improvement program, which includes the operation of 14 air-cooled chillers with an Energy Efficiency Ratio (EER) of 3.15 for cooling purposes. Additionally, MDH has invested in four water-cooled chillers in a heat pump configuration that deliver a combined EER of 4.3, optimizing both cooling and heating processes.

The Sir Anthony Mamo Oncology Centre (SAMOC), located within the MDH complex, is another example of the government's commitment to energy efficiency. SAMOC operates four air-cooled chillers with an EER of 3.05 for cooling and contributes to MDH's heating circuit. The centre is equipped with water-cooled chillers that operate in heat pump mode to provide domestic hot water and spatial heating, ensuring that no heat is wasted.

For spatial heating, MDH utilizes water-cooled chillers that supply heat via a plate heat exchanger, addressing the high dehumidification and reheat demands due to the hospital's fresh air ventilation units. Currently, these chillers meet 60% of the heating demand, with the remaining 40% provided by boilers.

ii. Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, including policies, measures and actions to stimulate cost-effective deep renovation and policies and actions to target the worst performing segments of the national building stock, in accordance with Article 2a of Directive 2010/31/EU

[127] The Malta Independent (2024), Msida to have the first zero-energy and carbon neutral public school in Malta. Available at: https://www.independent.com.mt/articles/2024-09-05/local-news/Msida-Primary-to-be-the-first-zero-energy-and-carbon-neutral-public-school-in-Malta-6736263954

The following is a compilation of policies and measures that directly pertain to the goals and benchmarks set forth in the long-term renovation strategy.

Regulatory measures to increase energy-efficiency in buildings

Analysis of the building stock and projections was carried out as part of the LTRS study. This indicates that the path to decarbonisation of the building stock in the private sector is dependent on mobilising national and private funding coupled with regulatory policies. Following the coming into force of minimum energy performance requirements in 2016 and the coming into force of NZEB requirements for private buildings in 2020, cost-optimality studies were carried out to determine if further improvements were cost-optimal. The Cost-optimality studies were carried out on a wide range of building typologies and building geometries in order to be able to identify the opportunities for economically viable increased energy performance. These cost-optimality studies carried over 2018-2021 indicated a gap between the cost-optimal energy performance and the current minimum energy performance requirements. New minimum energy performance requirements have been developed and issued for public consultation. The buildings simulated during cost optimality studies include:

- Dwellings,
- Offices,
- Hotels,
- Schools,
- Shops,
- Restaurants,
- Sports Complexes
- Homes for the elderly.

New cost-optimality studies have resulted in a number of possible policy measures that are able to increase the energy performance level of both new buildings and existing buildings undergoing major renovation. These proposed recommendations have been translated into the new Technical Guidance Document F. This document outlines the energy efficiency standards for buildings, shown in Table 10, focusing on the calculation of overall primary energy performance. This performance is measured against the energy required for heating, cooling, lighting, ventilation, and hot water, minus any on-site or associated renewable energy generation. The guide specifies that calculations must adhere to a national methodology and sets forth performance benchmarks, with distinct considerations for buildings with or without significant solar renewable energy potential. The energy performance is expressed on an annual basis per square meter of the building's useful floor area.

Table 10 - Minimum energy performance levels for buildings. Source: BCA

Overall Primary Energy Demand for Dwellings kWh/m^{2}a				
	New Category		Major Renovations	
Building Category	Without RES	With RES	Without RES	With RES

Terraced house	50	15	70	40
Fully detached villa	50	10	70	40
Fully detached bungalow	50	10	70	40
Semi-detached villa	40	10	60	40
Ground floor maisonette	65	65	75	75
Mid-floor flat	50	30	60	60
Top floor flat/maisonette	70	30	80	65

Training programmes aimed at ensuring the adequate skilled resources in the sustainability of buildings

One of the commitments of the Government of Malta's Recovery and Resilience Plan was an open call for applications for training and certification program for professionals and tradesmen of various levels in the buildings and construction industry.

It was targeted for an array of professionals and tradesmen at various levels within the local construction eco-system. The course attracted a diverse range of professionals and tradesmen, including architects, civil engineers, consultants, electrical engineers, Energy performance of building assessors, interior designers/building technicians, lecturers in mechanical engineering, project managers, building service engineers, quantity surveyors, mechanical engineers, and even individuals from the IT sector.

The course focused primarily on climate change and sustainability as its main objective, subsequently moving to more technical aspects such as sustainable design and building energy systems. The course covered topics on technological advancements and innovation within the industry, along with insights on construction assessment tools that future certified assessors may employ. The students were taught about the legal framework, standards, policies that must be adhered to and the government funding opportunities available.

Incentives for increased energy efficiency in buildings

The Government of Malta has introduced a pilot scheme in 2022 entitled "Irrinova Darek" designed by the Building and Construction Authority (BCA) to renovate properties and improve energy efficiency. The pilot scheme was available for the renovation of properties in the Grand Harbour Area where buildings are particularly challenging to renovate. The scheme requires that buildings are renovated to levels 20% more efficient than NZEB levels and the renovated buildings should be comparable to passive house buildings. The scheme allows for the renovations to be carried out according to the particular site constraints as long as the technical eligibility is satisfied. The scheme has a co-funding rate of 90% government funds to 10% own funds with a maximum allowable outlay of 15,000 euro per project. The scheme registered a total of 100 beneficiaries that received financial assistance to renovate their private dwellings around the Harbour region.

The BCA will keep rolling out various initiatives, such as the "Irrinova Darek" scheme detailed above, aimed at helping low and middle-income families renovate their homes with more sustainable and efficient energy solutions.

The government is also looking into the expansion of the aforementioned schemes for increased energy efficiency in buildings through a new concept following a modular approach for the classification of the schemes and their beneficiaries. The proposed schemes are split into domestic or residential and commercial and cover existing as well as new buildings. These schemes are then split into 3 packages, namely financing, renewable energy, and energy efficiency. The financing package would be applicable to buildings achieving Minimum Energy Performance Levels and would include measures such as a reduction in stamp duty, preferential loans for purchase and energy efficiency measures. Discussions are still ongoing within Government in this respect.

As part of Malta's commitment towards the decarbonisation of the building stock by 2050, the Government of Malta shall continue exploring further the possibility to support investments in improving the energy performance of buildings possibly to also address the challenges due to potential longer payback period of the capital investment. Notwithstanding this, Government already supports improvements in energy efficiency through a number of schemes and incentives, particularly related to roof insulation, higher efficiency glazing, air-to-water heat pump water heaters and solar water heaters.

Renovation of Private Sector Buildings Grant Scheme

Another grant scheme for the renovation of private sector buildings, including commercial and non-residential buildings was introduced in 2022. The assistance provided under this scheme is intended to facilitate building renovation investments within the private sector. The objective of this investment is to improve energy efficiency, reduce energy demand, and lower carbon emissions through the retrofitting of buildings. The scheme is targeting the renovation of 40,605 m^2 in private sector buildings and to achieve a reduction in primary energy demand (PED) within these buildings of at least 30% by 31st December 2025.

Government leading by example

Government acknowledges its important role in promoting energy efficiency and its obligation to gradually improve the energy performance standards in order to inherently achieve relative energy savings. The Building and Construction Authority (BCA) has devised a structured approach to systematically acquire and assess the relevant energy performance related data of the national public building stock. The Government is also embarking on various projects and initiatives to attain such objectives which will be outlined below.

The structured approach being adopted by BCA, shall serve to update and maintain a repository to further evaluate and assess the energy performance standing of the national public building stock. This systematic process will enable the central government to guide the strategy towards decarbonisation of the building stock and will enable the authority to monitor energy improvements being carried out across the Public Sector.

Various projects of investment in the renovation and greening of public sector buildings, including deep retrofitting through energy and resource efficiency measures are underway within the context of the reforms and investments under the RRP and in line with the long-term renovation strategy commitments to renovate and improve the energy efficiency of 9,232m² of public buildings. These

investments will contribute towards a substantial reduction in Primary Energy use of these buildings. The objective of this investment is to improve energy efficiency, reduce energy demand, lower carbon emissions and limit energy waste through the retrofitting of public sector buildings. The renovation shall achieve a reduction of primary energy demand (PED) of at least 30%, which amounts to an estimated reduction of 316,519 kg of CO2/year.

The government has recently completed the first renovations of public office buildings occupied by the central government as envisaged by the Long-term renovation strategy. These include the deep renovation of an office block including the insulation of building fabric, Building integrated Photovoltaics on facades and roof and buildings automation and control (BACS). The project gave new insights as to the best methods to achieve nearly zero-energy levels and reduced primary energy demand by 50,400kWh annually.

Investments being made to improve energy efficiency, reducing energy demand, lower carbon emissions and limiting energy waste in schools and hospitals is detailed in 3.2 (i).

iv. Description of policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models

In 2017, a public consultation on Energy Performance Contracting was launched, bringing together academics in the engineering sector, the energy Regulator, the buildings industry Regulator, companies providing energy services, the Distribution System Operator, an Energy NGO and the Malta Business Bureau. The conclusion was that while the Energy Performance Contracting model can, in theory, be suitable for Malta, the take up is limited due to limited savings and very long payback periods.

v. Other planned policies, measures and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2 (for example measures to promote the exemplary role of public buildings and energy-efficient public procurement, measures to promote energy audits and energy management systems, consumer information and training measures, and other measures to promote energy efficiency

Building upon the initiatives outlined in section 3.2 (i), a suite of supplementary policies, measures, and programs are projected to play a pivotal role in reducing the overall energy consumption by 2030. The forthcoming section delves into the specifics of these actions and initiatives.

Transport

The Government's ambition to accelerate the shift to cleaner vehicles is further exemplified in the commitments towards the local EV charging infrastructure and electrification of transport. Sufficient amount of charging points to meet the objectives of electrification of transport are expected to be installed by 2030. The aim is to have adequate infrastructure in place to intensify the uptake of EVs on

a national scale. Around 360 charging points are already installed around the Maltese islands. A further 1,200 charging points will be funded through the Cohesion Fund, achieving a total of 1,500 points by 2025. The Government's aim is to have 6,500 EV chargers installed by 2030.

In 2022, the Government's Cleansing and Maintenance Division started to plan the introduction of fully electrical equipment, aligning with the Maltese Government's vision for green transport investment to meet 2050 decarbonisation goals. The division acquired 57 fully electric pieces of cleaning equipment by mid-2023, totalling an investment of €5,757,220. This shift to electric machinery, including floor scrubber robots, city and compact sweepers, and pedestrian street sweepers, has not only reduced noise pollution but also significantly cut fuel consumption and CO_2 emissions. Despite the growing demand for services, the Division remains committed to its long-term goal of full fleet electrification, continuing to invest in electric equipment and maintaining existing machinery for optimal efficiency while planning for future acquisitions of electrified trucks and additional sweepers.

Moreover, over the span of five years, Malta has introduced incentives to promote the use of public and collective transport. In 2022, the Government has extended drastically this initiative to offer Free Public Transport to all Public Transport Card holders. More information is provided in section 3.1.3.

The Government is also supporting the decrease of private vehicle use through a number of transport measures and investments. These include measures to further encourage the use of smaller vehicles for urban mobility such as pedelecs and L category vehicles (e.g. mopeds, motorcycles, tricycles and quadricycles). Additionally, there is ongoing investment in transport infrastructure including footpaths, pedestrianised areas, widened sidewalks, cycling lanes, bicycle parking facilities, bike charging points as well as traffic management systems and associated signage. The government is also offering free public transport to all Tal-Linja card users.

Households

Information campaigns are run by the Government, and these are coupled by the free service offered by the Energy and Water Agency whereby technical personnel visit households, hold discussions in order to understand energy usage and, as a result, provide tailored energy conservation tips. As of 2022, this professional advice was extended also to micro-SMEs to advise them on efficient energy and water use in their businesses.

To support household renovations, the roof insulation and double-glazing scheme for households was relaunched in 2022. This scheme, funded through national funds, was open to private individuals for use on their residential properties, and for organisations that are not carrying out an economic activity. Beneficiaries were eligible for grants up to 50% of the eligible cost, capped at €1,000.

The 2024 Double-Glazing Scheme for Birzebbugia Residents is designed to help households replace outdated or inefficient external apertures with new ones that offer better sound insulation. The scheme promotes the installation of features like acoustic seals, noise reduction glass, and frames, and encourages the use of hinged systems and non-metallic frames for optimal noise reduction.

The Roof Insulation (retrofitting) and Double Glazing (retrofitting) scheme is administered by the Regulator for Energy and Water Services to encourage the use of systems that reduce the consumption of energy in the domestic sector. This scheme is funded through national funds and applies to private individuals (natural persons) for use on their residential properties, and for organisations that are not carrying out an economic activity.

Industry and Services Sectors

Malta's enterprises are very diverse, and thus a tailored approach is normally taken when designing initiatives for enterprises so that the measures taken yield the greatest energy savings. A number of initiatives targeting specific enterprise groups have been introduced.

Energy audits

The "Promotion of Energy Audits Scheme for SMEs"[128] is a crucial step for enterprises to assess their energy consumption, with grants of up to €5,000 available. This scheme, for which all SMEs are eligible, is divided into Scheme A and B to cater to different enterprise categories under the De Minimis Regulation and the General Block Exemption Regulation, respectively.

In the case of large enterprises[129], Regulation 10 of SL 545.33 of 2021 makes it mandatory for them to carry out energy audits to the established quality level and frequency as outlined in the regulation. Guidance notes are available to enterprises which qualify or may qualify for the statutory energy audit to assist in the discharge of this responsibility. The main objective of the Government is to build on lessons learnt from previous cycles so as to ensure that future Energy Audits performed by non-SMEs attain a higher quality. The next round of energy audit reports by non-SMEs is due by end of 2027.

Furthermore, the Stakeholder Support Unit within the Energy and Water Agency reaches out to stakeholders to promote conservation efforts. For micro-SMEs, the Agency provides a free service to advise on efficient energy and water use in their operations. This initiative was extended further by focussing on specific sectors, whereby the business owners were contacted directly through the support of the stakeholder representatives in order to carry out sectorial reviews. Sectors such as pharmacies and childcare centres were targeted and following the visits documents with suggested improvements and best practices were created. These guides were then distributed among each sector, following information sessions held with the respective business owners. This initiative will be focussing on other specific sectors in the coming years.

Incentives for enterprises

Malta Enterprise offers a variety of investment schemes that aid and encourage businesses to invest in their operations. The MicroInvest Scheme 2024[130] is one such initiative, through which Malta Enterprise encourages undertakings to invest in their business by expanding, innovating, and developing operations, offering a tax credit calculated as a percentage of eligible expenditure. Eligible expenditures include a variety of business investments such as salary increases, premises upgrades, machinery, technology, eco-friendly commercial vehicles, and certification costs. Through investments in premises upgrades and eco-friendly solutions, business can indirectly contribute to energy

[128] Energy and Water Agency (2024), Energy Audits for SMEs. Available at: https://energywateragency.gov.mt/energyaudits/

[129] Large companies and subsidiaries of large companies in Malta and Maltese subsidiaries of large foreign companies.

[130] Malta Enterprise (2024), MicroInvest 2024. Available at: https://maltaenterprise.com/support/micro-invest

consumption reduction. The Innovate program – Innovation Aid for SMEs – facilitates access to expertise and fosters the generation of new knowledge, thereby accelerating innovation, enhancing business performance, and driving competition. There is also a Research and Development incentive designed to support industry players in undertaking industrial research and experimental development activities.

Among other schemes which were available for enterprises in recent years, the "Support for Reducing the Environmental Impact of Construction Activities" offered a significant tax credit to enterprises, capped at €100,000 or 50% of eligible costs, to encourage environmentally friendly construction practices[131]. The "Business Re-Engineering and Transformation Scheme" assisted SMEs in restructuring their business models to incorporate green technology and practices, offering a cash grant that covered 50% of the costs, up to €5,000 per advisory service per undertaking[132].

The "Energy Efficiency and Renewable Energy Financial Instrument" (EERE)[133]aimed to improve financing conditions for enterprises and natural persons, through a guarantee and an interest rate subsidy. The interest rate subsidy applied for 10 years and helps to push the loan interest rates for project promoters near 0%. The combination of EERE with other grant schemes was also possible, as long as EERE loans are not used to pre-finance the grant. Some of the investment types that could be financed under EERE include purchase of electric or hybrid vehicles and charging stations, upgrades to the building envelope, heating and cooling systems, renewable energy generation, and energy efficient equipment, amongst others.

In order to further instil a supported transition towards the principles adopted by ESG, the government offered a cash grant of €3,000 (capped to 75% of the cost) for engaging specialised advisory services to assist in the development of the ESG report. In addition to this, the scheme also provided an additional support of €1,000, in grant form, if the enterprise decided to report on the voluntary ESG portal set up by the government, for the two subsequent years. This was designed to act as a further incentive for enterprises to improve on their year-on-year performance by making significant investments that will improve their ESG score.

Government-led Projects

Complementing these schemes are several pilot projects targeting specific groups. "MERCA" (Managing Essential Resources in Retail through Consumption Analysis)[134] is a pilot project which focuses on small- and medium-sized retail establishments that sell food and beverages and aims to support them in carrying out improvements that will lead to more sustainable operations. "GUEST" -

[131] Malta Enterprise (2024), Support for Reducing the Environmental Impact of Construction Activities. Available at: https://maltaenterprise.com/node/1811

[132] Malta Enterprise (2024), Business Re-Engineering and Transformation Scheme. Available at: https://maltaenterprise.com/reengineering-and-transformation

[133]European Commission (2024), Energy Efficiency and Renewable Energy for Malta (EERE Malta). Available at: https://www.fi-compass.eu/financial-instruments/malta/energy-efficiency-and-renewable-energy-malta-eere-malta

[134] Energy and Water Agency (2022-2024), MERCA. Available at: https://energywateragency.gov.mt/merca/

(Guesthouse owners and Users embarking on a Sustainable Transition)[135] provides guesthouses and boutique hotels with a more tailored approach to address energy and also water management given that their setup and management might differ from other types of collective accommodations such as hotels.

The "WE MAKE" (Water and Energy Management and Knowledge Transfer in Manufacturing Enterprises)[136] project focuses on improving engagement in the business community through constructive conversations on energy and water that encourage more manufacturing companies to implement energy and water efficiency-related projects. A series of workshops were organised which highlighted technical, financial and R&I opportunities. Best practices were also showcased, and SMEs were encouraged to replicate the best practices implemented by large companies through the setting up of mentoring sessions. The project is also exploring the possibility of integrating local companies in project proposals submitted for EU funding. The "REEValue"[137] project encourages businesses to collaborate in the food, beverage and transport sector in order to boost energy efficiency and renewable energy use. The project will provide online tools, mentoring, and a detailed report to help companies find funding and implement sustainable practices.

A recent study on the use of energy and water in offices aims to provide insights for further efficiency improvements. The overall objective of this study is the attainment of a holistic overview regarding the use of energy and water in offices. Analysis of opportunities emanating from this study shall be presented in detail following the completion of the three consecutive parts of this study.

The first part being a Baseline study covering offices of various sectors and different numbers of personnel. This will be carried out through a number of questionnaires, site visits and energy audits.

The second part of this study is the analysis of the opportunities emanating from the findings of the baseline study.

Based on the results obtained from the aforementioned, an implementation strategy is expected to be included as the final part of this study - which is expected to propose applicable schemes and incentives.

Malta also participated in the LEAP4SME project which aimed to support Member States in establishing and improving policies to encourage SMEs to undergo energy audits and implement the recommended cost-effective measures. The projected involved the engagement with businesses and key stakeholders including The Malta Chamber, to have a better understanding of the challenges encountered by SMEs when undertaking energy audits and energy efficiency projects. The project also intended to build links and connections between SMEs, policy makers and energy agencies for the proposition of more effective policy measures.

The LEAPto11 project, which is a follow-up to the LEAP4SME project, will strive to contribute to a comprehensive improvement of the current framework for energy audits, energy management systems as well as national programmes. The transposition of the new Article 11 of the recast EED will

[135] Energy and Water Agency (2023-2024), GUEST. Available at: https://energywateragency.gov.mt/guest/
[136] Energy and Water agency (2022-2023), WE MAKE. Available at: https://energywateragency.gov.mt/wemake/
[137] Energy and Water Agency (n.d), REEValue. Available at: https://energywateragency.gov.mt/reevalue-life-programme/

also be supported through the project. Furthermore, Malta has launched a number of information campaigns, to provide guidance towards different economic sectors aimed at reducing energy consumption in operations for various economic sectors. EWA is also providing online sustainability courses which are targeted towards employees from the corporate sector – 'The Energy, Water and Sustainable Solutions: Supporting Malta's Corporate and Government Sector.

Other initiatives

As part of Malta's commitments towards the country's green transition, the government launched an ESG portal[138] in December 2021 as a voluntary initiative, designed to instil education and awareness on enterprises' environmental, social and Governance credentials. The initiative was very well received, with all of Malta's listed companies participating as well as other medium-sized enterprises.

Besides this commitment spearheaded by the Government of Malta, the Malta ESG Alliance[139] was set up in 2022 by the private sector. It acts as a platform for Maltese businesses to collaborate and work together in order to lead and drive national ESG goals. This initiative is wholly welcomed and supported by the Maltese government through regular collaborations and stakeholder meetings with the aim to enable and accelerate the green transition.

Within the accommodation and food service sector, the Malta National Tourism Strategy 2021-2030[140] prioritizes the positioning of Malta as a Climate-Friendly Travel Destination. This objective entails a two-pronged approach: comprehending and addressing the effects of Climate Change on the local landscape and tourism infrastructure, while simultaneously assuming a leading global role in advocating for Climate-Friendly Travel in collaboration with the travel industry, academia, and other stakeholders as a response to the imminent threat of global warming. Aligned with this perspective, the government is committed to the ongoing expansion of the eco-certification scheme. Simultaneously, endeavours persist in the quest for a suitable green label that can be effectively employed for various economic activities within the tourism sector. Following an update to the aforementioned scheme in 2019, the criteria cover a broad spectrum of sustainability areas such as management systems, waste, purchasing, chemical use, energy, water, air and noise pollution, building and green spaces, local culture and nature, customer communication, and are recognized by the MTA Eco-Certification which ensures compliance with relevant laws and quality standards[141]. To this end, in 2023 the Malta Tourism Authority (MTA) and the Global Sustainable Tourism Council (GSTC) have entered into a Memorandum of Understanding (MOU) with the objective of enhancing and reinforcing their collaborative efforts. This partnership is intended to create mutual synergies and advocate for

[138] Ministry for the Environment, Energy and Regeneration of the Grand Harbour (2024), The Malta ESG Platform. Available at: https://sustainabledevelopment.gov.mt/esg-reports-2020/

[139] Malta ESG Alliance (2024), Welcome to Malta ESG Alliance (MESGA). Available at: https://maltaesgalliance.com/

[140] Ministry for Tourism and Consumer Protection (2021), Malta Tourism Strategy 2021-2030. Available at: https://tourism.gov.mt/wp-content/uploads/2023/04/National-Tourism-Strategy-2021-2030.pdf

[141] Malta Tourism Authority (2024), MTA Eco-Certification. Available at: https://www.mta.com.mt/en/mta-eco-certification

the implementation of sustainable practices and adherence to the GSTC Criteria within Malta's travel and tourism sector[142].

Industrial facilities

In view that Malta has spatial limitations for industrial purposes, INDIS Malta[143] is seeking to overcome this challenge by adopting a "going vertical" approach. This is being done by building, wherever possible new facilities on multiple levels to create more industrial space on land that is already committed for industrial purposes and without increasing the footprint of these developments. Furthermore, in cases where companies currently have multiple facilities spread across the island, these facilities are being returned to INDIS in exchange for a newly built facility that streamlines and consolidates their operations into one multi-story facility. Such projects will have the possibility of carrying a Gold LEED certification (Leadership in Energy and Environmental Design), which is the world's most widely used green building rating system. An example of this, is a warehouse project currently underway (in Hal-Far) which, once completed, will achieve such a certification.

Furthermore, a company operating within the INDIS-administered property has launched a new project aimed at setting up a smart factory based on Industry 4.0 principles. The smart factory will incorporate the production of the company's products, starting from sheet metal through the various process stages, until the final output, greatly increasing efficiency and output rates. It will consist of an interconnected network of machines and communication mechanisms using the Internet of Things (IoT). INDIS Malta Ltd intends to promote similar projects to move towards achieving carbon neutrality.

Other Actions

A scheme is also available for voluntary organisations[144]. The assistance provided under this scheme is intended to facilitate investment in solutions that support a reduction in overall energy and water consumption through an increase in energy efficiency, and/or reduction in water use, and/or augmentation of water supply. This scheme has proved to be very successful and allocated budget has been fully exhausted.

Energy Efficiency First Principle

The Energy Efficiency-first principle has already been considered in Malta's energy planning, policy and investment decisions. Energy efficiency was treated as a priority element in past investment decisions in Malta's power generation sector and energy infrastructure which transformed Malta's energy mix

[142] Malta Tourism Authority (2023), MTA and GSTC sign MOU for the application of sustainability practices in tourism in Malta. Available at: https://www.mta.com.mt/en/file.aspx?f=34982

[143] INDIS Malta Ltd is responsible for the administration of the government-owned industrial parks and related facilities around Malta and Gozo, as well as supporting and promoting their further development.

[144] EWA (2024), Voluntary Organisations Scheme. Available at: https://energywateragency.gov.mt/voluntary-organisations-scheme/

from one based on heavy fuel oil to a more sustainable energy mix based on gas, electricity imports through the Malta-Italy interconnector and renewable energy sources (gasoil is used as a backup fuel).

Malta plans to continue taking the Energy efficiency First principle into account as and when necessary, in line with the new provisions included in the new recast directive. There are, however, other factors that need to be equally considered when applying the "Energy Efficiency First" principle in energy planning, policy and investment decisions which need to give due importance to security of supply and cost-efficiency. In cases related to national security or national heritage projects, the energy principle will continue to be implemented within constrained parameters.

vi. Where applicable, a description of policies and measures to promote the role of local renewable energy communities in contributing to the implementation of policies and measures in points i, ii, iii and iv

Although the structure of the Maltese electricity system, with only one electricity supplier (Enemalta is designated as the exclusive electricity supplier in Malta), as well as the limited space available for the deployment of PV installations, can be considered as barriers for the setting up of renewable energy communities, the legal framework originally established for co-operatives, also lends itself for renewable energy communities. A study is also currently underway to assess relevant barriers to PPAs and renewable energy communities.

vii. Description of measures to develop measures to utilise energy efficiency potentials of gas and electricity infrastructure

Electricity Generation

By 2017, Malta had closed its inefficient power generation units and was exclusively using natural gas for electricity generation[145], which is delivered as LNG. Also in 2017, one of the existing electricity generation plants was partially converted from heavy fuel oil and gasoil fuel to natural gas/gasoil. During the design process of the conversion, the plant was equipped with a heat recovery system which makes use of heat generated by the internal combustion engines to produce fresh water. The plant has two evaporators and produces 30 m3/hr per evaporator.

A second HVAC sub-sea connector, similar to the existing HVAC sub-sea connector commissioned in 2015, is expected to be implemented and commissioned in 2026. This shall coincide with the end of the present LNG supply contract in August 2026. This will allow Enemalta to reduce the share of local generation from the two gas-fired power plants, and to increase the volume and proportion of

[145] A diesel-powered plant is kept on standby to achieve the desired level of security of supply.

electricity imported from the European electricity markets, therefore reducing the amount of local carbon emissions.

Electricity Distribution

Enemalta plc is the only electricity Distribution System Operator in Malta. In the recent years, Enemalta has embarked on an extensive program to ensure an efficient distribution system that minimises losses, operating the system in an efficient manner in accordance with European and local legislation. It must be noted that Enemalta has equipped almost all of its consumers with smart meters and has adopted a tariff system that favours prudent energy use and energy efficiency, with the aim of fostering such behaviour in its final consumers. Rollout of 2nd generation smart meters currently stands at around 18.6% of total smart meters installed.

The network operator has been adopting measures to improve the energy efficiency of its infrastructure. These include the use of low-losses distribution transformers, natural ventilation in transformer rooms to reduce the need for forced ventilation, energy efficient cooling fans, light colour finishes to reduce heat gain in summer, LED lighting and high efficiency air conditioning systems. Details of the network upgrades are found in section 2.4.2.

viii. Regional cooperation in this area, where applicable

Malta's national entities responsible for implementing the Energy Efficiency Directive have been actively participating within the Concerted Action of the Energy Efficiency Directive (CA-EED) project. Malta considers the CA-EED a useful regional cooperation forum for the sharing of best practices and dissemination of knowledge on the implementation of the Energy Efficiency Directive. Malta has been fostering a working relationship with all CA-EED members, in particular with other Member States with similar geographical realities, which tackle comparable challenges in implementing energy efficiency measures. In this sense, the CA-EED continues to be a useful structure for knowledge-sharing between Member States' experts. The CA-EED is currently in its third grant agreement and financed under the EU's Horizon 2020 Programme. The Energy and Water Agency will continue to participate within this forum.

Furthermore, as a member of the EnR network, a voluntary network for European energy agencies, the Energy and Water Agency also participates actively in the EnR Energy Efficiency working group. This working group aims to provide a communication and cooperation platform for energy agencies to discuss issues of common interest relating to energy efficiency. The working group focuses mainly on practical and operational matters in relation to programmes and measures in the field of energy efficiency, but it also strives to identify potential solutions, new project initiatives and propose good practices on common issues relating to energy efficiency, also in collaboration with other working groups in the EnR network.

ix. Financing measures, including Union support and the use of Union funds, in the area at national level

The predominant source of funding for Malta's energy efficiency measures are national funds. Nevertheless, EU funds are, and will continue to, be used to complement national funds for energy efficiency measures.

Malta's Recovery and Resilience Plan which is financed by €328 million in grants was given a positive assessment by the European Commission and as part of the key measures to secure a green transition, the following are amongst some of the actions will be taken:

- the large-scale electrification of road transport which will promote the purchase of zero-emission electric vehicles for the public and private sector. This investment will cost a total of €60 million. Together with this a reform granting free public transport to more than 100,000 Maltese citizens which will boost the use of public transport and help address congestion through obtainment of the 'tal-linja' card. The electrification of road transport will be supported by the installation of charging pillars, funds for which are allocated under the Cohesion Fund. The aim is to have some 1,200 charging points by 2026 through this measure.

- A large-scale energy-efficiency programme for public and private buildings worth EUR 30 million will be spent on the renovation and retrofitting of public hospitals (EUR 20 million); renovation and retrofitting, together with investing in renewable energy sources to energise the Nadur/Ghaxaq schools (EUR 10 million). Also, within the education sector, the government recently inaugurated the first carbon neutral school which will serve as a pilot project for such buildings (EUR 14.9 million). All these initiatives will lead to a sizable reduction of greenhouse gas emissions. Similar projects will also be carried out on road networks and public spaces to further increase the potential of exploiting renewable energy sources beyond traditional roof top investments (EUR 3 million).

3.3 DIMENSION ENERGY SECURITY

i. Policies and measures related to elements set out in 2.3

Section 2.3 provides a summary of the high-level objectives related to energy security, as well as an in-depth explanation of the evolving energy security landscape, including the specific impacts on Malta. This section provides an overview of the main policies and measures which are implemented and/or planned under the energy security dimension related to energy system preparedness, periodic contingency planning, and measures strengthening the flexibility of the energy system.

As mentioned in section 2.3, the objectives and targets related to energy security are contemplated within the context of the over-arching objective of decarbonising the energy system, concretely through the deployment of renewable energy sources (RES) and implementation of energy efficiency (EE) measures. Policies and measures promoting RES and EE have already been described under the relevant sections of the Plan (Section 3.1.2 – RES; Section 3.2 – EE).

In line with the guidance provided by the European Commission, this section also covers actions and measures taken as a result of the 'Save Gas for a Safe Winter' Communication and the Council Regulation on coordinated demand reduction measures for gas.

Complementing the already established interconnectivity link between Malta and Italy, Malta is also in the process of implementing a second interconnector. Malta is also actively assessing the feasibility of importing green hydrogen through the PCI hydrogen-ready gas pipeline project (MTGP) as an option for the decarbonisation of Malta's power generation sector and possibly also other inland sectors, whilst addressing the island's need for security of electricity supply. These two projects are expected to contribute to a number of targets and objectives under the energy security dimension, including reducing reliance on fossil fuels, diversifying energy sources, as well as reducing import dependency from third countries. Details of these two infrastructure projects are found in section 2.4.2. Additional information on regional cooperation efforts are available in section 3.3 (ii).

N-1 System Adequacy principle

The Government, through Enemalta, implements a security of supply principle described as the N-1 system/generation adequacy standard. This requires that even when losing the largest piece of power generation infrastructure (e.g. electricity interconnector or gas facilities) the system needs to be sufficiently resilient to meet the maximum electricity demand. This is an over-arching principle and is expected to be maintained until such time the power system configuration would require a probabilistic approach (as adopted in larger power system) to establish a system adequacy standard. In light of the historical data and the challenges posed by factors such as population increase, electrification, and climate change, the need for adherence to the N-1 system adequacy principle becomes even more important. Since 2010, annual peak demand has shown a general upward trend (Table 11), with significant year-on-year increases, reaching a record annual peak demand of 663MW in 2023, a 14.1% increase from the previous year. The annual evening peak demand, which is a crucial metric for assessing generation capacity in the absence of PV generation, was recorded at 663 MW on July 25, 2023.

Table 11 - Annual Peak Demand since 2010. Source: Enemalta

Year	Annual Peak Demand (MW)	Annual Peak Demand Year-on-Year increase (%)
2010	400	
2011	414	3.5
2012	429	3.6
2013	408	-4.9
2014	383	-6.1
2015	426	11.2
2016	418	-1.9
2017	488	16.7
2018	465	-4.7
2019	522	12.3
2020	482	-7.6
2021	565	17.1
2022	581	2.8
2023	663	14.1

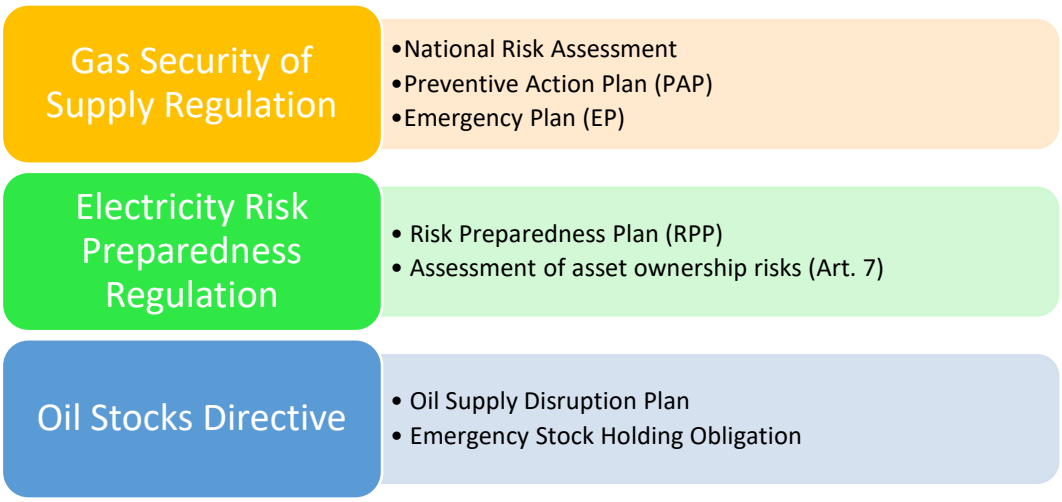
The second electricity interconnector project will ensure the ability to meet the N-1 system adequacy principle with the projected increase in demand. This investment would be highly beneficial as the current generation capacity in summer, assuming all plants are available for dispatch, is 779 MW. However, in an N-1 scenario where the existing interconnector is not available, the permanent generation capacity available for dispatch decreases to 559 MW, which falls short of the annual evening peak demand recorded in 2023. To compensate for the deficiency in meeting the N-1 system adequacy until the second interconnector becomes operational, the DSO has invested in a 60MW temporary emergency power facility. This temporary plant is scheduled for decommissioning following the commissioning of the new interconnector.

Contingency planning

The policy framework for energy security in Malta can be split into a number of policy documents which align with requirements under the respective EU legislative acts, in particular the Gas Security of Supply Regulation (EU) 2017/1938, the Electricity Risk Preparedness Regulation (EU) 2019/941 and the Oil Stocks Directive 2009/119/EC[146].

Figure 27 - Energy contingency planning in Malta

[146] Council Directive of 14 September 2009 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products



The Gas Security of Supply Regulation and Electricity Risk Preparedness Regulation set out timeframes for periodic updates of national electricity and gas contingency plans. Gas Security of Supply Plans and the electricity Risk Preparedness Plan have an updating cycle every 4 years. There are no timeframes for the update of the Oil Supply Disruption Emergency Plan. However, as per Regulation 18(2) of S.L. 545.09, the Regulator shall at all times have contingency plans to be implemented in the event of a major oil/petroleum supply disruption and shall provide for organisational measures to be taken to allow those plans to be implemented.

Malta's Gas Emergency Plan has been updated in the second half of 2022 in order to take into account gas demand reduction measures as a result of the adoption of Council Regulation (EU) 2022/1369. Malta's National Risk Assessment (NRA), including the N-1 calculation, has also been updated over the course of 2022/2023. In line with the Gas Security of Supply Regulation, Malta's Preventive Action Plan has been updated and submitted to the European Commission in July 2023. Malta's first Electricity Risk Preparedness Plan (RPP) has been developed and submitted to the European Commission in 2022.

Natural gas is used exclusively for the generation of electricity and currently constitutes the largest share of Malta's electricity generation mix (67.79% in 2022). Natural gas is imported in the form of LNG. Given the interlinkages between gas and electricity production in Malta, the contingency plans developed for the purpose of the Gas Security of Supply Regulation and that developed for the Electricity Risk Preparedness Regulation take a unified approach – they are based on similar risk scenarios and incorporate the same framework of roles, procedures, and preventive and emergency measures before, during and after a crisis affecting gas and electricity supply in Malta.

Gas Security of Supply

The Security of Gas Supply Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 requests the competent authority of each Member State to carry out multiple tasks, which include the development of a gas security of supply National Risk Assessment, a Preventive Action Plan, and an Emergency Plan. The Ministry responsible for energy is the designated Competent Authority for Malta. In line with Annex I of the same regulation, Malta forms part of four

Regional risk groups, which are also required to prepare a Common (regional) Risk Assessment and develop joint regional chapters for inclusion in the preventive action and emergency plans:

- North African gas supply risk groups:
    - Algeria: Greece, Spain, France, Croatia, Italy, Malta, Austria, Portugal and Slovenia
    - Libya: Croatia, Italy, Malta, Austria and Slovenia
- South-East gas supply risk groups:
    - Southern Gas Corridor – Caspian: Bulgaria, Greece, Croatia, Italy, Hungary, Malta, Austria, Romania, Slovenia and Slovakia
    - Eastern Mediterranean: Greece, Italy, Cyprus and Malta

In order to reduce the administrative burden and streamline and simplify the process of developing Common Risk Assessments, and in order to ensure that the Regional Risk Groups are up to date with the changing landscape of gas security of supply in Europe, as of mid-2024 the European Commission is in the process of developing a Delegated Act on the revision of the composition of the Risk Groups. The total number of Risk Groups is proposed to be reduced down to 4, with Malta expected to form part of an LNG Group (which incorporates all Member States) and the North-African Group (in view of planned connection with Sicily). Nonetheless, these changes would affect the next updating cycle of the regional and national risk assessments, preventive action plans and emergency plans.

Malta's National Risk Assessment (NRA) was updated in line with Article 7(3) of the Gas Security of Supply Regulation in 2023. The updated Risk Assessment considered the loss of the gas facility at Delimara on a day of peak demand with a likelihood of occurring once in 20 years. As the only use of natural gas in Malta is for electricity generation, the Risk Assessment considered how the loss of the LNG facility would impact the supply of electricity. Malta's Risk Assessment also took into account the effect of seasonality, therefore comparing the summer period (peak demand) with the rest of year. Since meeting electricity demand is more sensitive to within-day peaks as compared to gas, Malta's Risk Assessment also considered within-day peak periods. It highlights the importance of a second interconnector to provide Malta with the additional headroom necessary to mitigate any loss of gas supply. The occurrence of not meeting demand during a gas disruption would further be mitigated through the installation of utility-scale battery storage systems, which are also not considered in the analysis and would have a tangible impact on the mitigation of any gas supply disruptions.

The Risk Assessment also highlighted the strategic national importance and criticality of gas-fired power generation in Malta. In particular it underlined the need for ensuring continued imports of LNG in line with the long-term gas supply contract and ensuring the operational capability of gas facilities, and the need to ensure the security and resilience of the Delimara Power Station against natural hazards and man-made threats. Multiple risk scenarios were identified and adapted to gas security of supply.

The Risk Assessment identified that should the single largest piece of gas infrastructure be lost, Malta would be unable to meet all gas demand relying on alternative electricity sources should this coincide with an exceptionally high peak energy demand.

The within-day analysis also demonstrated that whilst solar PV contributes in aggregate and in daylight hours, peak electricity demand in afternoons and evenings (even during the rest-of-year period)

cannot be fully satisfied without natural gas for electricity production. It's important to note that the analysis focuses on existing electricity infrastructure.

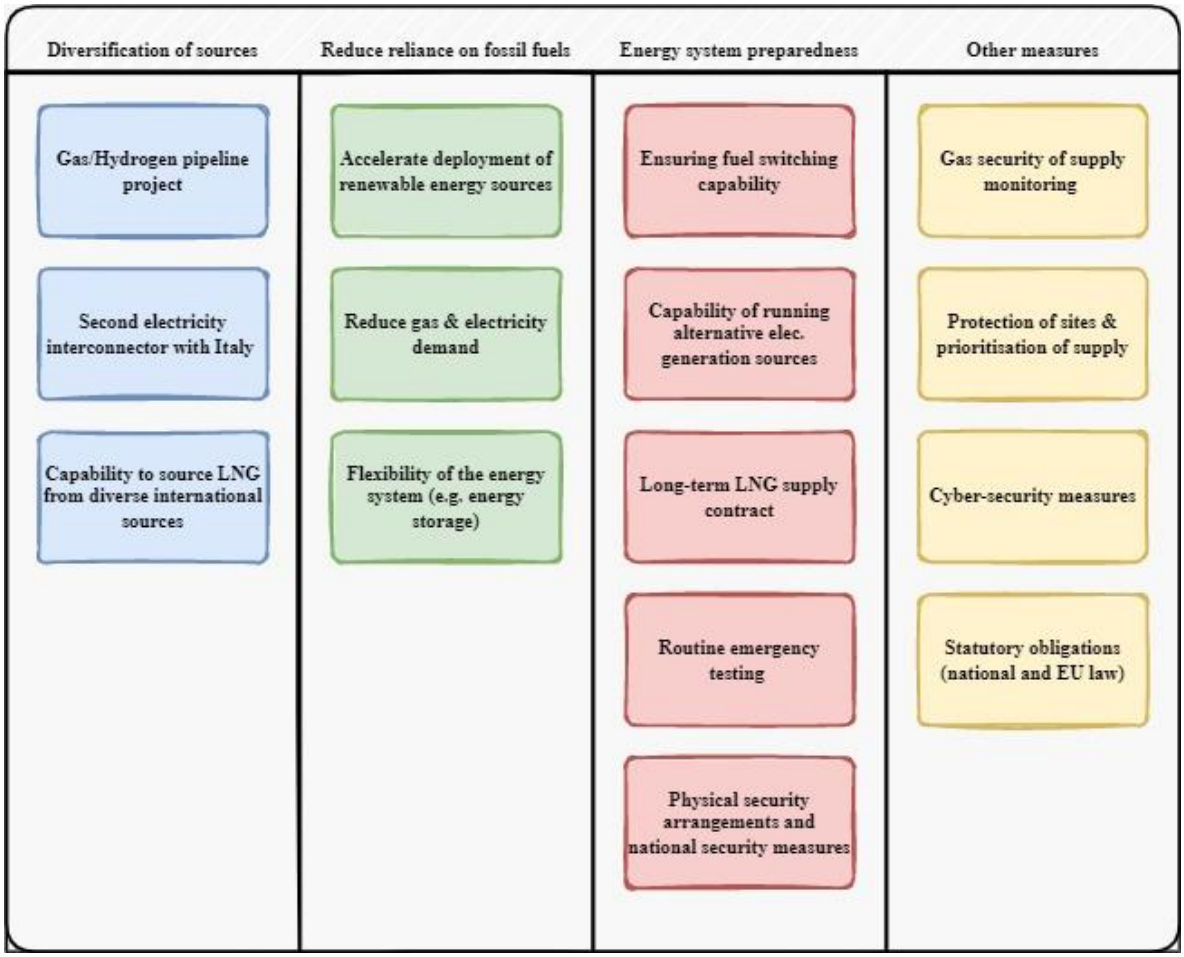
Compared to Malta's first NRA, the 2023 update included two additional risk scenarios, one which stems from the geopolitical situation and security of supply consequences of the conflict in Ukraine, and another one related to the prolonged loss of or damage to the electricity interconnector with Italy.

Article 8(2) of the Regulation requires that Member States develop a Preventive Action Plan containing the measures needed to remove and mitigate the risks identified in the Risk Assessment and an Emergency Plan outlining the measures to be taken to remove or mitigate the impact of a disruption of gas supply.

The Preventive Action Plan established a list of preventive measures in place, or to be adopted, to address the risks in case of a disruption of gas supply, as well as roles and responsibilities of relevant stakeholders which contribute to the prevention of a disruption of gas supply. The list of preventive measures includes physical security arrangements, periodic technical and engineering inspections and monitoring, national security measures, legal, statutory and operational obligations, as well as measures promoting the use of RES, energy efficiency measures, measures promoting the diversification of sources of energy supply, as well as measures available at regional level identified within the relevant Risk Groups. Malta does not have household gas customers, SMEs or essential services that are connected to a gas distribution network or gas district heating network. Nevertheless, customers are vulnerable if the supply of gas is restricted or stopped through the reduced availability of electricity. To minimise the impact from a gas supply disruption, Malta will maintain a formalized procedure for prioritising electricity supply to these groups of vulnerable customers.

Preventive measures in Malta can be broadly split into the following categories: Diversification of sources; Reduce reliance on fossil fuels; Energy system preparedness; and other measures, such as those focusing on reporting and monitoring, protection of critical sites, cyber-security and statutory obligations under EU and national law. Under diversification of sources, preventive measures focus primarily on planned or ongoing transmission infrastructure projects such as the hydrogen-ready gas pipeline and the second electricity interconnector with Italy. Malta's goal to reduce reliance on fossil fuel imports is driven by accelerating the deployment of renewable energy sources, implementation of energy efficiency and demand reduction measures, as well as increasing the flexibility of the energy system. Energy system preparedness is achieved through ensuring the capability of alternative electricity generation sources, through long-term supply contract, routine emergency testing as well as general physical security arrangements and national security measures. These measures are expected to be in place in the short-to-medium term as Malta moves closer to a decarbonised energy system.

Figure 28 - Schematic of high-level preventive measures (as per Gas Preventive Action Plan)



The Emergency Plan defines three main crisis levels related to a disruption of gas supply: early warning, alert and emergency, and outlines the roles and responsibilities of specific actors, such as the competent authority (the Ministry responsible for energy), natural gas undertakings, the electricity distribution system operator, the national regulatory authority, civil protection bodies, Critical Infrastructure Protection Directorate (CIPD) and other stakeholders per each crisis level. The Plan also identified the measures and actions to be taken to mitigate the impact of a disruption of gas supply on the electricity sector and the mechanisms and provisions in place to ensure the appropriate coordination and exchange of information between the main actors in the gas and electricity sectors. Apart from the escalation process, going from one crisis level all the way to an emergency, the Plan also outlines the measures and responsibilities for the process of de-escalating an emergency situation back to business-as-usual.

Emergency measures

The measures set out in Malta's Emergency Plan (EP) which are deployed at each relevant crisis level during a gas security of supply crisis are described below. From the perspective of ensuring the availability of gas, measures which are introduced at the alert and emergency level primarily take advantage of the pre-existing contractual arrangements for the procurement of LNG.

Figure 29 - Measures to be deployed during a gas security of supply crisis

Early warning	Alert	Emergency
•Explore possibility of bringing forward next planned LNG delivery; • Gas facility operator to monitor availability of interim/top-up delivery; •Monitor availability of alternative sources	•Bring forward next LNG delivery within existing contractual arrangements; • Seek an interim top-up/delivery; •Monitor availability of alternative sources	•Arrange an early delivery outside of existing contractual arrangements. Competent Authority may provide direct support or intervene if required; •Arrange an interim top-up/delivery; •Utilise all other electricity sources to reduce gas demand; •Enforce electricity demand reduction/load shedding;

At a high-level the measures to be implemented during a gas security of supply crisis can be split into the following categories:

1. Measures regarding the management of LNG deliveries (e.g. seeking a top-up delivery, bringing forward a delivery, ensuring approval of LNG facility by international suppliers, designation in line with international standards to ensure as many vessels as possible are suitable to berth and supply LNG to Malta).
2. Using alternative electricity sources (e.g. maximising the use of the electricity interconnector with Italy, maximising other forms on-island generation such as emergency back-up power plants, reducing demand for gas/electricity).
3. In extreme situations, forced electricity demand reduction and load shedding (e.g. in case of a prolonged gas supply shortage affecting Malta), electricity rationing may be necessary, restricting the consumption of certain electricity customers. This measure includes the protection of sites which are dependent on continuous electricity supply and which provide essential services.

<u>Gas and Electricity demand reduction measures</u>

The European Union has been actively working on measures to reduce gas consumption in response to the energy crisis exacerbated by Russia's military aggression against Ukraine. In 2022, the Council Regulation (EU) 2022/1369 concerning coordinated demand reduction measures for gas came into effect. This regulation mandated that Member States update their gas Emergency Plans to incorporate voluntary gas demand reduction measures for the winter period spanning from August 1, 2022, to March 31, 2023. The updates required a detailed description of the measures to be implemented to achieve the targeted reduction. The goal was for each Member State to make their best efforts to reduce gas consumption by 15% compared to the average of the same period over the previous five years. The initial regulation was a direct response to the urgent need for action in the face of the energy

crisis and was extended by an additional year in 2023. It expired on March 31, 2024. The demand reduction measures implemented under this regulation have been successful, enabling the EU to phase out approximately 65 billion cubic meters of Russian gas in 2023, affecting primarily households and industries.

In subsequent developments, the Council has now formally adopted a recommendation[147] encouraging Member States to persist in their efforts to reduce gas consumption by at least 15% relative to their average consumption from April 1, 2017, to March 31, 2022. This reduction is to be maintained until March 31, 2025. This recommendation is designed to support Member States in taking necessary measures to secure their energy supply until the transposition of the Directives on energy efficiency (EED) and renewable energy sources (RED) in 2025. These directives are expected to bring about structural demand reduction and contribute to the EU's decarbonization objectives.

According to the opinion report from the European Union Agency for the Cooperation of Energy Regulators (ACER), starting in the summer of 2024, the EU is expected to have substantial gas reserves and anticipates a significant increase in LNG imports[148]. This positions the EU's gas network to meet the demand and refill storage to full capacity by the end of the injection season on November 1, without dependence on Russian gas. However, if Russian pipeline supplies are disrupted and LNG supplies to Europe are constrained, it would necessitate a more extensive use of gas reserves to satisfy demand. Furthermore, Russian gas flows to Europe via Ukraine are expected to stop by the end of 2024 following the expiry of the gas transit agreement between Russia and Ukraine. This could result in notably depleted storage levels by the end of winter 2024/2025. In such a scenario, a 15% reduction in gas demand, based on the last five-year average, would be essential, along with an increase in LNG supplies to prevent gas rationing. Additionally, Ukrainian gas storage sites could enhance the flexibility of the gas network by providing an extra storage capacity of 10 billion cubic meters. The importance of gas storage cannot be overstated, as it provides critical flexibility within the gas system, particularly during the winter months, ensuring a secure energy supply.

Due to the nature of its energy system and its isolated position, Malta cannot fully contribute to the goals of Regulation (EU) 2022/1369 on gas demand reduction and provide solidarity to other Member States during an emergency by supplying other Member States with natural gas. Malta only uses natural gas for its critical gas-fired power plants. Natural gas is imported as LNG via sea vessels and stored in a floating storage unit (FSU) which is permanently moored next to the power plants and processed at an adjacent re-gasification facility. There is no gas market in Malta as there are no gas distribution networks and no end-users of natural gas. Since Malta is not connected to the trans-European Gas network or any other third country network, with just-in-time deliveries of LNG shipments for exclusive use by power plants, Malta does not have any means to provide any significant contribution to the reduction of gas demand in Europe. In fact, recital 15 of Council Regulation (EU) 2022/1369 notes that certain Member States, due to their lack of direct interconnection to the gas

[147] Council of the European Union (2024), Council Recommendation of 25 March 2024 on continuing coordinated demand-reduction measures for gas (C/2024/2476). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32024H02476

[148] European Union Agency for the Cooperation of Energy Regulators (2024), ACER Opinion: EU gas network set to meet demand and winter storage goals. Available at: https://www.acer.europa.eu/news-and-events/news/acer-opinion-eu-gas-network-set-meet-demand-and-winter-storage-goals

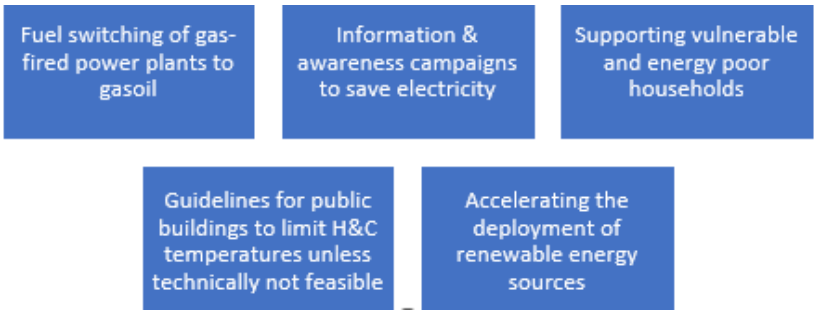
interconnected system of another Member State are not able to free up significant volumes of pipeline gas to the benefit of other Member States. Furthermore, paragraph 6 of Council Recommendation C/2024/2476 acknowledges that the recommendation is not addressed to a Member State for as long as that Member State is not directly interconnected to a gas interconnected system of any other Member State.

Moreover, a reduction of the critical gas volumes which are used for electricity production in Malta would increase Malta's reliance on electricity imports via the sub-sea electricity link with Italy and could ultimately lead to an increase of gas demand in Italy. This would have the opposite effect to what is intended by the Council Regulation. Malta is nevertheless committed and doing its utmost to utilise existing and implement new measures focusing on the reduction of electricity (and therefore natural gas) consumption in Malta and ensure the capability of the electricity system to switch to alternative sources, such as gasoil in case an EU alert is triggered in line with the gas demand reduction Regulation. In the spirit of solidarity, Malta has also made its best efforts, in line with Article 3 of the Council Regulation on voluntary gas demand reduction, by introducing additional measures focusing on the reduction of electricity (and therefore natural gas) consumption. The following measures, which are outlined in the 'Save Gas for a Safe Winter' communication are considered of relevance to Malta.

- **Fuel Switching**: all gas-fired power plants in Malta are considered critical. Gas supply is covered by a take-or-pay long-term gas supply contract and therefore reducing gas for electricity production is, in practice, unfeasible in the short-to-medium term. During emergencies, for a limited period of time, Malta has the capability to run gasoil-fired power plants. It is to be noted that gasoil-fired emergency plants can only be used in case of an emergency and due to technical constraints and limited capacity, cannot fully replace gas-fired power plants in the event of a long-term gas disruption.
- **Measures focusing on the reduction of electricity consumption**: existing and planned measures focusing on the reduction of consumption of electricity amongst its citizens and businesses in the various sectors are described under the Energy Efficiency dimension, whereas measures focusing on the installation of renewable energy sources are described under the Renewable Energy dimension.
- **New measures and actions on voluntary gas demand reduction**: In August 2022 the Government issued guidelines on efficient electricity use to be followed by all public buildings and public open spaces. These guidelines focused on heating, cooling, lighting and efficient use of appliances with the aim of achieving energy savings.
- **Information and Awareness Campaigns**: In October 2022, Malta launched a public awareness campaign focusing on inducing energy saving behaviour in the residential sector. This consisted of a three-month campaign aimed at raising awareness among the public to conserve energy through small and easy changes in everyday life. The campaign used tools such as an interactive website, printed and online booklets, advertising via social media and digital platforms focusing on different energy savings tips. It is expected that the Government will continue to promote and develop policies and measures to support the efficient use of energy in the public sector, households and businesses. Further information with reference to this joint action with business associations in section 3.2
- **Support for vulnerable households:** The Energy and Water Agency (EWA) provides free professional advice to households on energy efficient behaviour, providing guidance to residential consumers to lower their energy and water utility bills. For vulnerable/energy poor

households a financial scheme is available to replace old and inefficient household appliances with new energy-efficient models.

Figure 30 - Measures of relevance for reducing gas volumes in Malta



Risk Preparedness in the Electricity Sector

The electricity system operator, Enemalta plc, was assigned the responsibility of preparing the Risk Preparedness Plan (RPP) on behalf of the National Competent Authority. Enemalta plc, as the designated Distribution System Operator in Malta is responsible for ensuring the security of electricity supply within the Maltese Islands. Regulation (EU) 2019/941 sets out a common framework of rules on how to prevent, prepare for and manage electricity crisis whilst ensuring that measures are taken in a coordinated and effective manner, including solidarity measures between Member States. As per the Regulation, Member States are required to ensure that all relevant risks relating to the security of electricity supply are assessed, identify electricity crisis scenarios and subsequently establish Risk-Preparedness Plans, which consist of national and regional measures to prevent, prepare for and mitigate electricity crisis.

Malta's first electricity Risk Preparedness Plan (RPP) was prepared and submitted to the European Commission in 2022. Malta's RPP included a description of national electricity crisis scenarios. These were broadly aligned to the regional electricity crisis scenarios developed by ENTSO-E, but adapted to the specific circumstances of Malta. The most relevant national electricity crisis scenarios were grouped into the following main categories:

- Cyber-attack;
- Extreme weather;
- Physical attack;
- Human-induced threat scenarios;
- Fuel shortages;
- Technical failure;
- Market rules;
- Natural disasters.

The Plan also considers scenarios which are specific to Malta, such as the prolonged loss of the electricity interconnector with Italy. Furthermore, the RPP sets out the roles and responsibilities of national actors in terms of crisis management, established the role of the designated competent

authority, outlined the responsibilities which have been delegated to other relevant stakeholders, and identified the role of the Crisis Coordinator. The RPP also sets out the procedures and measures implemented during an electricity crisis, including the information flow between relevant parties before and during a crisis, the preventive and preparatory measures established in Malta as well as measures which are to be implemented in order to mitigate any electricity crisis. Furthermore, the RPP establishes a framework for emergency testing and includes a summary of previous and planned emergency tests which are to be carried out at the Delimara Power Station.

The measures which are described in the RPP consist of the following main elements:

- National legislation which governs the procedures to be implemented in an electricity crisis;
- Alignment with the EU legislative and regulatory framework for crisis management and contingency planning;
- National rules for the declaration of a crisis level (falling under the responsibility of the Crisis Coordinator);
- Routine monitoring carried out by the Regulator for Energy and Water Services (REWS);
- National procedures for emergency response and coordination with civil protection bodies;
- Strategic preparatory measures (e.g. black start capability, implementation of business continuity plans);
- Operational preparatory measures (e.g. ensuring effective physical security arrangements, regular cyber-security testing, checking availability of critical spares, testing capability to move FSU onto storm moorings, etc.);
- Measures to mitigate electricity crises;
- Principles for load shedding and prioritisation of designated sites;
- Mechanisms to inform the public about an electricity crisis;
- Bilateral procedures and measures;

On 24th March 2023 Malta received a Commission Opinion on the Risk Preparedness Plan submitted by Malta to the European Commission. In the Opinion, the Commission have pointed out that it considers some elements of the RPP do not fully comply with the requirements of the Regulation and have asked Malta to submit an updated Plan in line with its recommendations.

Malta's updated Risk Preparedness Plan (RPP) which takes into account the Commission's Opinion of 24 March 2023 was officially submitted to the European Commission on 5 October 2023.

Oil Supply Disruption Emergency Plan

EU Directive 2009/119/EC amended by Commission Implementing Directive (EU) 2018/1581, which requires Member States to maintain minimum stocks of crude oil and petroleum products, was transposed into national law through Legal Notice 109 of 2013 and amended by Legal Notice 156 of 2019. Regulation 18(2) of this legal notice requires the REWS to develop contingency plans that would be implemented in the event of a major supply disruption. In this regard, an Oil Supply Disruption Emergency plan, to be activated in the event of difficulties arising in the supply of crude oil and petroleum products has been prepared.

The document outlines the strategic approach to be taken in the management of an oil supply disruption emergency in Malta. The Plan ensures that, as far as possible, the institutions, information, hardware and infrastructure are available, ready, and coordinated to perform efficiently and expeditiously in any emergency involving oil supply, while allowing a certain freedom and flexibility to respond effectively to any circumstances as they arise. It also highlights the arrangements to be established between the oil industry, the REWS and the European Commission for the safe and effective management of oil supply emergencies. The scope of the original plan does not cover natural gas.

Under the Contingency Plan, an Oil Supply Disruption Task Force may be appointed on an ad hoc basis, depending on the disruption/interruption event that arises. The Task Force would be made up of high officials representing the Ministries responsible for energy and for finance, the Regulator for Energy and Water Services, and oil suppliers and importers, under the Chairmanship of the Minister responsible for Energy. The Task Force would be in a position to collaborate with high fuel consumers potentially affected by an oil supply disruption. If the emergency is the consequence of a natural disaster, the Oil Supply Disruption Task Force would work closely with the Civil Protection Department, which has the overall responsibility for emergency response to such events. The Task Force would also advise the Minister on what measures, proportionate to the situation, to take, monitor, analyse and report to the Minister on the situation and events, during activation of the contingency plan. Finally, when the shortage is declared over, the Task Force is required to take stock of lessons that could be learnt and update the Plan where required.

Emergency stock holding obligations

In Malta, the national emergency stock holding obligation is delegated to fuel importers and calculated on the gross inland consumption attributed to each importer. The national emergency stock holding obligation on aviation kerosene (Jet A1), bitumen and lubricants constitutes an exception whereby the emergency stock is held by the Regulator on behalf of the Government.

The emergency stock holding obligation must be met through emergency stock holding tickets in Malta or any other EU country, except in those cases where the importer has a legal title to storage (ownership or lease) and may claim emergency stocks held as physical stocks. The composition and location of the security stock holdings may vary. For instance, in 2023, on average, throughout the first and second quarters of the year, 84% of the stocks were held as tickets abroad while 12% were held as tickets locally whereas the remaining 4% were held as physical stock by the operators. As for the third and fourth quarters of the year, on average, 59% of the stocks were located as tickets held abroad and 33% were held as tickets in Malta whereas the remaining 8% were held as physical stocks by the operators. Whilst no evaluation on the impact on security of supply in the case of a supply crisis regarding 'tickets' has been carried out by the Regulator, it has to be noted that during the recent COVID-19 and Ukraine crises, no persistent difficulties were encountered for the procurements of CSO agreements ('tickets').

The Regulator monitors the compliance of the entities delegated with an emergency stock-holding obligation. Operators are required to report monthly data related to commercial and emergency stocks held on their behalf and on behalf of third parties being local or foreign entities who are holding stocks on behalf of Malta or other EU Member States. In addition, normally verification inspections of oil

stocks including those stocks declared as emergency stocks are carried out at the end of June, September, and December of each year.

Critical Infrastructure Protection

Critical Infrastructure Protection Unit

Directive 2008/114/EC has been repealed by Directive (EU) 2022/2557 on the resilience of critical entities. The new directive imposes several new obligations on Member States. Firstly, they are tasked with the identification of critical entities within their jurisdictions. Furthermore, by January 2026, each Member State is mandated to develop and implement a comprehensive strategy aimed at bolstering the resilience of these critical entities. Additionally, Member States are obligated to conduct thorough Risk Assessments at a minimum of every four years, commencing in January 2026, to identify potential threats to the security and functioning of these critical entities.

Cyber-security in the energy sector

Directive (EU) 2016/1148 of the European Parliament and of the Council concerning measures for a high common level of security of network and information systems across the Union is transposed into national legislation through the Measures for High Common Level of Security of Network and Information Systems Order[2] (Legal Notice 216 of 2018). The order establishes the Critical Information Infrastructure Protection Unit (CIIP unit) within the Critical Infrastructure Protection Directorate, responsible for monitoring the application of the Order, which includes the establishment of criteria for the identification and designation of essential services within Malta as well as identifying the designated operators of essential services in Malta. The CIIP unit is also tasked with encouraging the use of European or internationally accepted standards and specifications relevant to the security of network and information systems. Electricity, oil and gas undertakings are included as operators of essential services in the energy sector.

The requirements and tasks of Computer Security Incident Response Teams (CSIRTs) within designated operators are also spelled out in the legislation. CSIRTMalta, the national CSIRT Unit within the CIIP Unit, supports critical infrastructures (CIs), Critical Information Infrastructures (CIIs) and other sensitive infrastructures in Malta on how to protect their information infrastructure assets and systems from cyber threats and incidents. CSIRTMalta also promotes the sharing of unclassified information which is useful against cyber-attacks and provides alerts and warnings to its constituents and internal autonomous CSIRTs. CSIRTMalta is composed of two units, Security Operations Centre (SOC) and Intelligence and Forensics Unit (IFU).

The following measures were taken by the Critical Infrastructure Protection Directorate to enhance the cyber security across multiple sectors, including energy. This includes the following:

1. Identified Operators of Essential Services are requested to establish their own Computer Security Incident Response Team (CSIRT) as part of the local transposition of the NIS Directive (L.N. 216 of 2018). Further to this, MaltaCIP directorate is updating the list of Security Liaison Officers (SLOs) and keeping them informed about their duties.

2. MaltaCIP Directorate issued a letter to all OESs requesting information about the status of implementation related to their Operator Security Plans. On the 9th August 2023, MaltaCIP

directorate requested information from the Operators of Essential Services (OESs) and Digital Service Providers (DSPs) on their preparedness, processes, and solution plans. The status of their conduct a risk assessment and the implement of their operator security plans. Documents had to be provided as evidence in the OESs' survey reply. From the energy sector, Electro Gas provided the documentation and is currently under review. In the interim, MaltaCIP directorate intends to request the other entities to provide with a reply to this survey.

3. CSIRTMalta managed to successfully apply to an EU funds program entitled "*Increasing the Resilience and Capability of the National CSIRT heightening Malta's Cyber Security Infrastructure* and acquired 1.2 million EUR in funds to assist OES's CSIRTs in purchasing equipment and necessary training such as MISP training, TAP devices and other CSIRT services. CSIRTMalta issued a circular to the Operators of Essential Services (OESs) and Digital Service Providers (DSPs) dated 20th April 2023 informing them as being eligible to utilise new services. These new CSIRT services are:

    - Hosting MISP instances within CSIRTMalta
    - Connecting with a central CSIRTMalta MISP instance
    - The usage of Nine (9) high-speed sensor Network Detection and Response (NDR) devices with aim to detect IOCs collected from the MISP Servers network

    On the 10th April 2023, MaltaCIP Directorate issued a circular to the Operators of Essential Services (OESs) and Digital Service Providers (DSPs) entitled "*Provision of services under the Cybersecurity Support Action*" as part of the F-OCU-22-T31 programme 100% funded by the European Commission. Project coordinate is European Union Agency for Cybersecurity ENISA and the contractor for Malta is Deliotte. As part of this project OESs and DSPs operating within Malta are eligible for Ex-ante and Ex-post services related to cyber security incidents.

    Ex - ante services refer to different types of penetration testing services as follows:

    - Application Testing
    - Infrastructure testing
    - Red Teaming
    - Hardware/IOT penetration testing
    - Industrial Control penetration testing
    - Wireless penetration testing
    - Purple Team Testing
    - Breach Attack Simulation

    Ex-post Services includes:

    - Incident Response
    - System Forensics Cloud
    - Forensic Analysis
    - Digital Footprint Assessment
    - Malware analysis

- Pure Sandbox (PS) analysis Mixed Light (ML) analysis Mixed Deep (MD) analysis
- Takedown Services
- Blacklisting of fraudulent sites
- Removal of fraudulent content
- Closure of fraudulent web pages that impersonate the Client's identity.

The project budget is of €500,000 and services are expected to be available till end of November 2023. Within the energy sector, Enemalta requested to undertake penetration testing services, the scope for the exercise was agreed and is planned for quarter three of this year. The overall costing of the penetration testing exercise is €70,000.

4. MaltaCIP Directorate conduct regular training exercises with OESs and DSPs. The last one was organized on 14th and 15th November 2022. The exercise was conducted not only by MaltaCIP directorate but as part of the inter-ministerial committee on Countering Hybrid threats. The committee has representation from the Office of the Prime Minister, Ministry for Home Affairs, Security, Reforms and Equality, Ministry for Foreign and European Affairs and Trade, and Malta Permanent Representation to the EU. The exercise was entitled EU Integrated Resolve 2022 also known as Parallel and Coordinated Exercise known as PACE. The simulation exercise involved entities from public and private sectors from the transport and energy sectors in fact the Maritime Security Committee was called for a meeting. A report after the exercise was provided to the participating members and to the inter-ministerial committee on Countering Hybrid threats.

Furthermore, Cyber-security risks were also considered within the existing contingency planning, such as the Risk Assessment and Preventive Action Plan and Emergency Plan under the Gas Security of Supply Regulation. The Critical Infrastructure Protection Directorate (CIPD) was consulted during the development of these plans to ensure that gas facilities are classified with respect to designated essential services, that the appropriate cyber-security measures are in place which enable the manual override of electricity and gas facilities in the event of a cyber-attack.

Offshore renewable energy technologies

The Government is committed to increasing its share of renewable energy from indigenous resources to contribute towards increased energy security. Unlike fossil fuels, intermittent renewable energy sources such as solar and wind are not subject to price fluctuations as their levelized cost of electricity is heavily dependent on their CAPEX. Relying on indigenous resources also reduces the country's dependence on foreign energy imports, further strengthening energy security and insulating the nation from external energy market volatility. Moreover, investing in renewable energy projects fosters the development of a more diversified energy mix. This diversification reduces reliance on a single energy source, minimizing the impact of potential disruptions and enhancing overall energy resilience. Details on renewable energy policies and measures are found in section 3.1.2.

Battery Energy Storage Systems (BESS)

The Government's investment in utility-scale battery storage marks a significant advancement in strengthening the resilience and operational efficiency of Malta's power system. Energy storage solutions are essential for enhancing the electricity system's adaptability, which is increasingly important as the country is committed to integrate more renewable energy sources. Battery storage plays a critical role in demand management and peak demand shaving, swiftly responding to demand shifts to mitigate grid stress during peak times and ensuring a reliable electricity supply.

Incorporating BESS into Malta's electricity infrastructure offers numerous benefits. It ensures a secure supply during plant outages, thus reinforcing grid stability. BESS helps to resolve grid bottlenecks, facilitating faster integration of renewable energy sources and alleviating congestion in the distribution network. It also provides a black start capability, which is crucial for re-energizing the grid in case of a total shutdown. Furthermore, BESS allows for the storage of energy generated by renewables at times of high production, which can then be used during peak demand, effectively reducing the need for peaking plants. This storage capability also lessens the impact of variability and intermittency from renewables, allowing for more stable operation of conventional plants and leading to gains in reliability, efficiency, and emission reductions. Additionally, BESS supports the introduction of more large-scale renewable energy projects, reducing reliance on fossil fuels. Lastly, BESS can offer fast frequency and voltage stabilization, which is particularly valuable if Malta's connection to the Italian grid is disrupted due to maintenance or faults. This integration of BESS positions Malta to achieve its EU decarbonization commitments while reinforcing the power system's resilience and operational efficiency.

Two utility scale BESS are under development, both of which have a planned commissioning date before 2030.

1. The first BESS Project to be located inside the 'A' Station in Marsa, with a capacity of 8MW / 20MWh
2. The second BESS Project will have a larger capacity than the first, with a capacity of 32MW/64MWh, and will be located within the Delimara power station site.

Furthermore, the Government intends to continue to provide financial support to further increase the deployment of solar PV technologies in conjunction with behind-the-meter battery storage systems. Malta has implemented a scheme in 2021 which aims to increase consumers' flexibility in their ability to store excess renewable electricity generated by PV systems instead of exporting to the grid and thus also supports self-consumption. Further details on this initiative are found in sections 2.3 IV and 3.1.2.

Demand-side Response

The current electricity market set-up, in the particular the lack of price signals (e.g. regulated retail tariffs) also limits possibilities for implicit (price-based) demand response, which requires real-time price signals to incentivize consumers to shift their consumption.

Nevertheless, some demand-side price-oriented solutions have already been implemented in Malta. For example, in order to incentivise off-peak charging of electric vehicles, reduced electricity tariffs

apply for off-peak consumption by electric vehicles. Additionally, a night and day tariff is available for non-residential consumers of electricity with an annual consumption over 5 GWh[149].

It is also important to note that smart appliances, smart metering systems and smart grids are an essential pre-requisite for unlocking the full potential of demand side response. Currently, a second generation of smart metering systems are being installed in the residential sector in Malta. These new meters have new functionalities which could be deployed to allow consumers to be more aware of their energy consumption. This will be done through a consumer energy management system where in-house display systems, smart phones and other devices will provide consumers with information on their consumption. Consumers will therefore have the opportunity to better understand their consumption patterns, resulting in increased energy conservation. It is important to note that the second generation smart meters do not active directly demand side response. However, the second generation meters can assist by providing consumption data to the account holder and possibly in future to an aggregator. These meters have a dedicated communication connections on which 3rd party devices can connect and obtain the consumption data.

As the number of electric vehicles increase, new flexibility options become possible. The potential of vehicle-to-grid (V2G) technologies as flexibility solutions shall be assessed. The government, together with the Distribution System Operator (DSO), is actively analysing the introduction of flexibility services as part of the effort in modernizing the electricity grid and preparing it for future developments and needs. In this context one of the solutions being studied in some detail is the introduction of vehicle to grid (V2G) technology in the Maltese islands. The conclusions of the study provide an understanding of the various enabling conditions and potential contribution of V2G to declared decarbonising ambitions by the Maltese Government.

One of the recommendations in the study was that a key next step was to conduct a V2G pilot study for a period of 12 months to capture user behaviour across a full year and accounting for seasonal differences. The aim would be to demonstrate the economic and environmental benefits offered by V2G, and to test the technology in a controlled environment. The project should bring together the public and private sector, and experts across transport, energy and infrastructure.

ii. Regional cooperation

In an era where energy security has become a paramount concern for EU Member States, the role of the CIP Unit has never been more crucial. Tasked with coordinating and supporting emergency preparedness plans under Legal Notice 434/2011, the CIP Unit's mandate extends to safeguarding critical infrastructures and ensuring a robust response to any potential disruptions.

The synergy between Malta and other Member States, as well as the European Commission, forms the backbone of a comprehensive strategy designed to maintain a steady and secure energy supply. In light of the recent energy price crisis and geopolitical tensions, particularly the conflict in Ukraine, the importance of a coordinated EU response has been underscored. Malta's engagement in regional risk

[149] Regulator for Energy and Water (n.d.), Regulated electricity tariffs. Available at: https://www.rews.org.mt/#/en/a/13-regulated-electricity-tariffs

groups and adherence to EU regulations exemplifies its commitment to a collective approach in addressing energy security concerns.

The mechanisms and agreements, such as emergency stock holdings, solidarity provisions, and interconnections, flexible sourcing of LNG, show Malta's readiness to address its energy requirements while contributing to the broader European energy framework. The following paragraphs detail Malta's strategies, collaborations, and ongoing projects aimed at reinforcing its energy infrastructure's robustness.

Malta collaborates with European Member States on national emergency stock holdings, with approved arrangements for placing stocks, in the form of tickets, overseen by Malta's competent authority, REWS and the respective national authorities in other Member States.

As mentioned above, Malta forms part of the active Libyan and Algerian Risk Groups under the Gas Security of Supply Regulation. The updated 2022/2023 Common Risk Assessments for the Algerian and Libyan Risk Groups, respectively, together with the simulations done by ENTSO-G for the European Commission and presented during the Gas Coordination Group (GCG) confirmed that Malta is not at significant risk from a disruption to the gas supply from neither gas supply route or from Russia, namely because the only source of natural gas in Malta is imported Liquified Natural Gas (LNG). This enables flexibility in the choice of the country of origin. Regional Risk Groups have worked on updating the common risk assessments to take into account recent developments, and in particular assessing the impact of a full Russian gas disruption.

The Preventive Plan and the Emergency Plan also identify various mechanisms developed for cooperation between Member States, such as the exchange of relevant information between Competent Authorities, risk groups, and the GCG. Nevertheless, until Malta is connected to the trans-European gas network, regional measures implemented by gas TSOs are not particularly relevant in the national context.

As regards the provision of solidarity, as explained in the previous section, due to the nature of Malta’s energy system, its isolated position, and the fact that Malta only uses natural gas (in the form of LNG) for its critical gas-fired power plants, it cannot fully provide solidarity to other Member States. Whilst entering into mandatory solidarity arrangements with neighbouring countries is currently not relevant for Malta, as explained in the previous section, should it become necessary, in the spirit of solidarity, for Malta to arrange an LNG delivery outside the existing contractual arrangements (e.g. long-term gas supply agreement), the Competent Authority would be in a position to provide support as deemed fit, including by liaising with other Member States.

Moreover, Malta does not have any gas storages and therefore the gas storage obligations do not apply for Malta. As a result, Malta did not carry out any bilateral or regional cooperation for this purpose. Furthermore, given the existence of a long-term gas supply contract, Malta does not currently participate in the EU Energy Platform focusing on joint gas purchasing. This is without prejudice to Malta’s potential future participation in the platform following the expiry of the current gas supply contract in 2026.

Under the Risk-Preparedness Regulation in the electricity sector, Member States are required to act and cooperate in a spirit of solidarity in order to prevent or manage electricity crises. Regional and

bilateral measures have to be agreed upon by Member States for the purpose of protecting public safety and personal security and outlined in their Risk-Preparedness Plans.

Arrangements are currently in place between TERNA (the Italian TSO) and Enemalta regarding the operation of the existing sub-sea interconnector between Malta and Italy. These arrangements are prescribed by the Regolamento di Esercizio signed in February 2015. Discussions regarding a solidarity agreement for electricity with the Italian authorities are ongoing in line with Article 15 of the Risk Preparedness Regulation. Until now, discussions have mainly been carried out at the technical level. The bilateral agreement shall seek to establish the mechanisms for bilateral cooperation and ensure appropriate coordination before and during electricity crises, including the decision-making procedures for an appropriate reaction between Malta and Italy.

Regional cooperation is most prevalent in Malta with regards to interconnections. Malta is hence working on enhancing such cooperation through the planned second electricity interconnector between Malta and Italy. At the same time, preparatory work continues with respect to the Melita TransGas Hydrogen ready Pipeline Melita TransGas Hydrogen-ready Pipeline ('MTGP') Melita TransGas hydrogen-ready pipeline Project of Common Interest.

Malta has also been a catalyst in spearheading discussions for regional cooperation amongst countries in the Mediterranean, including third countries, for mutual opportunities in the energy sector. Such opportunities can potentially contribute significantly to a number of objectives under the energy security dimension, including reducing reliance on fossil fuels and diversifying energy sources. Given that they are cross-sectoral in nature and also contribute to objectives set out under the Internal Energy Market dimension, these projects are described in detail under section 3.4.2.

iii. [If applicable] Financing measures in this area at national level, including EU support and use of EU funds

Financing is required in particular for the deployment of large-scale infrastructure projects. EU funding has been allocated under the European Regional Development Fund (ERDF) 2021-2027 for the second interconnector between Malta and Italy (financing details of this project are found in section 3.4.1). Additionally, significant investments are being made in utility-scale battery storage systems (BESS), which are essential for enhancing grid stability and integrating renewable energy sources.

A total planned investment of € 47 million EU Funds are to be split as follows:

- The first BESS project will be funded from the Recovery and Resilience Fund (RRF) with a budget allocation of approximately €12 million. This investment falls under the scope of "Strengthening and widening the electricity [network] through investments in the extension of the grid, distribution services, and battery storage," aiming to bolster the electricity network's capacity and reliability.
- The second BESS project will receive funding under the Multi-Annual Financial Framework (MFF) programme 2021-2027, with a maximum eligible cost of €35 million. This project is part of the Specific Objective RSO2.3 "Developing smart energy systems, grids, and storage outside the TEN-E" network, highlighting the strategic importance of smart energy solutions for Malta's energy future.

These projects are described in more detail under the Internal Energy Market dimension, in particular under section 3.3 (i).

3.4 DIMENSION INTERNAL ENERGY MARKET

3.4.1 Electricity Infrastructure

i. Policies and measures to achieve the targeted level of interconnectivity

As indicated in section 2.4.1. on the national objectives and targets in electricity interconnectivity, the level of interconnectivity is expected to remain well above the EU-wide target of 15%, as required under the Governance Regulation, via the commissioning of a second electricity interconnector.

ii. Regional cooperation in this area

Cooperation between the Maltese and Italian authorities on issues of electricity interconnection has always been very strong. Since 2015, continued coordination between Enemalta and the TSO in Italy has ensured the optimal functioning of the existing electricity interconnector. On a technical level, high-level inter-ministerial discussions between the Malta and Italy are underway to ensure an efficient and streamlined permitting process for the new second cable interconnector between Malta and Sicily.

In addition to advancing the development of a second electrical interconnector with Italy, the government is committed to improving energy security, sustainability, and affordability of energy. To this end, it is actively collaborating with neighbouring nations in Southern Europe and North Africa. During a state visit to Libya in June 2023, the Maltese Government established a Memorandum of Understanding with Libya to jointly study and develop a submarine interconnector between the two countries. Additionally, in July 2023, the Maltese Government visited Tunisia, where discussions focused heavily on the renewable energy sector. These ongoing technical discussions are set to be reinforced by a formal agreement to create an energy partnership with Tunisia. In January 2024, Malta and Egypt signed a Memorandum of Understanding to enhance cooperation in energy and electricity sectors. This agreement outlines potential collaborative efforts to share knowledge and expertise in energy production and electricity generation, with an emphasis on diversifying energy sources and securing supply. Both nations are considering the possibility of indirect electrical interconnections and the creation of virtual energy corridors, aiming to expand the use of renewable energy sources.

iii. Financing measures in this area at national level, including EU support and use of EU funds

The preliminary investment costs for the second interconnector, including preparatory studies, were initially estimated at €285.5 million. This estimate has been revised following a call for tenders, which reflected an increase in the budget for the transformer and reactors. The updated Capital Expenditure (CAPEX) now stands at €298.5 million. The project has been incorporated into Malta's Multiannual Financial Framework (MFF) programme for 2021-2027, targeting the specific objective RSO2.3: "Developing smart energy systems, grids, and storage outside the TEN-E (Trans-European Networks-Energy) with funding from the European Regional Development Fund (ERDF)."

In December 2023, the project received approval for funding under the 2021-2027 ERDF/CF/JTF Programme, falling under Priority 2, which focuses on 'Promoting clean and fair energy transition, sustainable wastewater management, and green investment', and Specific Objective 2.3, 'Developing smart energy systems, grids, and storage outside the TEN-E network'. Recognized as an 'Operation of Strategic Importance', the project is pivotal in achieving national priorities for the 2021-2027 Programme period. The ERDF has allocated €165,347,846.70 in funding to this project.

Financial details of the two utility-scale BESS are included in section 3.3 (iii).

3.4.2 Energy Transmission Infrastructure

i. Policies and measures related to elements set out in 2.4.2

As mentioned in section 2.4.2, the Maltese government has put forward a plan to integrate with the Trans-European Natural Gas Network via the Melita TransGas Hydrogen-ready Pipeline Project, which will create a link between Malta and Sicily. This initiative is part of a broader strategy to decarbonize Malta's power generation and other domestic sectors as well as to bolster the island's electricity supply security. This is in conjunction with the government's decision to pursue a second electrical interconnection with Sicily, Italy.

ii. Regional cooperation in this area

During the Med9 Energy Ministers' meeting in Valletta on May 18th, 2023, the participating countries pledged to transform the Mediterranean region into a green energy hub to support the European Union's goal of achieving a decarbonized Europe. The nine countries endorsed the Malta Statement, a joint declaration that outlines a vision for the Mediterranean as a hub of green energy. This initiative is aimed at accelerating the EU's pursuit of a decarbonized and energy-independent future.

The Med9 countries have resolved that the Mediterranean should become a focal point for renewable energy investments, emphasizing offshore renewables and the creation of new energy interconnections between EU and non-EU Mediterranean nations. These efforts are intended to encourage European investment in green energy. A steering committee has been established by the

Med9 countries to collaborate and devise a strategic plan for the creation of the Mediterranean Green Energy Hub. This commitment is expected to generate new opportunities for growth and employment within the region.

The Energy Ministers have also called upon the EU Commission to prepare an exhaustive report to evaluate the viability of green energy corridors. These corridors would connect Europe with the renewable energy resources available in North African countries and are considered essential for the development of Mediterranean interconnections. The Ministers have concurred on the importance of prioritizing investments in renewable energy technologies, including offshore renewables, solar PV power generation, renewable hydrogen, and energy storage solutions. The Malta Statement confirms the collective intent of the nine countries to ensure that every member state benefits from the green energy potential of the Mediterranean region.

Malta has played a pivotal role in initiating these discussions among Mediterranean Member States and remains dedicated to fostering this dialogue. The country is actively seeking to engage all Mediterranean nations in the ambition to establish a network of green energy hubs across the Mediterranean.

Reference to the Maltese Government's commitment to working closely with neighbouring countries in southern Europe and North Africa to improve energy security, sustainability, and affordability is included in section 3.4.1 (ii).

iii. [If applicable] Financing measures in this area at national level, including EU support and use of EU funds

Financing measures for the MTGP project are covered under the Internal Energy Market dimension in section 2.4.2.

3.4.3 Market Integration

i. Policies and measures related to elements set out in 2.4.3

Policies and measures related to market integration have to a large extent already been described under section 2.4.3. For the sake of clarity, the high-level measures which fall under section 2.4.3 are summarised below:

- Roll-out of cost-effective and innovative flexibility solutions, such as energy storage
- Promotion of renewable self-consumption through schemes which combine the installation of solar PV technology and battery energy storage
- Further deployment of second-generation smart metering systems which allow monitoring of near real-time consumption

- Ensuring power system adequacy in the medium-term through investments in second interconnector, utility-scale battery storage, offshore renewables and additional solar PV technology
- An updated assessment of cost-optimal solutions to ensure resource adequacy for Malta's electricity system in the long-term
- Evaluation of Vehicle to Grid (V2G) technology as applied to the Maltese Islands

Although there are no liquid wholesale markets in Malta, the electricity generation sector was liberalised in 2005. However, significant Independent Power Producers (IPPs) entered the sector only in 2017, namely D3 Power Generation Ltd and ElectroGas Malta Ltd. Prior to that, independent power production was limited to small producers generating electricity from renewable sources. The conventional IPPs, account for 71.98% of the electricity sent out to the grid from all sources during the year 2021. The involvement of Enemalta plc in the electricity generation sector is mainly limited to the provision of backup generation service.This is evident from the fact that while Enemalta plc owns 23.36% of the production nominal capacity, only 0.35% of the electricity sent out to the grid during 2021 was produced by its own plants.

The electricity distribution system covering Malta remains under the responsibility of one distribution system operator which forms part of a vertically integrated company, Enemalta plc. Enemalta is the only undertaking which is licensed to carry out all the three activities of generation, distribution and supply and remains the exclusive supplier of electricity in Malta. The demand for electricity is met from the IPPs generating mainly from natural gas, IPP RES generators (mainly solar photovoltaic systems) and from imports through the interconnector Italy (Sicily)- Malta.

Enemalta plc is obliged to dispatch the available sources on economic merit order basis with electricity from renewable energy benefitting from priority of dispatch. Electricity imported through the interconnector is mainly traded on the Italian day-ahead market. Since the retail market is not open to competition, all IPPs may either consume on site the electricity generation and/or sell to Enemalta plc.

ii. Measures to increase the flexibility of the energy system with regard to renewable energy production

Thus far, the intermittent nature of renewable electricity sources has been mitigated by relying on the interconnector to provide balancing services and to a lesser extent on local conventional facilities. Whilst the Government is planning to install a second electricity interconnector, increased flexibility of the energy system will be tackled through multiple actions:

- Increased sector integration through the electrification of road transport
- Further deployment of energy storage (both small-scale and utility scale)
- Assessment of the potential and applicability of demand response solutions in the local context

Distribution system secondary node reinforcements are being implemented to address issues related to system current carrying capacity and voltage regulation. However, further installation of renewable energy capacity, particularly large-scale installations such as offshore renewable energy technology, will necessitate the implementation of different mitigating strategies through additional investments, namely utility scale storage and major grid upgrades to minimize curtailment.

Enemalta's Network Code approved by the Regulator in 2013 does not discriminate between renewable and conventional generators. Generators less than 5MW are not subject to dispatch (self dispatched). However, there are only a few renewable energy installations larger than 5MW in Malta. Enemalta is required to dispatch different generation sources on an economic basis and aim to minimize the overall system costs. Enemalta has set up an energy trading section to optimise the various parameters affecting its dispatch scheduling. No planned measures are envisaged for the establishment of real-time price signals and dynamic prices, largely in view of there being no liquid wholesale market.

iv. [If applicable] Measures to ensure the non-discriminatory participation of RES, demand response and storage, including via aggregation in all energy markets

In view of the absence of wholesale electricity trading arrangements, Enemalta is responsible for central dispatch and therefore obliged to dispatch electricity from local generation plants and the interconnector based on their order of economic merit, with electricity from RES and CHP plants, irrespective of their size, benefitting from priority dispatch for as long as there is no liquid wholesale market.

Measures enabling a hydrogen market (in particular the infrastructure)

There is currently no production of renewable and low-carbon hydrogen in Malta, no consumption of hydrogen for energy purposes and negligible consumption of hydrogen for non-energy purposes. For Malta, one of the main constraints remains the physical isolation from the trans-European gas network. There is no natural gas production in Malta, natural gas is imported as LNG and used solely for electricity generation. There are also no gas distribution networks nor any gas district heating & cooling networks. This greatly limits the potential use of hydrogen in end-use sectors in Malta. Malta also does not have any gas infrastructure which could be repurposed or retrofitted for hydrogen use.

In 2022, renewable electricity makes up approximately 10% of the Malta's electricity mix and this is fully absorbed by the present demand. The lack of a necessary storage infrastructure, coupled with the absence of any hydrogen-based industries (such as steel manufacturers), diminishes the likelihood of having economically feasible indigenous hydrogen production in the short to medium term in Malta.

An analysis conducted in 2020 as part of a "Pre-Feasibility Study for Alternative Solutions to cater for the Energy Demand in Malta", concluded that it is not feasible to produce green hydrogen indigenously from onshore RES due to economies of scale, spatial requirements and water scarcity. The country's water resource is already limited and the water required for electrolysis would need to be produced from energy intensive desalination plants. This makes a hydrogen-ready pipeline the most realistic

solution for importation of green hydrogen, but this only in a context where hydrogen demand picks up locally either for power generation and other hard-to-abate sectors such as industrial heating, road transport, and maritime transport.

While Malta currently faces challenges in terms of renewable or low-carbon hydrogen production and consumption, the government is taking steps to address these issues. The Maltese government has decided to upgrade the Project of Common Interest (PCI) to a hydrogen-ready pipeline and assess the feasibility of importing green hydrogen through the PCI as an option for the decarbonization of Malta's domestic power generation sector and other inland sectors.

The PCI is designed to facilitate bi-directional flow, offering the potential for hydrogen to be transported from Malta to Italy, contingent upon further investment in compression infrastructure.

Malta believes that hydrogen is just one of many tools and solutions to progress as a European Union towards the goal of achieving decarbonisation by 2050. Hydrogen can be the leading alternative for decarbonizing sectors that are hard-to-abate. Concurrently, Malta is still evaluating the electrification of end-use sectors, where it represents a more cost-efficient approach. The Government recognizes that hydrogen has vast potential as an energy carrier and can act as a link between the electricity and gas sectors, but also sees the need for technology neutrality to allow all sustainable and renewable technologies and energy carriers to compete on a level playing field in the market.

In line with the EU Hydrogen Strategy, Malta is still assessing the potential of hydrogen for industry to gear itself towards such an innovative source of energy. Based on the outcome of this study, Malta may develop a national hydrogen plan based on expected developments in technology and demand, such that relevant industry will have access to a clean alternative fuel. As a first step, the Government also plans to launch a study to explore the viability and feasbility of the various decarbonisation options for energy end-uses and processes in the industrial and services sectors. Central to this analysis is the exploration of sectors and sub-sectors where direct electrification emerges as the most viable pathway, leveraging advancements in renewable energy technologies to replace fossil fuels. Concurrently, for those processes where electrification presents substantial challenges or limitations, the study shall assess alternative decarbonization solutions, such as the utilization of decarbonised fuels, including renewable hydrogen.

v. *Policies and measures to protect consumers, especially vulnerable and where applicable energy poor consumers, and to improve the competitiveness and contestability of the retail energy market*

Malta's social policy framework encompasses a range of targeted financial support schemes aimed at directly reducing energy costs, with a particular focus on assisting vulnerable households. The Energy Benefit Scheme offers direct reductions on utility bills for those eligible, such as individuals receiving Social Security Benefits or Assistances, including unemployment, carers, or single parent support, as well as pensioners. Eligibility can also extend to those who pass a means test that confirms their earnings fall below a certain threshold. Complementing this, the Eco-Reduction Scheme encourages energy conservation by providing rebates on electricity bills to households that demonstrate lower electricity consumption, thereby promoting energy efficiency and supporting low-income families. Together, these subsidies and incentives play a crucial role in ensuring energy affordability and accessibility for all Maltese citizens.

In 2022, 16,004 individuals received the energy benefit.[150] Malta's assessment of the number of energy poor households is further described in section 4.5.4.

Additionally, as a short-term measure, the Government is absorbing the increases in imported energy costs through the fiscal budget. This allows household and business budgets to continue being managed in a manner which is sheltered from the effects of high energy prices. From a longer-term perspective, Malta aims to increase the share of renewable energy in the energy mix, which in turn reduces reliance on imported fossil fuels and stabilizes energy prices.

Increasing efficiency is another key element towards affordability of energy with benefits sustained in the long run. The deployment of smart meters allows consumers to monitor and manage their energy use more effectively, reducing unnecessary consumption and lowering costs. Energy efficiency programs aimed at educating and assisting households in adopting energy-efficient practices and technologies also play a crucial role in reducing overall energy consumption. These programs help households and businesses become more aware of their energy use and identify ways to save energy and reduce costs. A number of these programs are detailed under the Energy Efficiency Dimension.

vi. Description of measures to enable and develop demand response including those addressing tariffs to support dynamic pricing

The electricity supply landscape in Malta is characterised by a single supplier, with Enemalta (the DSO) serving as the sole electricity distributor and supplier on the island. This structure is supported by fixed retail electricity tariffs. The government recognizes the benefits of demand response initiatives, which not only allow consumers to reduce energy consumption and costs but also equip system operators with effective peak demand management, load adjustment, and grid stabilization tools. Active demand-response measures, including time-of-use tariffs for large non-residential consumers and electric vehicle (EV) charging, are detailed in Section 3.1.3 (i) Section 3.3 (i)).

Complementary to these measures, Malta is investing in smart grid technologies, Vehicle-to-Grid (V2G) systems, and small-scale storage facilities to enhance electricity distribution, demand management, and the integration of renewable energy. These investments aim to improve the energy system's flexibility and resilience, minimizing the risk of supply disruptions. The rollout of second-generation smart meters further supports these initiatives by providing consumers with real-time data on energy consumption, fostering more informed energy use decisions.

Despite the absence of a competitive wholesale market, which has historically posed challenges to the growth of aggregation services, the government is dedicated to exploring viable alternatives within the existing framework to foster the development of demand response activities.

3.4.4 Energy Poverty

[150]NSO (2024), Social Protection 2024, Available at: https://nso.gov.mt/wp-content/uploads/Social-Protection-2024.pdf

i. Policies and measures to achieve the objectives set out in 2.4.4

Malta's commitment to reduce poverty and social exclusion is reflected in the various initiatives, policies and measures taken up by Government, mostly funded through national funds. The Social Climate Plan will provide additional support to vulnerable households, vulnerable transport users and/or vulnerable enterprises, via the Social Climate Fund.

A number of these measures are in place to address vulnerable households and energy poverty. Table 12 below highlights these measures in place whilst Table 13 includes measures in place targeting the transport sector that also address vulnerable households and energy poor.

Table 12 - Measures implemented within the Energy Sector

Building of new social housing and renovation of existing units[151]	The National Development and Social Fund (NDSF) has committed €50 million to a social housing project, in partnership with the Housing Authority, aiming to construct 500 new eco-friendly social housing units across 12 localities in Malta. This initiative, which includes a mix of one, two, and three-bedroom apartments, is designed to address the demand for social housing based on a social profiling exercise. The project emphasises environmental, social, and economic sustainability, with features like waste-water management systems and adherence to high health and safety standards, aiming to set a precedent for future social housing developments.
Energy Benefit Scheme[152]	The Energy Benefit scheme provides a direct discount on utility bills for vulnerable households. Established eligibility criteria are in place, targeting various types of vulnerable households such as low income families, households on social assistance, persons receiving unemployment benefits, pensioners, or people with disabilities.
Eco-Reduction Scheme[153]	The eco-reduction scheme applies to households that either consume less than 2,000 electricity units per year in a single-person household or less than 1,750 electricity units per person in a two or more-person household. Beneficiaries receive a direct rebate on 15-25% of their electricity bills. This policy incentivises efficiency and lower consumption, while also having a positive effect on the bills of low-income households who fall within the consumption limit.

[151] NDSF (2022), "*News Release 1/2019 - NDSF's explanation of its vote during LBM plc EGM of 10 November 2022*". Available at: https://ndsf.com.mt/news/news-release-1-2019/

[152] Department of Social Security – MALTA (n.d.), "*Energy Benefit*". Available at: https://socialsecurity.gov.mt/en/information-and-applications-for-benefits-and-services/family-benefits/energy-benefit/

[153] Automated Revenue Management Services (n.d.), Booklet "Your Residential Electricity and Water Bilhas changed". Available at: https://arms.com.mt/files/documents/user_guides/2018-10/4201%2BARMS%2BNEW%2BBILLING%2BINFO%2BBOOKLET%2BFINAL%2BENG.pdf

Rising-Block tariff[154]	The current electricity tariffs incorporate a built-in mechanism to promote end-use electrical energy savings. These include a "rising block tariff" which deters high consumption by applying higher tariffs as consumption increases.
Provision of professional advice to vulnerable households[155]	The Energy and Water Agency also carries out visits to vulnerable households, amongst others, where technical personnel are tasked with helping residents understand energy and water usage and provide tailored energy conservation tips.
Replacement of Appliances in Vulnerable Households Scheme	A tailor-made scheme managed by the Energy and Water Agency in collaboration with the Financial Services for Social Welfare, replaces old and inefficient appliances classified as socially vulnerable. Beneficiaries are referred to the Agency through their social worker.
Double-Glazing Scheme (Retrofitting) for Birżebbuġa Residents[156]	The scheme is designed to support households in Birżebbuġa in upgrading their external facing apertures to more energy-efficient and sound-insulating double-glazed units.
Roof insulation and double-glazing scheme[157]	This scheme promotes energy efficiency in residential properties by subsidising retrofitting insulation and double glazing.
Renewable energy sources scheme for households[158]	A financial incentive aimed at promoting the adoption of renewable energy systems in homes, offering various levels of support for the installation of photovoltaic systems and battery storage solutions.
Deep energy renovation project of a social housing block in Zabbar[159]	The primary objective is to undertake comprehensive renovation projects aimed at transforming social housing units to near-zero energy levels. This initiative is designed to enhance the energy efficiency of the social housing.

[154] Regulator for Energy & Water Services (n.d.), "Regulated Electricity Tariffs". Available at: https://www.rews.org.mt/#/en/a/13-regulated-electricity-tariffs

[155] Energy and Water agency (2024), "Vulnerable Households Scheme". Available at: https://energywateragency.gov.mt/vulnerable-households-scheme/

[156] Regulator for Energy & Water Services (2024), "2024 Double-Glazing Scheme (Retro-fitting) for Birżebbuġa Residents". Available at: https://www.rews.org.mt/#/en/sdgr/603-2024-double-glazing-scheme-for-bir-ebbu-residents

[157] Regulator for Energy & Water Services (2024), "*2023 Roof Insulation and Double Glazing (Retrofitting) Scheme*". Available at: https://www.rews.org.mt/#/en/sdgr/562-2023-ridg-retrofitting-scheme

[158] DOI (2024), "*Government Notices published in Govt. Gazette No. 21,198 of 27th February 2024*". Avalable at: https://www.gov.mt/en/Government/DOI/Government%20Gazette/Government%20Notices/Pages/2024/02/GovNotices2702.aspx

[159] Gov.mt (2024), Tender for Civil, Electrical, Plumbing and Finishing Works, and Supply, Installation and Commissioning of Energy Efficient Systems for Deep Renovation to Near-Zero Energy Levels for Social Housing. Available at: https://www.etenders.gov.mt/epps/cft/prepareViewCfTWS.do?resourceId=11396841

Table 13 - Measures implemented within the Transport Sector

National Free Public Transport Service[160]	Over the span of five years, Malta has introduced progressive schemes to promote the use of public transport. The Government launched free use of public transport for youths and students between 16–20 year olds, persons with disability and individuals over the pensionable age in October 2018. From the end of 2022, nation-wide free public transport service was provided to all 'Tal-Linja' card holders. Data as of 2023 shows that almost 480,000 Maltese residents are card holders.
National Free School Transport Service[161]	Free school transport is being offered to all state and non-state school students, with over 29,900 students registering for this service for the scholastic year 2021–2022.
Support to purchase a new electric vehicle[162]	Malta currently offers grants up to €8,000 for new EV purchases and an extra €1,000 for scrapping vehicles over 10 years old. The scheme is available for natural persons and enterprises.
Support to low-emitting alternative modes of transport[163]	Apart from support to purchase electric vehicles, there are various schemes to support the investment in e-scooters, retrofitting LPG as fuel for ICE vehicles, and conversion of bicycles to pedelecs, amongst others.
Free Harbour ferry service[164]	The Valletta Ferry Service initiative allows holders of a personalized Tallinja Card to travel for free on the ferry routes between Valletta and The Three Cities (Cospicua), as well as between Valletta and Sliema. This service is available both day and night and offers additional benefits such as quick boarding. Furthermore, the Valletta circular bus route connects the ferry quays to the city centre, and passengers from Cospicua receive a free ticket for the Upper Barrakka lift to reach Valletta's centre.

As part of the ongoing public consultation for the National Strategy for Poverty Reduction and Social Inclusion, as previously outlined in section 2.4.4 , a number of measures are being put forward for consultation to address energy poverty:

- Launch a program that allows recipients of energy poverty benefits to exchange outdated, energy-inefficient appliances, such as refrigerators and air conditioners, for modern, energy-saving models.

[160] Infrastructure Malta (2024), " Free Public Transport", Available at: Free Public Transport - infrastruttura (gov.mt)

[161] Servizz Gov (2024), "Free School Transport". Available at: https://www.servizz.gov.mt/en/Pages/Education_-Science-and-Technology/Education-Services/Primary-and-Secondary-Education/WEB2252/default.aspx

[162] Transport Malta (2024), "Purchase of New Electric Vehicles - 2024". Available at: https://www.transport.gov.mt/land/sustainable-transport/financial-incentives-2024/new-electric-vehicles-6667

[163] Ibid.

[164] Malta Public Transport (n.d.), "*Valletta Ferry Service*". Available at: https://www.publictransport.com.mt/en/vallettaferry

- Implement energy efficiency upgrades across all social housing units to significantly reduce energy poverty and its associated burdens.
- Roll out targeted energy poverty alleviation programs for the elderly, aimed at cooling their homes through the acquisition of energy-efficient appliances, regular maintenance services, and sustainable power solutions.
- Introduce cost-effective home cooling initiatives, utilizing simple energy-saving technologies such as solar-reflective paint and solar window films.
- Kickstart a National Project to empower low-income households through energy-efficient home improvements. Professional surveyors will evaluate residences and suggest cost-effective electrification solutions for heating, cooling, and cooking, such as heat pumps, high-efficiency appliances, and insulation enhancements. A dedicated fund will subsidize these upgrades up to a predetermined limit to maintain affordability for households with limited financial resources.

There are also a number of complimentary measures which are set to help support energy poor households:

- Review and amend planning and spatial policies to foster inclusive urban development, which includes promoting non-motorized transportation, expanding green spaces, encouraging urban reforestation, and supporting the proliferation of smart buildings and smart city innovations.
- Establish 'community cooling hubs' and equip public squares and streets with green infrastructure, including water features and cooling dispensers, to provide relief during hot weather.
- Collaborate with the Meteorological Office (MO) and the Superintendence of Public Health (SPH) as part of Malta's Climate Change Strategy for Mitigation and Adaptation. This collaboration will enhance the dissemination of heat-related health information during summer months via the Health Promotion and Disease Prevention Directorate (HPDPD), focusing on at-risk groups. Strengthen and develop communication channels with community organizations, including local councils, religious institutions, band clubs, and the Church, and employ personalized text messaging to ensure message penetration to a broad audience.
- Pursue a national effort to make Maltese villages and towns more 'liveable' for the elderly and individuals with disabilities. This includes ensuring that pedestrian infrastructure, such as sidewalks, is accessible, obstruction-free, and fitted with curb cuts and tactile paving to assist those with mobility aids or visual impairments; as well as installing tactile and audible crossing signals to facilitate safe navigation across streets.

Additionally, the development of the Social Climate Plan, as outlined in section 2.4.4, has commenced. The process for the development of this plan will enable the identification of the key actions and ambitions targeting vulnerable households, vulnerable transport users and/or vulnerable enterprises.

3.5 DIMENSION RESEARCH, INNOVATION AND COMPETITIVENESS

i. Policies and measures related to the elements set out in point 2.5

Malta has undertaken a series of measures and actions to strengthen its national research and innovation (R&I) framework. The national Research and Innovation Plan 2023-2027, launched in 2024, introduces a transformative governance approach to R&I policymaking. It integrates R&I and public policy aiming to advance the local research ecosystem through five primary goals as detailed in section 2.5. The plan promotes a synergy between national priorities and the R&I ecosystem. Moreover, the plan advocates for R&I to play a pivotal role in shaping national economic strategies. It encourages the adoption of science-driven policy and inventive public initiatives. Key actions include leveraging innovation in public procurement, increasing science literacy, and expanding the influence and number of doctorate holders within government. Additionally, the plan facilitates the establishment of a collaborative network for research funding organisations, aiming to boost investment in innovative projects. It also envisions the evolution of the Malta Council for Science and Technology (MCST) into MCST+, empowering it to take a more proactive role in government R&I activities.

Complementing the National R&I plan was the introduction of the new Smart Specialisation Strategy (RIS3) for 2021-2027 to bolster the national research and innovation framework. In July 2022, six expert thematic committees were formed, each focusing on a specific RIS3 area. These committees proposed initial action plans and continued to refine and implement action plans with a focused approach. Furthermore, Malta's National Strategy for R&I in Energy and Water 2021-2030 provides for the establishment of the Platform-RINEW (Research and Innovation in Energy and Water) to act as the primary tool for the coordination of its implementation. Platform-RINEW brings together government, academia, industry, and the commercial/private sectors within a structure that enables multi-level coordination and cooperation, as well as streamline and effectively allocate resources for R&I in energy and water. The platform also enables the development of appropriate supply- and demand-side policies which strengthen the interrelationship between the energy and water sectors and R&I. The Platform achieves these goals through the constituted Technical Committee which is supported by a Secretariat.

Building on these foundations, the Energy and Water Agency (EWA) has implemented the Energy and Water Research and Innovation scheme to foster research and innovation in the energy and water sectors. Aligned with the National R&I strategy, the scheme provides financial support to projects within seven thematic areas, awarding approximately €1.25 million across 11 projects from its first two calls. Projects typically have a two-year completion timeline and can now receive up to €200,000 in funding, reflecting an increase from the initial €120,000 cap. The scheme has evolved to support more advanced projects, now requiring a technology readiness level (TRL) of 7, and mandates a consortium structure for eligibility, promoting collaboration across academic, private, and public sectors. Beneficiaries have worked on diverse topics, including water resource management, solar panel optimization, and the integration of renewable energy systems. The 2022 and 2023 calls continued this

approach, with projects expected to present operational prototypes in ideal environments. The 2024 call maintains this structure, supporting the progression of innovative energy and water solutions.

In support of these strategic directions, Malta Enterprise has implemented R&I schemes to provide direct assistance for R&D activities. These schemes are designed to support industrial research and experimental development activities that lead to innovative products and solutions. They cater to projects based on original concepts or hypotheses and address uncertainties inherent in R&D. The level of support varies by enterprise size, with large undertakings receiving up to 25% support for Experimental Development and 50% for Industrial Research, while small undertakings can receive up to 45% and 70%, respectively. Additional bonuses are available for collaborative projects and those carried out in assisted areas, with the maximum aid intensity not exceeding 80%.

ii. Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context

Since the development of the National Strategy for R&I in Energy and Water 2021-2030, EWA has entered a joint project with partners from Malta, Cyprus and the Netherlands called the Mediterranean Island Cleantech Innovation Ecosystem (MICIE). Through this project, two Action Plans were developed, one for Malta and another for Cyprus to enhance R&I in both countries, under the theme of Energy & Climate. In total, eight workshops, evenly split between the two islands, were conducted with relevant stakeholders. The Action Plans include actions resulting from stakeholder interaction workshops carried out in Malta and Cyprus respectively.

In addition to the MICIE project, the Clean Energy Transition (CET) Partnership underscores the necessity for collaboration with researchers across various EU Member States and Horizon Europe Associated Countries. The CET Partnership, which includes over 51 partners and funding organizations from 30 countries, pools national funds to support joint transnational R&I projects that align with the EU's co-funding mechanisms. Malta's commitment to this partnership is facilitated by the Malta Council for Science and Technology (MCST) within the Ministry for Education, Sport, Youth, Research and Innovation (MEYR). Through its participation, Malta is actively involved in several Transition Initiatives (TRIs) that address diverse challenges within the clean energy transition.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

In 2021, the Government budget allocations for Research & Development (R&D) amounted to €35.3 million, which was an increase of €1.5 million compared to 2020. The National R&I Strategic plan outlines a comprehensive approach to enhance financial support for research and innovation through a collaborative public funding plan, increased investment in basic and applied research, and improved access to EU funding. It proposes the creation of a research fund, diversification of scholarship programs, and initiatives to attract global talent, aiming to build a competitive R&I ecosystem.

The financial support measures being provided through the National Strategy for R&I in Energy and Water 2021-2030, functions through two distinct mechanisms:

1. Calls for bottom-up proposals relating to the Priority Areas outlined in this Strategy; and
2. Calls for proposals to structured research questions which relate to Priority Areas.

The financial support under this Strategy as of the 2022 Call of the EWA Research & Innovation Scheme prioritises projects at experimental design stage to system prototypes which means that any project that is applying for this scheme, needs to ultimately reach Technology Readiness Level (TRL) 7 by the end of the Project Period. Support disbursed through this fund may also act as an essential springboard for research teams to apply for the larger volumes of support required at higher TRL levels as projects evolve. Further details on the funding schemes being employed through the Strategy can be found in Section 4.6 (i).

From an investment perspective, a new programme called Technology Extension support, is responsible, through a € 5 million investment, for financing innovative projects across a range of industries with the help of the private sector[165].

The MCST R&I unit also manages R&I funding to enhance Malta's R&I landscape through thematic top-down initiatives. Building on a collaboration with the MDIA, the MCST seeks to leverage MDIA's technical expertise, MCST Smart Spec Digital Committee and the MCST R&I Unit's funding administration experience for targeted initiatives in the digital domain.

As part of the Horizon 2020, Malta forms part of the Clean Energy Transition Partnership, aimed towards the promotion of the energy transition. The MCST through this Scheme is able to launch yearly co-funding calls for initiatives to create practical solutions and deliver outcomes for clean energy transition. The MCST has also launched five additional schemes to support the participation of Maltese entities in the Horizon Europe programme, namely[166]:

- ERC Support Scheme – Providing researchers with guidance and support to secure financing from the European Research Council;
- Horizon Europe Networking Support Scheme – This fund allocates resources to enable interested individuals to participate in networking events associated with Horizon Europe;
- Horizon Internationalization Partnership Award Scheme – This grant aids Maltese organisations in their efforts to coordinate and submit funding proposals for Horizon Europe projects;
- Postdoctoral Fellowship Training Scheme for Incoming Postdocs to Malta – This grant covers any travel expenses for postdoctoral researchers coming to Malta to engage in collaborative

[165] National Reform programme Malta (2024). Available at: https://finance.gov.mt/wp-content/uploads/2024/05/National-Reform-Programme-2024.pdf

[166] Times of Malta (2024), "Five schemes launched to encourage increased participation in Horizon Europe". Available at: https://timesofmalta.com/article/five-schemes-encourage-malta-participation-horizon-europe.1089015

projects with local entities, as part of the Horizon Europe initiative under the Marie Curie Fellowship; and

- European Innovation Council Support Scheme – This program provides assistance to applicants seeking funding from the European Innovation Council's Horizon Europe Programme.

It is envisaged that EU funds will become a significant resource for the R&I undertaken in Malta.

4. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES

The analytical section of Malta's updated National Energy and Climate Plan (NECP) is grounded in a sound and robust quantitative analysis of both the current state and future projections within the energy and climate sectors. This modelling framework update is imperative to reflect the significant changes that have occurred since the inception of the initial NECPs.

The 'current situation' segment of the NECP begins with an evaluation of existing conditions, incorporating projections based on existing policies and measures. This assessment is crucial as it sets the baseline from which Malta can measure progress and adapt strategies accordingly. The updated plan will, for each of the Energy Union's five dimensions, integrate the latest available data to ensure a comprehensive and accurate representation of the current landscape. The social and economic repercussions of the COVID-19 pandemic as well as the energy crisis as a result of the war in Ukraine, are significant factors that the updated NECP must consider. The pandemic's impact has extended into the energy sector, influencing consumption patterns, investment decisions, and policy responses. By incorporating these considerations, Malta's updated NECP aims to provide a clear and comparative analysis across all sections of the plan, ensuring that the strategic vision for the Energy Union's five dimensions is both resilient and responsive to the evolving global context.

The analytical basis of Malta's final update of the NECP is based on two scenarios as defined below:

- Scenario With Existing Measures (WEM): The WEM scenario is a set of projections based on the policies and measures implemented and adopted by Government. This includes policies and measures which, with a cut-off date as at the end of 2021, were directly in force through applicable Union or national law, financial resources were allocated, human resources were mobilised, or an official government decision has been taken and there is a clear commitment to proceed with implementation.
- Scenario With Proposed Measures (WPM): The WPM scenario is the set of projections based on the options that are under discussion and have a realistic chance of being adopted and implemented, but have not yet been officially approved. This scenario additionally includes all the policies and measures included in the WEM scenario. For instance, the WPM scenario envisages an increased effort to expand the capacity of on-land solar PV installations by 2030, surpassing the levels projected in the WEM scenario. This goal is not factored into the WEM scenario because certain necessary steps and actions have yet to be undertaken to fulfill this commitment.

Whilst the WEM and WPM scenarios modelled for the NECP update are designed to provide insights into the impact of various policies, it is important to note that not every initiative detailed in Sections 2 and 3 has been incorporated into the scenarios. This is due to a range of factors, such as the complexity of certain measures, the evolving nature of policy implementation, data availability, or the need for more time to observe and quantify the effects of recent policy developments. The government remains committed to continuously updating and refining the modeling approach to better reflect the full spectrum of policy actions as they progress.

4.1 PROJECTED EVOLUTION OF MAIN EXOGENOUS FACTORS INFLUENCING ENERGY SYSTEM AND GHG EMISSION DEVELOPMENTS

i. Macroeconomic forecasts (GDP and population growth)

The macro-economic projections to be utilised for the final update of the NECP were prepared by the Economic Policy Department (EPD) within the Ministry of Finance and Employment. Such forecasts include the typical macro-economic indicators issued by government for internal planning. The latest available projections form part of the analytical basis of the NECP. They are based on the EPD's own methodology and set of assumptions and have been developed using a Structural Annualised Econometric Model for Malta (SAMM). The model's main purpose is to perform policy simulations at a detailed sectorial level. The output indicators include Gross Domestic Product (GDP), Gross Value Added (GVA) by NACE, disposable income, and employment rates. These figures provide the basis for governmental economic policy formation, analysis and decision-making processes and are therefore used by various ministries in all modelling exercises, including those relating to the development of the NECP.

The preparation of scenarios was based on the most recent and comprehensive sector-specific data, which was available up to 2021 at the time of analysis. Projections were then formulated for the period from 2022 onward. However, in the meantime, historical data for 2022 became available. Thus, while the models primarily use 2021 as the baseline year for the majority of sectors, this chapter presents historical data up to 2022, with projections presented from 2023 onward. It is pertinent to note that Malta was materially affected by the COVID-19 pandemic given its openness in terms of imports and exports (including tourism) which was further exacerbated by Russia's aggression in Ukraine and the ensuing energy crisis. As a result, this context needs to be kept in mind when interpreting any conclusions.

Driving the macroeconomic indicators and projections, economic growth and a consequent increase in demand for labour have led to a high net inward migration, resulting in a rapid increase in population in recent years[167]. Figure 31 shows the increase in population together with the corresponding yearly percentage increase, as per data published by the National Statistics Office (NSO)[168] and projections by the Ministry for Finance. Demographic and employment projections were based on trends in age groups established by Eurostat projections and recent trends in employment by economic activity type. From 2019 to 2023, population increased by 7%, initially projected to increase to 550,356[169] in 2023 by the Ministry for Finance, amounting to an average growth rate of 2.2% each year. Actual population numbers for 2023, as published by the NSO, were equal to 563,443, exceeding the Ministry for Finance's projections by more than 10,000 inhabitants. This surge in population is particularly

[167] NSO (2024), World Population Day: 11 July 2023. Available at: https://nso.gov.mt/world-population-day-11-july-2023/

[168] NSO (2023), Census of Population and Housing 2021: Final Report: Population, migration and other social characteristics (Volume 1). Available at: https://nso.gov.mt/themes_publications/census-of-population-and-housing-2021-final-report-population-migration-and-other-social-characteristics-volume-1/

[169] Population figures retrieved from the Ministry for Finance and Employment

noteworthy when considering the projections set forth in the 2019 NECP, which estimated that Malta's population would reach 554,772 by the year 2030. Remarkably, the actual population count in 2023 is already nearing this forecasted figure, underscoring the rapid and substantial demographic expansion that has taken place in a relatively short span of time. Demographics have been characterised by an ageing process due to falling fertility rates and increasing life expectancy. This has been offset by an increase in net migration, most of whom are in the working population age bracket[170] (Figure 32).

Population growth is projected to continue increasing with an average rate of 1.5% between 2023 and 2030, reaching 610,244 and 670,787 by 2030 and 2040, respectively. Projections for population under a policy change scenario assumes a slower growth than accustomed, same level of historical productivity, an increase in labour productivity in line with the Ageing Working Group (AWG) projections, an average unemployment rate of 3%, and a less labour-intensive economy. This naturally translates into an increased number of households over the projected period (Table 14). The source of historical data for number of households is the EU-SILC Survey (Survey for Income and Living Conditions) while the projected data takes into account historical trends as well as projected population growth. A mean unemployment rate of 3% was applied consistently over the projection horizon.

Table 14 - Total population and number of households. Source: Projected population and occupancy rate for households as per Ministry for Finance and Employment projections.

	2030	2040
Population	610,244	670,787
Number of households	264,175	298,128

Figure 31 - Population trends and growth rate in Malta. Source: Ministry for Finance and Employment.

[170] Ministry for Finance and Employment (2021), State of the Maltese Economy – Submission to the National Post-Covid Strategy Steering Committee. Available at: https://economicpolicy.gov.mt/wp-content/uploads/2024/03/State-Of-Maltese-Economy-V2.pdf

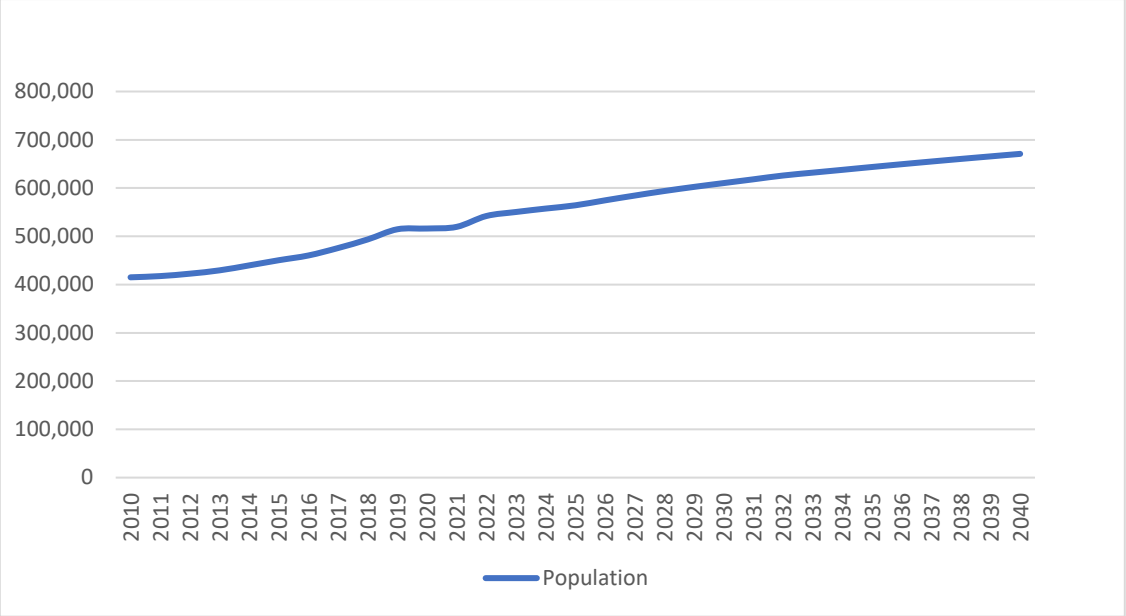


Figure 32 - Projected demographic trends. Source: Historical data up to 2021 from the NSO 'World Population Day' news release; projected demographics as per Ministry for Finance and Employment projections.

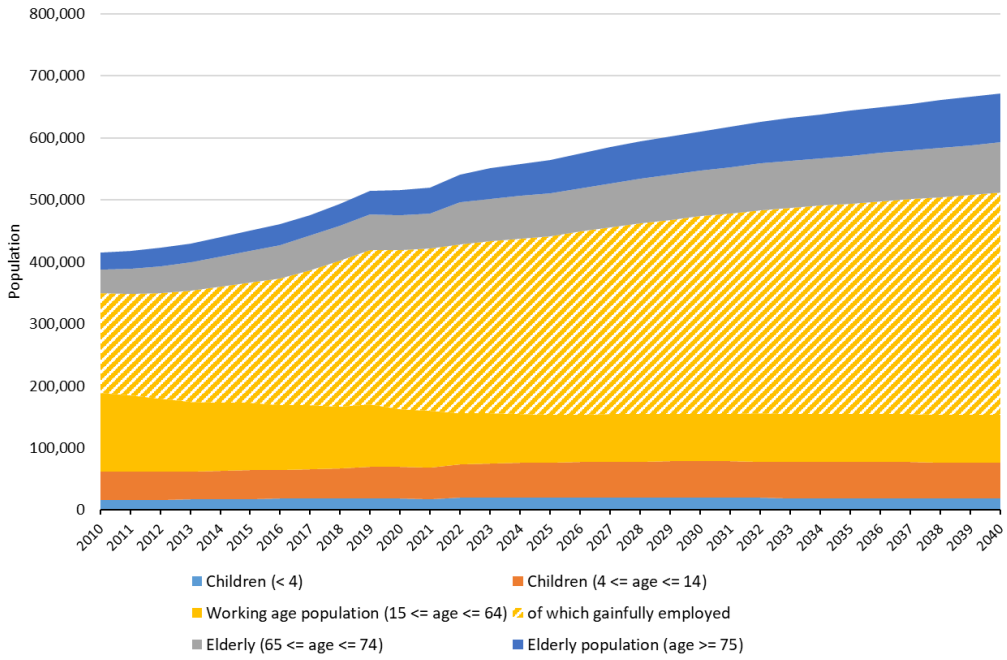


Table 15 shows the projected average GDP growth rate and the average GDP per capita up to 2040. The largest contributor to the decline in GDP in 2020 was clearly the pandemic, which led to a decline in net exports, primarily due to a decrease in foreign demand, restriction on travel-related activities

and disruptions to the global supply chains[171]. Looking ahead, real GDP growth is projected to stabilise at around 3%. The GDP per capita is projected to maintain a steadily increasing trend, exceeding €30,000 (€ 2015) per capita by 2030.

Table 15 - Projected average GDP growth in five-year periods, %. Source: Ministry for Finance and Employment.

5-year period	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040
Average GDP growth (%)	3.6	5.7	3.1	3.0	3.0
Average GDP per capita (€2015)	23,845	26,405	28,810	31,327	34,766

The tourism sector is also projected to experience a steady growth in the number of inbound tourists In 2023, tourism in Malta reached pre-pandemic levels, and within the first two quarters of 2024, the number of tourist arrivals increased by more than 23.4% when compared to the same period in 2023[172].

Tourists are expected to exceed 3.18 million by 2030 with an average of 122 tourists per scheduled flight being assumed[173].

ii. Sectoral changes expected to impact the energy system and GHG emissions

Residential Sector

Traditionally, the main driver of consumption in the residential sector has been the growing population, particularly the number of households. The number of households in 2021 stood at 215,691 translating into an occupancy rate of 2.41 inhabitants per household[174]. This is projected to decrease to 2.31 and 2.25 in 2030 and 2040, respectively (Figure 33). The average electricity consumption per household is estimated to increase by 5.2% between 2022 and 2030 (Figure 34), and energy, consisting of electricity, LPG, gasoil and biomass, is expecting to increase by 3.0%, while the number of households is estimated to increase by 17%.

[171] Ministry for Finance and Employment (2021), State of the Maltese Economy – Submission to the National Post-Covid Strategy Steering Committee. Available at: https://economicpolicy.gov.mt/wp-content/uploads/2024/03/State-Of-Maltese-Economy-V2.pdf

[172] NSO (2024), Inbound Tourism: June 2024. Available at: https://nso.gov.mt/inbound-tourism-june-2024/

[173] EWA's Energy Model, Central Scenario. Projections are based on aircraft movement data for scheduled and chartered flights.

[174] NSO (2023), Census of Population and Housing 2021: Final Report: Population, migration and other social characteristics (Volume 1). Available at: https://nso.gov.mt/themes_publications/census-of-population-and-housing-2021-final-report-population-migration-and-other-social-characteristics-volume-1/

Figure 33 - Household occupancy rate. Sources: historical data up to 2021 from the NSO 'World Population Day' publications, 'EU-SILC: Main Dwelling' statistics, and the 'Census of Population and Housing 2021', and projections provided by The Energy and Water Agency.

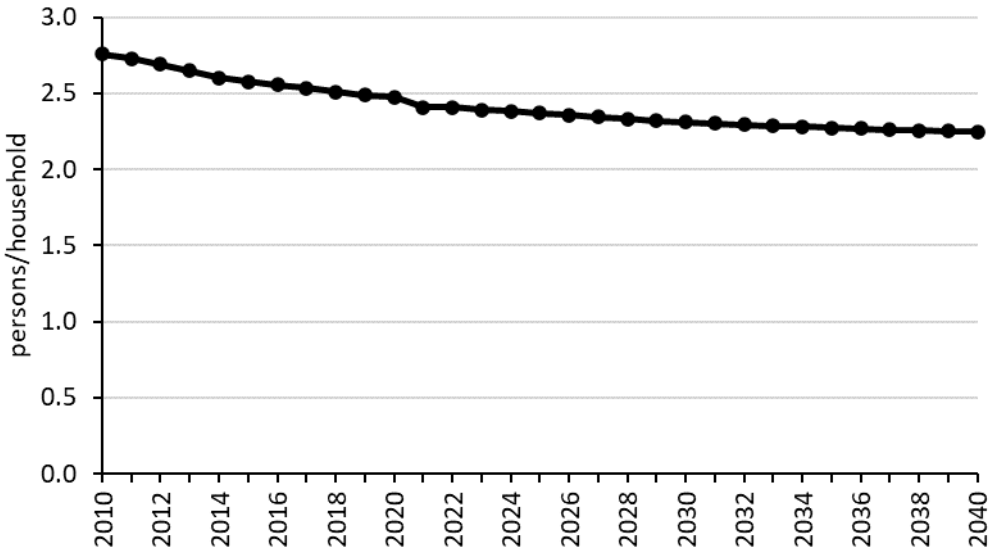
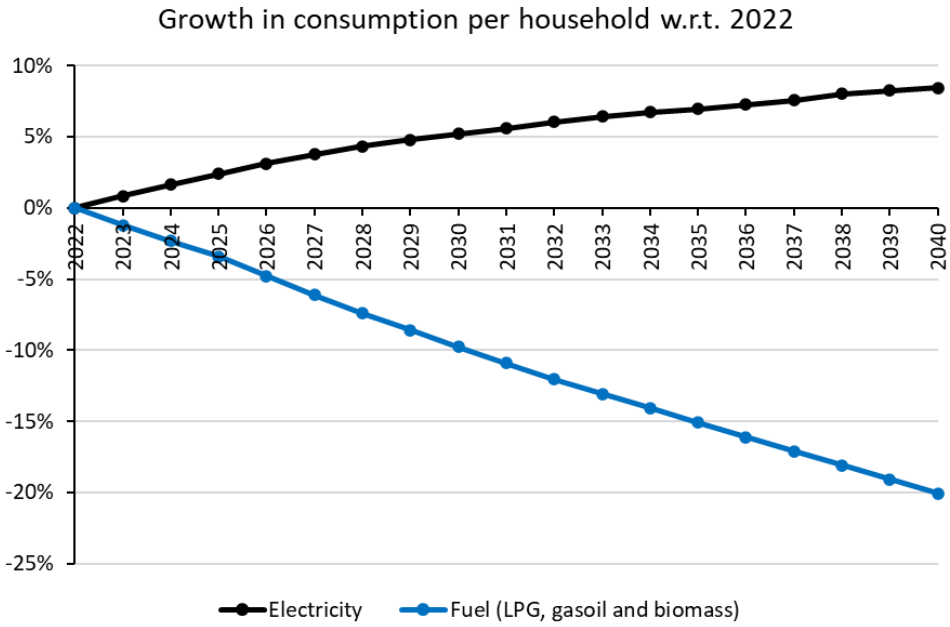


Figure 34 - Growth in electricity and fuel (LPG, gasoil, and biomass) consumption per household with respect to 2022. Source: The Energy and Water Agency.



This increase in population and the number of households is leading to a higher assumed electrification rate and increase in the use of air-to-air heat pumps Electricity consumption per households is expected to increase by 5.2% between 2022 and 2030, with the natural process of electrification being assumed to continue with 44% of households using electricity for cooking in 2030, and up to 54% in 2040. Uptake of heat pumps is also expected to increase, with the share of households with heat pumps reaching 93% in 2030 and 98% in 2040 (Figure 35[175]). The number of heat pumps per 'household with heat pump' is also projected to increase to 2.3 units in 2030 (Figure 36[176]).

[175] Historical disaggregation is based on 'Household Energy' surveys.
[176] Historical data is based on number of households from the NSO' EU-SILC: Main Dwelling' statistics and heat pumps imports data collected from 'Customs' and 'Intrastat' databases.

Figure 35 - Number of households with/without heat pumps

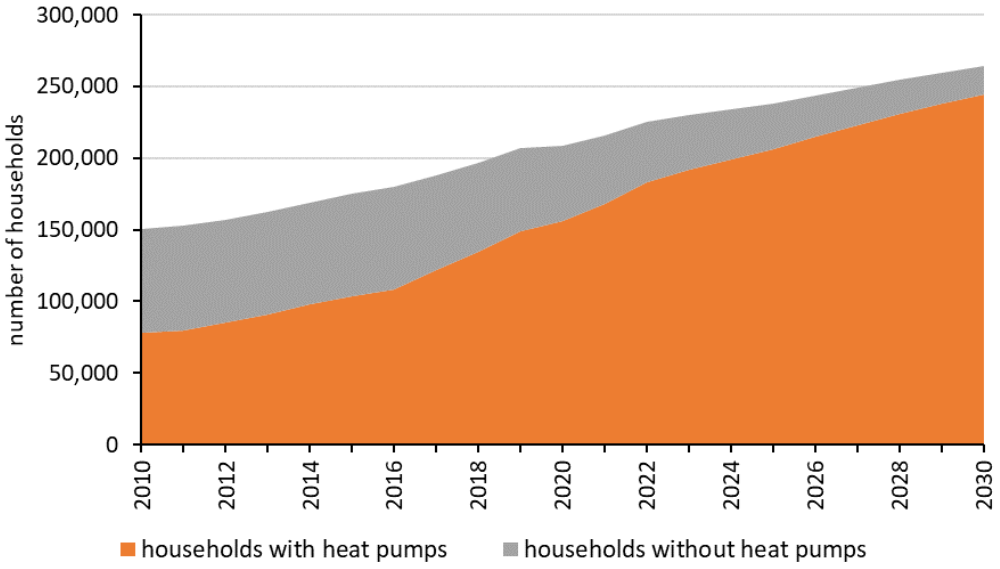
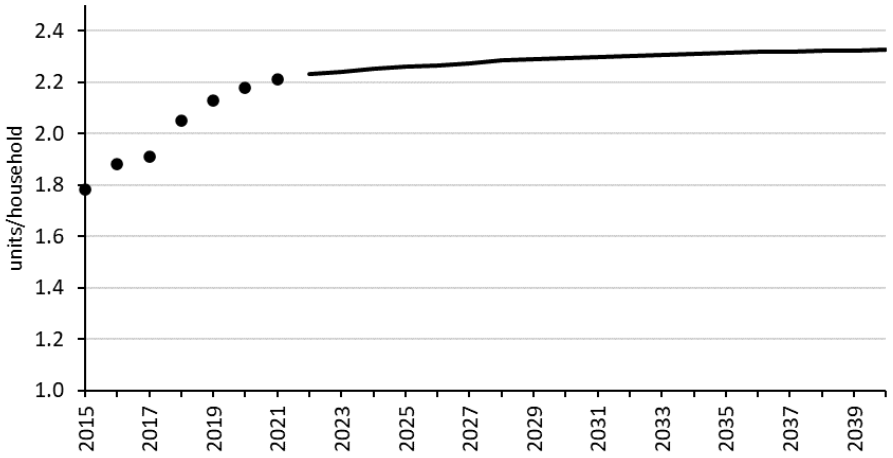


Figure 36 - Number of heat pumps per 'household with heat pump'.



Furthermore, projections show that Liquified Petroleum Gas (LPG), gasoil and biomass consumption per household used for space heating and cooking is projected to decrease by 9.8% by 2030. Support for the installation of solar water heaters and heat pump water heaters in the residential sector is assumed to continue, with an estimated projections of 3,200 additional units between 2024 and 2030 – consisting of 2,278 solar water heaters and 916 heat pump water heaters.

Final energy consumption in the residential sector is projected to reach 1,396 GWh in 2030. The average total energy consumed by a household is the result of electricity and other non-electric fuels (such as LPG) that are used by households. The highest consuming energy end-uses would be appliances and lighting, followed by water heating. In a WEM scenario, it is expected that the natural process of electrification of households will continue, leading to a projected increase of 23.2% of

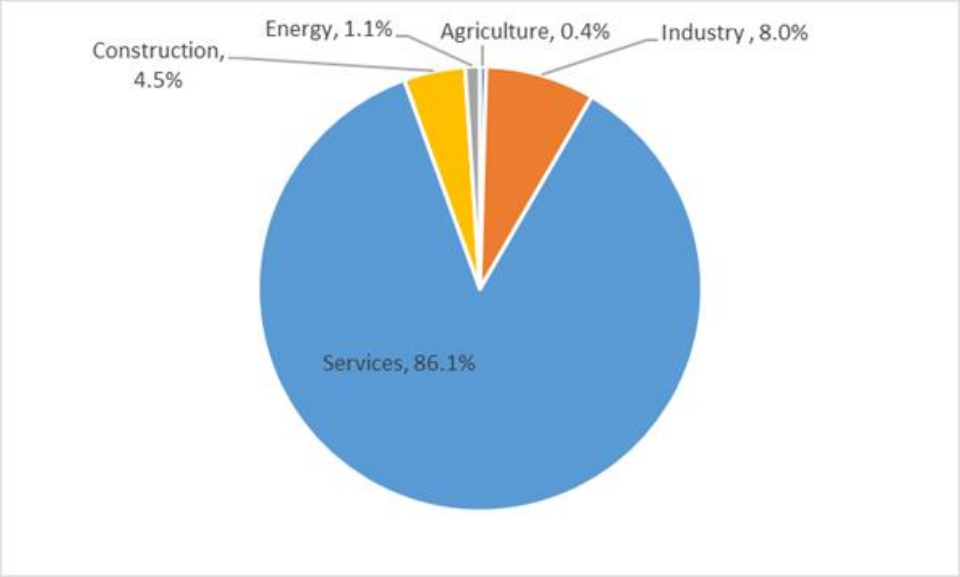
electricity consumption per household by 2030 with respect to 2022, including baseload. Another contributor to this higher estimated electricity consumption is the increase in disposable income per household, as this tends to lead to a higher use of certain electric devices such as white appliances and air-to-air heat pumps.

Non-Residential Sector

The gross value added (GVA) generated in Malta in 2019 stood at €11.5 billion (€2015), while that in 2022 increased to €12.9 billion (€2015), representing an overall higher GVA generation by 12% when comparing the two years. The COVID-19 pandemic, along with its economic implications, had an impact on all the sectors of the economy, albeit with different intensities. The hardest-hit sector was the services sector which includes tourism and contact-intensive personal services[177]. Activity in this sector was restricted due to containment measures imposed in Malta and abroad. The contraction of the industrial sector due to COVID-19 was less pronounced than that observed in the services sector and depended heavily on the nature of manufacturing operations.

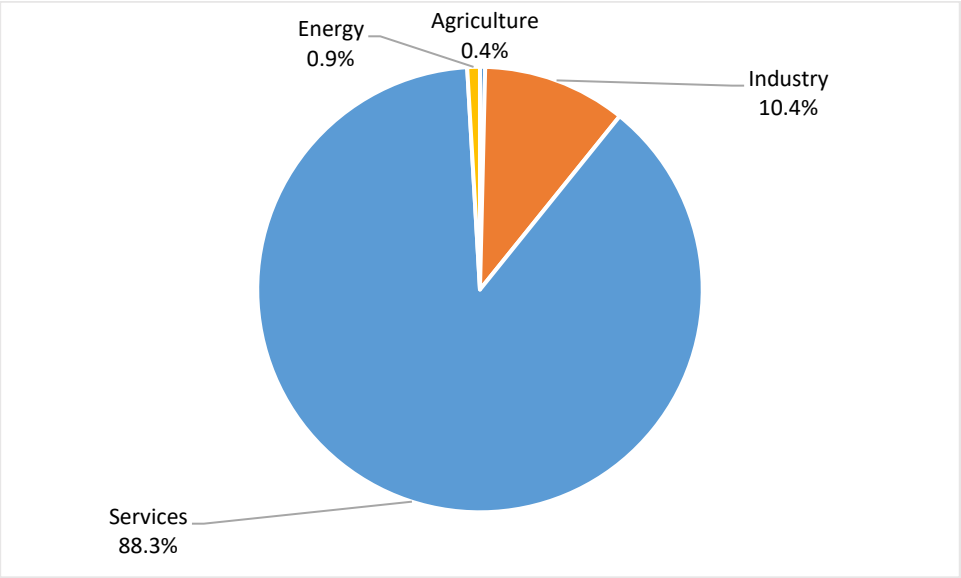
As shown in Figure 37, the largest sector currently contributing to the GVA is by far the services sector. Based on macroeconomic projections, this sector is expected to remain the most significant in terms of GVA, maintaining a share of around 88% of the total GVA up to 2040, Figure 38.

Figure 37 - GVA distribution in 2021. Source: Ministry for Finance and Employment



[177] Ministry for Finance and Employment (2021), Medium-Term Fiscal Strategy for Malta 2021-2024. Available at: https://finance.gov.mt/wp-content/uploads/2023/04/MTFS-2021-2024.pdf

Figure 38 - GVA distribution in 2040. Source: Ministry for Finance and Employment



The GVA of all sectors is forecasted to reach around €22 billion (€ 2015) by 2040[178]. This amounts to a compounded annual growth rate of roughly 3% annually, from 2022. Therefore, a significant increase in economic activity is expected.

This growth in activity will likely require an expansion in floor area utilised by such economic activities to support new and enlarged businesses. It is also assumed that additional floor space will also be required to accommodate:

i. an increase in the number of employees
ii. additional bed spaces in the healthcare sector required to cater for an increased population
iii. additional bed spaces in elderly care facilities, owing to growth in the 75+ demographic due to the ageing nature of the Maltese population

As a proportion of the total energy consumption in the services sector, the energy consumption in the hospitality sector is projected to decrease gradually to 24% in 2030 and 23% in 2040, due to an increase in efficiency improvements. The energy consumption in the health care sector is projected to increase its energy consumption (as a share of the total consumption in services) from around 10% (average over years 2017 - 2019) of consumption, to 12% by 2040. Further analysis on these two sectors are provided in subsequent paragraphs.

Given the assumption that the projected economic growth results in a corresponding expansion in physical terms, in the WEM scenario, the energy consumption required to sustain economic activities is reasonably expected to increase, as may be seen in Table 16 and Figure 39.

In 2021, approximately 59% of the gainfully employed in the services sectors worked in office-based jobs or educational institutions; this is projected to remain the same for 2030 and 2040. Offices,

[178] Ministry for Finance and Employment.

schools, and the public sector accounted for 25% (average over years 2017 to 2019) of the energy consumption in the services sector and is projected to remain the same. Given the particular energy consumption profile of such activities, predominantly electricity for space heating and cooling and ICT equipment, electricity demand for such end-uses is expected to create additional load on the electricity grid. Furthermore, energy consumption in these sectors is expected to amount to 332 GWh, 45 GWh and 32 GWh in 2030 respectively (from 279 GWh, 26 GWh and 32 GWh in 2021).

The main contributor to the energy consumption in the services sectors is the tourism and hospitality sector. In national accounting, this sector is captured through various NACE codes, such that there are various direct, indirect and induced effects; tourism is not covered through one specific NACE code. It is estimated that electricity and fuel consumption in this sector is generally high, accounting for 27% (average over years 2017 to 2019) of the energy consumption in the entire services sector. This is projected to decrease gradually to 24% by 2030 and 23% by 2040 owing to efficiency improvements in both collective (hotels, guesthouses, tourist villages and aparthotels) and private accommodation establishments. Tourism is expected to continue to be one of the main drivers of economic growth for Malta. The healthcare sector, incorporating hospitals, medical institutions, and elderly care facilities, is another important contributor to electricity and fuel consumption, with the healthcare sector contributing circa 10% (average over years 2017 to 2019) of energy consumption within the services sector. This is projected to increase to 12% by 2040.

The industrial sector (manufacturing quarrying, and construction) maintained a contribution of around 12% of the total GVA in between 2017 and 2021. While it is projected that the GVA will continue to increase, its sectoral contribution is expected to decrease moderately, declining to around 10% by 2040.

Table 16 - Final energy consumption in economic sectors (excluding transport) in 2030

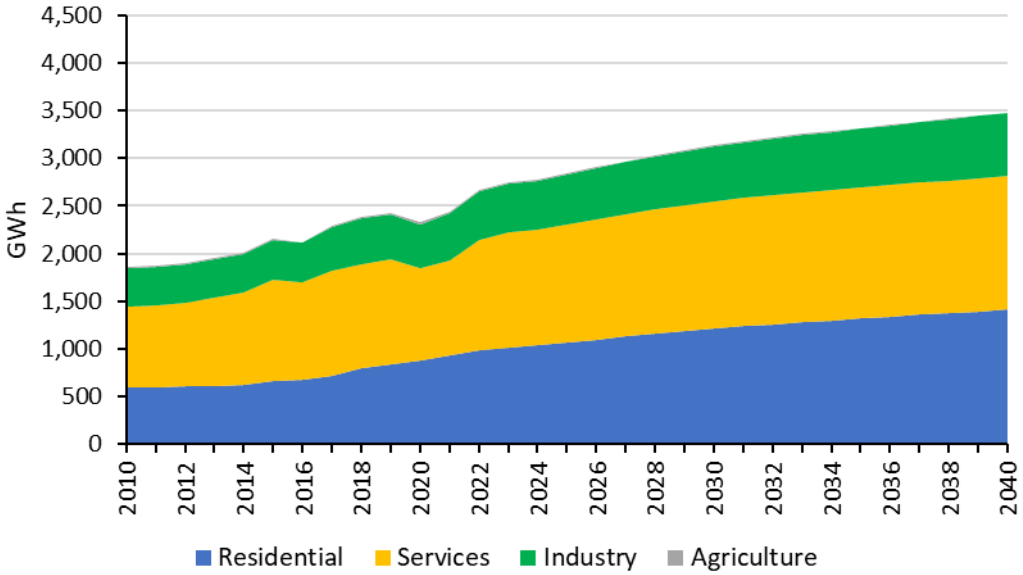
Sector	Final energy consumption in 2030 (GWh)
Services	1,669
Industry	1,013
Agriculture, Forestry and Fishing	190

As of 2018, the manufacturing sector accounted for around 89% of the energy consumption in the industry sector, while the quarrying and construction sector accounted for 11%. Due to an accelerated increase in fuel consumption within the quarrying and construction sector between 2019 and 2022, the share of manufacturing in the sector's energy consumption fell to 74% in 2022 and is forecasting to fall to 72% by 2030. Energy intensity of the manufacturing sector is projected to keep a decreasing trend from 678kWh/thousand € 2015 in 2021 to 588 kWh/thousand € 2015 in 2030.

Water supply, sewage and wastewater management in Malta is dependent on energy consumption due to the country's dependency on reverse osmosis for desalinisation. This is because Malta as an island state lacks access to alternative water sources that are typically available to continental regions, such as rivers and lakes. Energy is also required for wastewater treatment, groundwater pumping,

distribution and new water[179] production. The overall demand for potable water is expected to increase, along with the volume of wastewater requiring treatment; however, the trend of increase in electricity demand for these end-uses reflects decoupling from both population and economic growth. It is projected that electricity consumption required to produce and distribute water and treat wastewater will increase by around 23% from 159 GWh in 2022 to 196 GWh in 2030. Roughly 8% of this consumption will be required in order to produce new water.

Figure 39 - Electricity Consumption in the residential and economic sectors (excluding transport) with central scenario assumptions.



Transport Sector

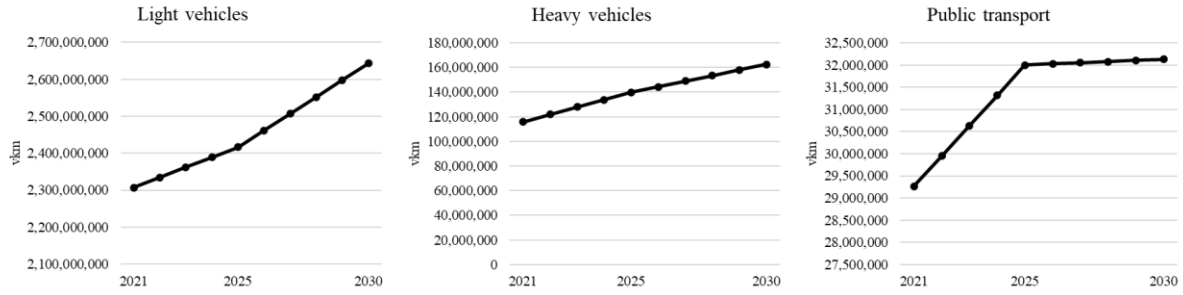
The number of road vehicles and vehicle-kilometres is projected to continue to increase as a result of economic and population growth. That being said, the average fuel consumption and emissions per vehicle is projected to decrease slowly, as manufacturers respond to EU Regulations setting CO2 emission reduction targets for new vehicles. There are no car manufacturers in Malta. This, couple with the rate at which new vehicles are registered in the domestic market, are expected, reflect a natural time lag in the adoption of these standards and their effect on the fleet. Meeting such targets requires manufacturers to include an increasing share of electric cars in their fleet, a trend that is expected to be reflected in the stock of newly imported vehicles in Malta. The effect of this development may be somewhat delayed as a significant portion of newly licensed vehicles tend to be

[179] Water Services Corporation (n.d.), New water refers to repurposed and treated wastewater, which can be used for agriculture, industry, and landscaping. Source: WSC (2024), New Water. Available at: https://www.wsc.com.mt/information/new-water/#:~:text=%E2%80%9CNew%20Water%E2%80%9D%20is%20highly%20polished,centre%20of%20the%20Mediterranean%20Sea.

imported second-hand vehicles (48% of the total stock excluding e-kick scooters and 59% of passenger cars in 2021).

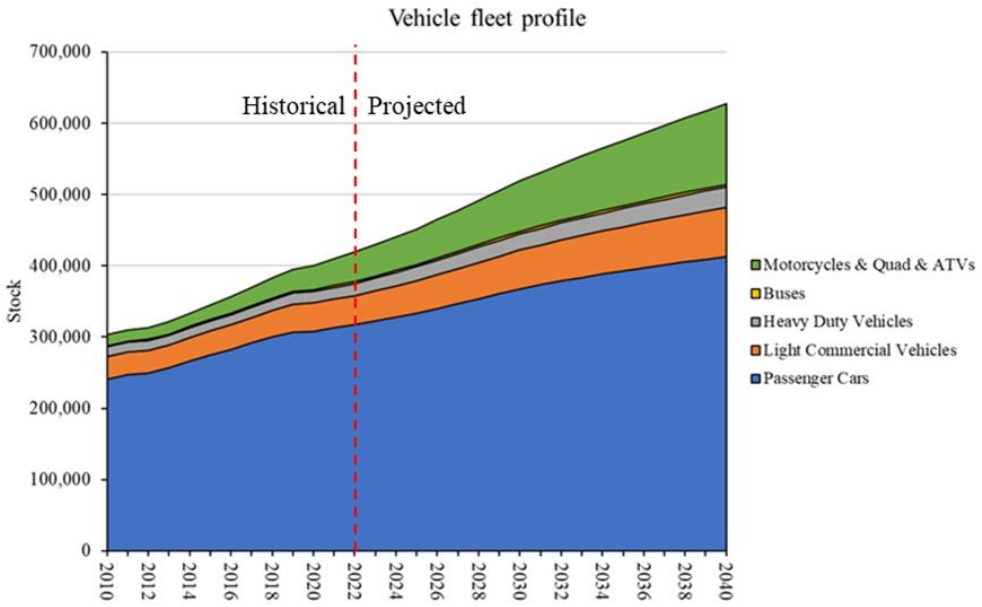
In 2019, final energy consumption in the road transport sector stood at 2632 GWh. The COVID-19 pandemic and its subsequent economic repercussions affected various transportation sectors to varying degrees. In 2020, there was a noticeable decline in energy consumption, which decreased to 2,172 GWh. However, by 2022, the sector had bounced back to its pre-pandemic levels. Future projections for energy consumption in this sector are informed by the 'Business-As-Usual' scenario from the 2023 update of the National Transport Model (NTM) (also reflected within the WEM scenario), which anticipates vehicle-kilometre demand as depicted in Figure 40 and incorporates the speed assumptions used within the model. The specific measures factored into this scenario include the ambition of achieving 65,000 battery electric and plug-in hybrid passenger and light commercial vehicles by 2030. The business-as-usual scenario also includes transport measures provided by Transport Malta, which include the upgrade of Triq San Andrija in Pembroke, Msida Creek, free public transport, free school transport, the increase in the frequency of selected PT routes from September 2023, as well as the remote working policy, which was not explicitly modelled, but was reflected in the NHTS data in 2021. Additionally, the historical data on vehicle stock has been adjusted to align with figures released by the NSO, as shown in Figure 41.

Figure 40 - Annual vkm indicators from the National Transport Model with 'Business-As-Usual' Scenario. Source: MEEC.



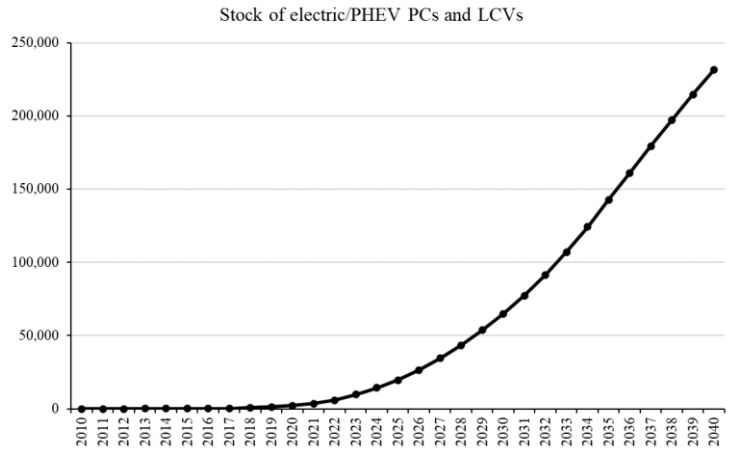
The increased share of electric vehicles in the vehicle fleet is expected to impinge on the average consumption of electricity although the impact on peaks may be mitigated through effective demand management. In this context, an advantageous night-time electricity tariff, applicable to EV charging, has been in effect since 2021. Additionally, it is projected that from 2035, the sale of new and used internal combustion engine (ICE) passenger cars, light commercial vehicles, and motorcycles could be prohibited, in line with eventual EU legislation.

Figure 41 - Evolution of vehicle stock by vehicle type under a 'Business-As-usual' scenario. Source: MEEC.



When considering the electrification of the heavy-commercial vehicle fleet, the approach is guided by Regulation (EU) 2019/1242. This regulation sets forth mandatory CO2 emission reduction targets for the collective fleet of new vehicles in the EU, aiming for a 15% reduction by 2025 and a 30% reduction by 2030, with the baseline period being from 1 July 2019 to 30 June 2020. While these requirements are directed at vehicle manufacturers, it is presumed that the fleet of newly registered vehicles in Malta will mirror these trends and align with the options available in the broader EU market.

Figure 42 - Stock of electric and plug-in hybrid passenger cars and light commercial vehicles under a 'Business-As-Usual' scenario in the NTM. Source: MEEC.



Apart from road, energy demand projections in the transport sector also include aviation, national navigation and international maritime bunkering. The international aviation sector was the hardest-hit transport sector by the COVID-19 pandemic, leading to massive repercussions on tourism. Energy consumption dropped drastically by 64% from 1,924 GWh in 2019 to 696 GWh in 2020. In spite of strong progress towards recovery, Jet A1 (Kerosene) consumption in 2022 was still 23% below 2019 levels. In 2023, whilst the number of scheduled flight arrivals returned to 2019 levels, Jet A1 consumption was still lower by circa 9%. The data available points towards a combination of factors. Aircraft movement data shows that there is a gradual change in aircraft fleet, with more efficient product lines/series landing in Malta. There was also a shift in aircraft movements to shorter routes. For example, the share of aircraft movements to/from the UK decreased to 17% in 2023, compared with 21% in 2019, while the share of aircraft movements to/from Italy increased to 26% in 2023, from 20% in 2019. The increase in final energy consumption across the projected horizon is in line with the expected increase in aircraft movement and scheduled flight arrivals received in September 2023.

In the case of domestic navigation, energy consumption stood at 252GWh in 2021. The Cirkewwa – Mgarr ferry service and the Valletta – Mgarr fast-ferry service account for more than half of the energy consumption in this sector and are assumed to still be in operation post 2030. Projected fuel consumption in the domestic navigation sector is projected to remain relatively stable, with energy demand going up to 272 GWh in 2030.

Projections for the international maritime bunkering sector are based on trends from the 'Technical Study and Cost-Benefit Analysis for the Development of LNG as a Marine Fuel in Malta'[180]. This study assessed the potential of LNG as a bunkering fuel in Malta and concluded that while the demand for LNG bunkering in the Central Mediterranean is expected to increase at a rather modest rate during the next decade, medium- to long-term solutions will rely on access to LNG storage facilities. Fuel consumption in the international maritime bunkering sector are projected to reach 28,797 GWh by 2030.

Electricity supplied to ships berthed at the Valletta Grand Harbour and the Malta Freeport Terminals is accounted for under the international marine bunkering sector. It is assumed that by 2030, these ports will be able to provide shore-side electricity to all containerships/passenger ships moored at the quayside. The number of cruise ship calls is projected to increase to 417 in 2030, with an average berthing duration of 12 hours. Projections for electricity demand at the Malta Freeport Terminals assume 1,676 lift-on-lift-off cargo ship calls in 2030 with a berthing duration of 24 hours. Electricity consumption is expected to reach 223 GWh by 2030. Discussions are under way with NSO (and indirectly with Eurostat) on the manner in which electricity supplied to international bunkers should be accounted for statistical purposes. This in view that, by definition, all fuels supplied to international bunkers have so far been excluded from the national final energy consumption figure. It is noteworthy that the fuels supplied to the international marine bunkering sector are approximately three times larger than Malta's gross final consumption of energy (GIC). It is pertinent to note that the contribution submitted by Malta towards the indicative target for final energy consumption under Article 4 of the

[180] The Energy & Water Agency (2017), LNG as a Marine Fuel in Malta. Available at: https://energywateragency.gov.mt/lng-as-a-marine-fuel-in-malta/

Energy Efficiency Directive does not include the projected electricity consumed by international bunkers.

iii. Global energy trends, international fossil fuel prices, EU ETS carbon price

The past few years were characterised by global instability linked to the war in Ukraine, and the Middle East, and an on-going economic recovery from the pandemic and its impact on supply chains. Wholesale natural gas prices in Europe peaked in August 2022, reaching levels above 300 €/MWh, which is well above pre-pandemic levels where prices stood at around 10-20 €/MWh[181] (Figure 43). These very high prices reflected a surge in demand where Member States rushed to fill depleted gas storages in preparation for the winter season. Following a mild winter, prices started to drop, and continued to slide in 2023, even though they are still higher than pre-pandemic levels. Supply diversification and high storage levels have led to a decreased risk of stress in European gas markets. Whilst the threat of immediate gas shortages has abated, the evolution of natural gas prices is still uncertain., particularly in view of the impending expiry of the gas transit agreement via Ukraine by the end of 2024, which will not be extended. This development may have significant implications for the security of gas supply in Europe and could subsequently affect prices. Gas market prices and oil price projections were taken from IHS Markit (2023), 'European Gas Long Term Price Outlook, June 2023'. In the short-term, it is projected that gas market prices in 2026 will decrease to around €'22/MWh. However, increased demand triggered by various factors such as cold winters or hot summers, and reduced incentives to save gas can reignite pressures on market prices. In the long term, average gas market prices are projected to hover at around €'22/MWh[182].

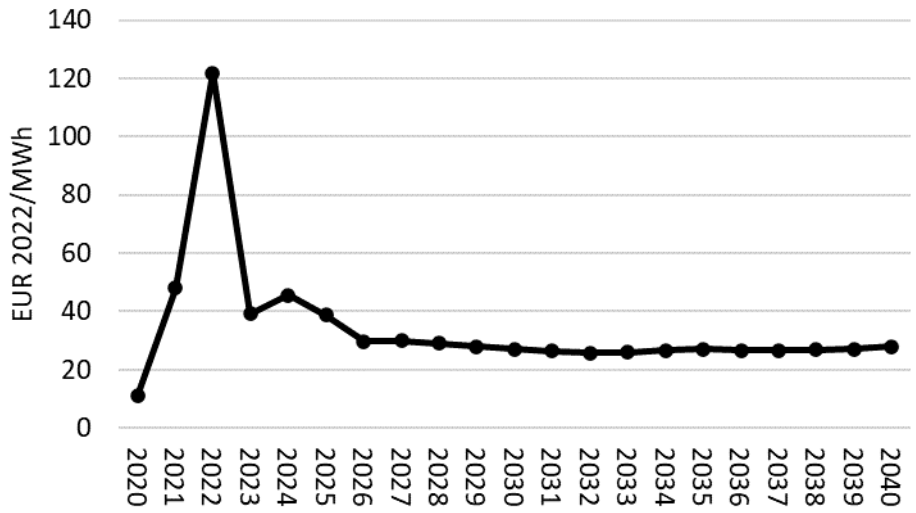
From its inception, the EU ETS market was the main source of EU carbon pricing for industries, including the energy sector, which was the first to be subject to a 'cap and trade' system that transformed carbon from an externality into a market commodity (

[181] European Commission (2023), European Economic Forecast – Spring 2023. Available at: https://ec.europa.eu/newsroom/rtd/items/795360/en#:~:text=Upward%20revisions%20for%20the%20euro,0.3%25%20higher%20than%20in%20winter.

[182] European Commission (2024), European Economic Forecast – Spring 2024. Available at: https://economy-finance.ec.europa.eu/publications/european-economic-forecast-spring-2024_en

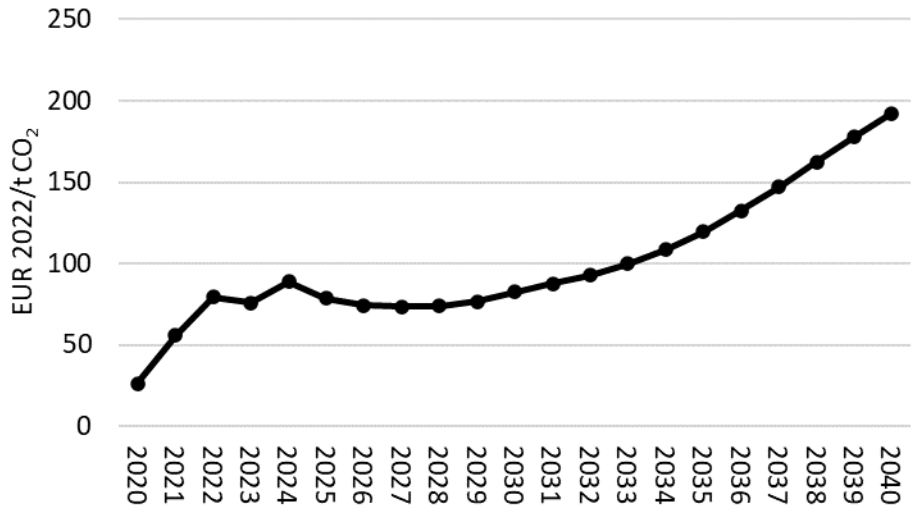
Figure *44*). In this regard, the early days of the carbon market saw EU ETS allowances trade at prices below €10 per tonne from 2013 to the early 2018. The prices were maintained at this level as supply somewhat exceeded demand and conditions for price movements for carbon allowances weren't that strong. Early signs of price movements started in 2020 when the EU ETS price started to trade at an average rate of €24 per tonne, which was more than double the standard price the market had ever witnessed. This surge in price was further pronounced in 2021 as ETS allowances were traded on the market at an average price of €54 per tonne and which was underpinned by several factors that led to further market dynamism. ETS price record highs were registered in 2022 and further solidified in 2023 to the point that ETS allowances hit for the first time the €100 per tonne price mark as a result of various factors, including, among others, market reaction to decreased fuel supplies from Russia, having long been a leading reliable energy supplier to the EU, market formation changes, the falling back on more polluting industries for energy such as coal, the impact of episodes of extreme weather conditions and other international events. A high degree of uncertainty remains on the future evolution of international fuel prices in the coming years, and these would be reflected in future projections. In 2024, the average ETS price traded on the market was equal to €65 per tonne, a drop from prior years, mainly attributable to ample supply and lower emissions. By 2030, ETS prices are expected to increase to €150, due to the forecasted exhaustion of cheaper forms of emissions abatement, and a reduction in the supply of allowances[183].

Figure 43 - Natural gas price developments and future prices. Source: IHS Markit (2023), 'European Gas Long Term Price Outlook, June 2023'.



[183] BloombergNEF (2024), EU ETS Market Outlook 1H 2024: Prices Valley Before Rally. Available at: https://about.bnef.com/blog/eu-ets-market-outlook-1h-2024-prices-valley-before-rally/

Figure 44 - Development of carbon price.. Source: IHS Markit (2022), 'European Long Term ETS Carbon Price Outlook, December 2022"



iv. Technology cost developments

The primary technology cost assumptions used in the development of Malta's with Existing Measures (WEM) and With Policy Measures (WPM) scenarios for the NECP are presented in this section. As a technology taker, Malta faces various challenges and limitations. First, relying on off-the-shelf technologies may not always align perfectly with Malta's specific needs, leading to potentially suboptimal solutions. Secondly, the country's dependence on external technologies exposes it to vulnerabilities when sudden technological changes occur due to shifts in international policies or market conditions in technology-exporting countries. Additionally, Malta has limited control over the development and direction of adopted technologies, potentially hindering its ability to address specific national priorities effectively.

Solar PV

Projected cost reductions for small-scale residential solar photovoltaics are based on the costs for small-scale rooftop solar PV set out in the PRIMES 2020 technology assumptions (Table 17) which provide capital investment costs and annual fixed operation and maintenance costs (€/kW) for the projected years.

However, there is a notable discrepancy between actual local costs and those assumed by PRIMES, and thus an adjustment was made to the projected PRIMES costs, based on data compiled by REWS for residential solar PV grant schemes. In addition to these costs, a one-time €50 connection fee was included in the overnight capital costs. The technical lifetime of solar PV technology was assumed to be 20 years. Moreover, it is assumed that the inverter will require changing half-way through the installation's lifetime. The cost for a replacement inverter was calculated based on historical data of inverter costs and projected according to trends in capital costs. Table 18 presents the solar PV costs for a residential-sized system in Malta for 2022. These costs are calculated on the dataset of Solar PV installations benefitting from grants provided by REWS.

Table 17 - Solar PV technology cost assumptions, € 2015/kW excluding taxes. Source: Primes 2020 technology assumptions.

	Investment Costs €/kW (2015=100)				Fixed annual O&M €/kW (2015=100)			
	2020	2030	2040	2050	2020	2030	2040	2050
Solar PV – residential rooftop	890	803	597	483	19.0	14.9	11.1	9.0

Table 18 - Residential-sized solar PV costs, 2022 real prices Source: REWS.

Solar PV costs	Value	Unit
Capital Cost of System excluding Inverter (including PV modules, Frame, Labour Installation)	1,330	€/kWp
Capital Cost of Inverter	404	€/kWp
System (excluding inverter) Lifetime	20	Years
Inverter Lifetime	10	Years
Total Capital Cost (€/kWp)	1,734	€/kWp
Total Capital Cost (€/KWp) (less VAT)	1,422	€/kWp

For non-residential PV systems, the capital investment costs and fixed annual operation and maintenance costs for solar PV with a high potential were selected from the PRIMES 2020 technology assumptions. However, given the variance between local capital expenditure (~1200 €/kW in 2021 excluding VAT) and EU capital costs (730 €/kW in 2020), it was concluded that the PRIMES 2020 study costs had to be complemented by other sources in order to accurately project the CAPEX of non-residential PV systems in Malta. Furthermore, capital costs in the PRIMES 2020 assumptions appear to exclude grid connection costs. In Malta, these costs are borne by the PV developer and were thus factored into national estimates of the CAPEX of commercial PV systems. However, grid connection costs for PV connections greater than 16A per phase are not fixed, but are dependent on the particularities of the installation site and are derived following site-specific network studies; these

costs can be relatively high, running into the hundreds of thousands depending on the site and the size of the installation.

The ASSET study projected costs based on average prices of solar PV in Europe which have, in recent years, been driven down significantly following the introduction of auctions to support utility-scale PV systems and other renewable technologies around Europe. Given that the median size of non-residential PV system in Malta is 12 kWp, ASSET prices are not reflective of local costs. Therefore, for non-residential PV systems, it was assumed that the ASSET costs did not adequately account for the Balance of Systems components. These were factored into the total PV system costs based on projections published by Fraunhofer ISE (2015) on behalf of Agora Energierwende[184], which are outlined in Table 19. As the report uses 2014 as its base year, it is likely that the recent price evolution of PV systems, as a result of the increase in utility-scale PV, was not captured and therefore the costs are more reflective of small-scale PV systems prevalent in Malta.

Table 19 - Cost reduction scenario, € 2014/kW excluding taxes. Source: Fraunhofer ISE.

Cost reduction scenario (€ (2014=100)/kWp)			
	2014	2050 (before efficiency effect)	2050 (incl. efficiency effect)
Installation	50	30-45	13-28
Mounting Structure	75	38-60	16-38
DC Cabling	50	30-45	20-32
Grid Connection	60	24-36	24-36
Infrastructure	40	28-36	16-26
Other BoS costs	60	39-56	29-46

Battery Systems

The electricity generated from Renewable Energy Sources (RES) in Malta, which is almost exclusively solar PV, is highly volatile. The nominal power of solar PV installed in Malta is relatively high when compared to the installed power capacity. Given the size of Malta's power system, variations in output by solar PV are significant and create problems for the electricity provider, mainly in the spinning reserve and voltage regulation. Battery Energy Storage Systems (BESS) are one solution to smooth out the supply of intermittent variable forms of renewable energy.

Utility-Scale Battery Energy Systems

As a result, Malta is looking to introduce utility-scale Battery Energy Storage Solution (BESS) to allow for increased penetration of RES by storing the energy which is generated by the renewables during

[184] Fraunhofer ISE (2015), Current and Future Cost of Photovoltaics. Study on behalf of Agora Energiewende. Available at: https://www.ise.fraunhofer.de/en/publications/studies/studie-current-and-future-cost-of-photovoltaics-long-term-scenarios-for-market-development-system-prices-and-lcoe-of-utility-scale-pv-systems.html

the hours of maximum delivery of RES and discharging in hours when these RES are not available. Such BESS will reduce Malta's emissions as excess RES generation can be stored and used to limit the starting up/ramping up of carbon emitting plants during peak hours. This will also strengthen the security of supply, where energy stored by the BESS can assist towards plant outages to enhance the grids resilience and balance the distribution grid.

Malta has identified two different potential sites for the BESS. Development permits have been obtained for both sites during 2024. The first site is within the tunnels of the former 'A' Station in Marsa and is estimated to have a capacity of 8MW/20MWh. The second site identified is the Delimara Power Station and is estimated to have a capacity of 32MW/64 MWh. These projects fall within the scope of EU funding including ERDF and RRF.

Commercial and Residential behind-the meter BESS

Commercial and industrial users can use BESS for peak shaving, load shedding and load shifting, where demand spikes are eliminated through the use of such systems and users can decide to shift their energy consumption to different time periods based on energy prices. For residential users, BESS can be used to store energy generated through solar PVs during the day, and then use this energy at night. The current average cost of installing a household-sized battery in Malta is around €708 per kWh (2022 prices, excluding other costs)[185] -- However, through the new Government schemes that were launched in 2021, beneficiaries may be able to recuperate up to 80% of the battery cost[186].

A BESS also enables consumers greater control to fully utilise the power they are generating reducing their energy bill. In light of this, the Energy and Water Agency (EWA) shall be cooperating with the University of Malta (UOM) to conduct a study on how best to enable the active participation of electricity consumers.

Floating Offshore Wind

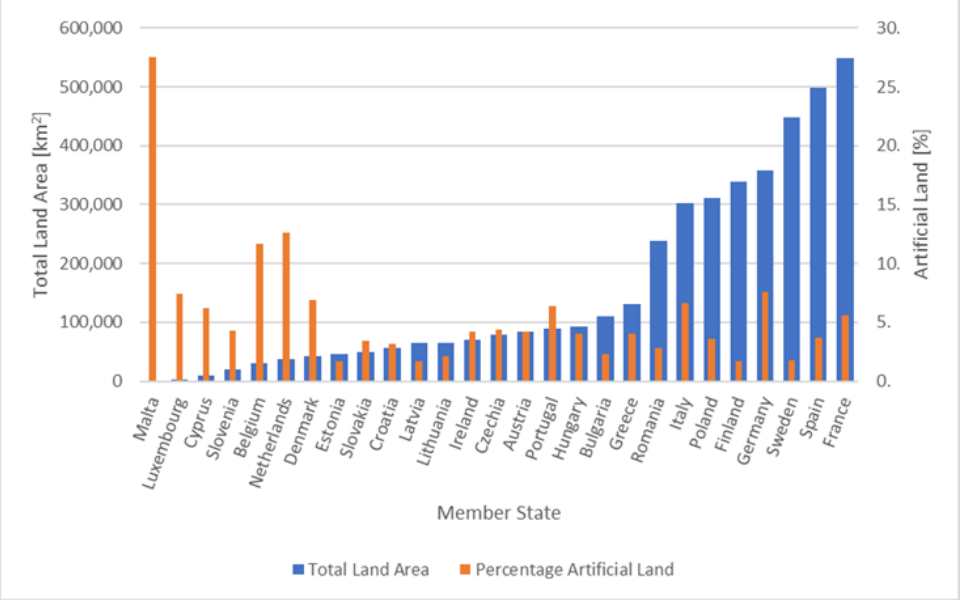
Malta is actively exploring ways to tap into the country's offshore renewable energy potential within 12 nautical miles of the coast, recognising the unique geospatial and environmental characteristics of its territorial waters that make traditional onshore or fixed-foundation offshore wind turbines less viable.

Figure 45 depicts the total land area for Member States, with Malta having the smallest total land area, amounting to a total of 316 km^2. Furthermore, Malta has the highest proportion of land that has been developed or significantly altered by human activity (such as urban areas, industrial zones, and roads) compared to all other Member States. This developed land, known as artificial land, made up 27.5% of Malta's total land area as of 2018. These spatial constraints render onshore wind projects impractical.

[185] Battery Costs include VAT. Costs are calculated on the dataset of battery installations benefitting from a grant (2021/RES) provided by REWS.

[186] Based on data provided by REWS for the 2021 Renewable Energy Sources Scheme. More information regarding the scheme available at: https://www.rews.org.mt/#/en/sdgr/463-2021-renewable-energy-sources-scheme

Figure 45 – Share of Artificial Land and Total Land Cover. Source: Eurostat[187].



The bathymetric characteristics of Malta's territorial waters, as shown in Figure 46, significantly limit the suitable areas for traditional bottom-fixed wind turbines, which require relatively shallow water depths. Nonetheless, floating offshore wind technology offers a promising alternative.

The deployment of floating offshore wind technologies, while promising, comes with its own set of challenges and potential additional costs. Unlike fixed-bottom turbines, floating platforms must be engineered to withstand the dynamic forces of deeper waters and variable sea conditions, which can lead to higher design complexity and increased material requirements. Mooring systems and anchors for floating turbines also contribute to the overall cost and complexity, as they must be robust enough to maintain stability in various sea conditions. Furthermore, the installation process for floating turbines can be more intricate and expensive, requiring specialised vessels and procedures. All these factors can significantly influence the levelized cost of energy (LCOE) and the total capital expenditure (CAPEX) for floating offshore wind projects.

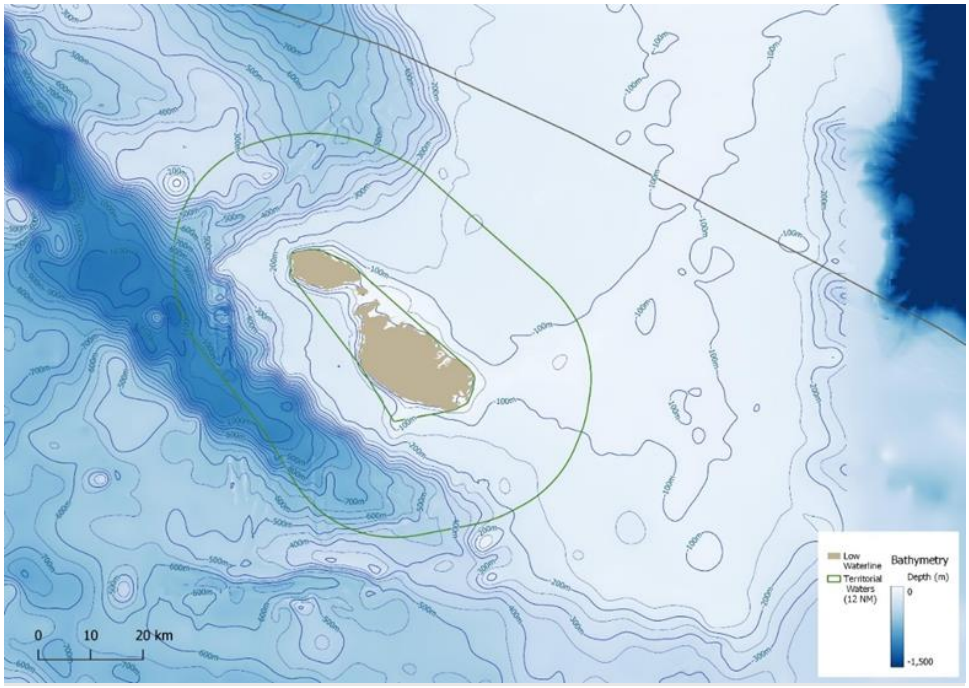
Floating offshore is a recent and innovative technology and thus available data is limited since few such projects have been implemented globally to date and more so when considering the Mediterranean region.

[187] Eurostat (2024), Land cover overview by NUTS 2 region. Available at: https://ec.europa.eu/eurostat/databrowser/view/lan_lcv_ovw__custom_13514080/default/table?lang=en

Figure 47 shows the main drivers of change for the global levelized cost of wind between 2020 and 2050, as presented in the Energy Transition Outlook 2022 report[188]. Costs for offshore floating wind are expected to decline at a higher rate till 2050 relative to fixed-bottom wind, given that floating technology is still in the initial development stages, whilst fixed-bottom is at a more advance stage along the cost learning curve. The levelized cost of floating wind technology presented in

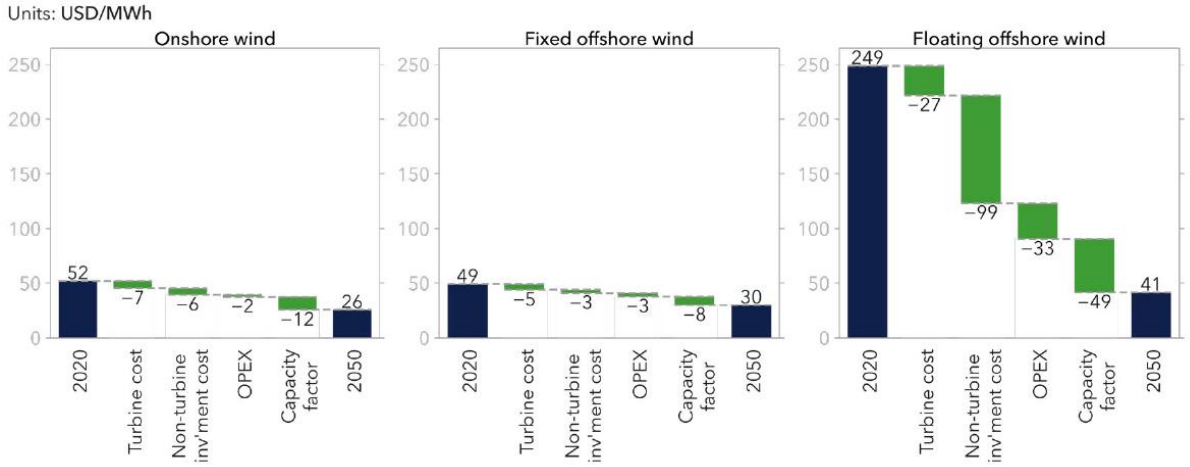
Figure *47* shows a decline in the cost for floating wind from 249 $/MWh in 2020 to an estimated 41 $/MWh by 2050.

Figure 46 - Bathymetry. Source: GEBCO (2021), Gridded bathymetry data.



[188] DNV (2024), Energy Transition Outlook 2022. Available at: https://www.dnv.com/energy-transition-outlook/download/

Figure 47 – Levelized cost of wind technology. Source: DNV, Energy Transition Outlook 2022.



A study[189] examining the levelized cost of energy (LCOE) for floating wind farms in the Mediterranean Sea indicates that, in the area near Malta, the LCOE could vary significantly depending on different scenarios. In the most favourable conditions, the LCOE could be between 100 to 140 €/MWh, while in less ideal circumstances, it could rise to between 200 to 300 €/MWh. Additionally, the study estimates that the total capital expenditure (CAPEX) required to build a 1GW floating wind farm in the Mediterranean would range from €4.1 billion to €5.0 billion. Due to the novelty of floating offshore wind technology and the limited commissioning of large-scale projects to date, there is inherent uncertainty associated with these cost estimates. Further research, development, and the implementation of actual floating wind projects will provide more accurate data and reduce uncertainties in the cost projections. The Floating Offshore Wind Centre of Excellence published estimated costs for offshore floating wind farm (based on a number of site conditions and assumptions). These are shown in Table 20.

Table 20 - Costs for Offshore Wind Farm (in real 2021 prices) [190]

Category	Estimated Cost	Unit
Development and project management	175,000	€/MW
Wind turbine	1,512,000	€/MW
Balance of plant	1,977,000	€/MW
Installation and commissioning	430,000	€/MW
Operations and maintenance	83,000	€/MW/annum
Decommissioning	175,000	€/MW
Contingency and insurance	314,000	€/MW

[189] A. Martinez et al. (2021), Multi-parameter analysis and mapping of the levelized cost of energy from floating offshore wind in the Mediterranean Sea. Available at: https://www.sciencedirect.com/science/article/pii/S0196890421005926

[190] Guide to a Floating Offshore Wind Farm (2024), Wind farm costs. Available at: https://guidetofloatingoffshorewind.com/wind-farm-costs/

EU Strategy on Offshore RES

To ensure that offshore renewable energy can help reach the EU's ambitious energy and climate targets for 2030 and 2050, the European Commission published a dedicated EU strategy on offshore renewable energy (COM(2020)741) on 19 November 2020 which proposes concrete ways forward to support the long-term sustainable development of this sector. The Offshore Renewable Energy Strategy highlights the need to reach at least 300 GW of offshore wind and 40 GW of ocean energy by 2050 in the EU as a key means to reach climate neutrality, providing a major opportunity to ramp up renewables, develop a resilient industrial base in the whole EU and creating quality jobs, benefiting both coastal and landlocked Member States.

Malta's Outlook on Offshore RES

As part of Malta's forward outlook and ambition in increasing the share of renewable energy, the Maltese Government is focusing on the development of its offshore (floating) renewable potential. This is being done with a view of establishing the necessary administrative and regulatory frameworks, which will enable the future deployment of larger-scale projects.

In parallel, pursuant to article 14(1) of the TEN-E Regulation (EU) 2022/869, in January 2021, Malta has entered into a non-binding agreement on goals for offshore renewable generation in 2050 for 400MW capacity, with intermediate steps in 2040 and 2030 of 400MW and 50MW respectively. Malta's Low Carbon Development Strategy (June 2021)[191] also highlights offshore renewable energy as one of the strategies to enable Malta to reach its environmental targets towards achieving carbon neutrality by 2050 and has since been studying offshore areas that can be dedicated to offshore renewables.

PMC EEZ

In view of Malta's limited land area, the Maltese government is investigating the possibility to exploit the country's potential for a far larger exclusive economic zone (EEZ) in the surrounding waters, beyond the territorial waters within 12 nautical miles of the coast. In May 2022, the Maltese Government issued a Preliminary Market Consultation (PMC) for proposals of Economic Activities within Malta's Exclusive Economic Zone. The outcome of this consultation and the submission of interested economic operators has enabled the Government to gauge the interest of potential investors to undertake activities and projects in the proposed EEZ area in line with the rights provided under the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and the Malta EEZ Act. Fifteen of the proposals

[191] Ibid.

submitted from the private sector targeted the development of offshore wind farms within Malta's continental shelf.

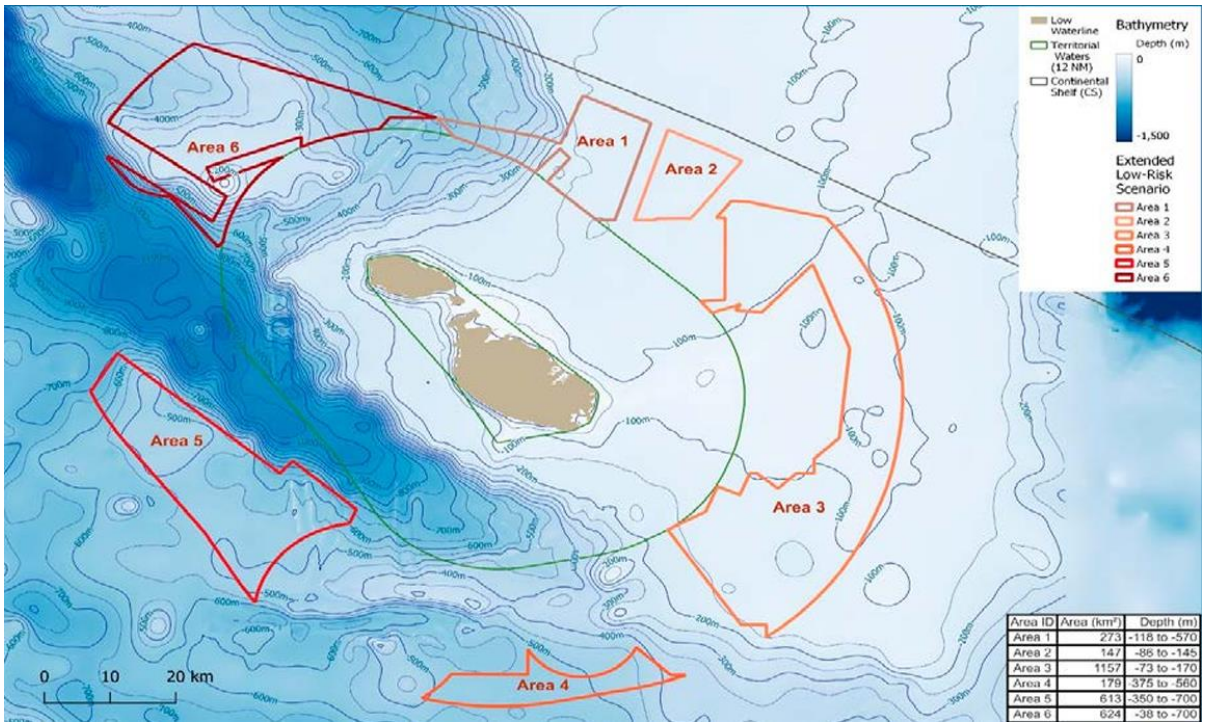
Offshore RES Policy

On 31st August 2023, the Ministry for the Environment, Energy and Enterprise (now the Ministry for the Environment, Energy and Regeneration of the Grand Harbour) launched the first policy document, detailing the National Policy for the Deployment of Offshore Renewable Energy for public consultation. The offshore renewable energy policy is aimed at contributing further to the country's already successful path in achieving a greener balance between energy-use and impact on the environment and to ensure further diversification in the local energy mix. The launch of the policy was the initial step to enable large scale offshore wind development in the country. This policy was finalised in August of 2024.

The Offshore Renewable Energy Policy[192] seeks to enable the offshore potential of the Mediterranean in the country's best interest. Technology-neutral, the policy supports the implementation of offshore renewable projects, mainly wind and solar, in areas lying beyond the territorial waters and within Malta's potential EEZ. The policy provides a comprehensive framework to promote investment in renewable energy, direct potential investors towards efficient renewable technologies, promote research, development, and innovation, and ensure that the offshore energy potential supports the country's energy security. The proposed policy also seeks to complement the regulatory and implementation framework, which will support investors in materialising their offshore projects, reducing the time from concept to commissioning by assisting directly through effective governance and monitoring. The Offshore Renewable Energy Policy identified six potential areas for the deployment of floating renewable energy. Following this, a strategic environmental assessment (SEA) narrowed the areas to two, namely, Area 3 and Area 4 depicted below.

[192] Energy and water Agency (2024), National Policy for the Deployment of Offshore Renewable Energy. Available at: https://energywateragency.gov.mt/wp-content/uploads/2024/10/MEE-National-Policy-23_-DIGITAL-_final-5.pdf

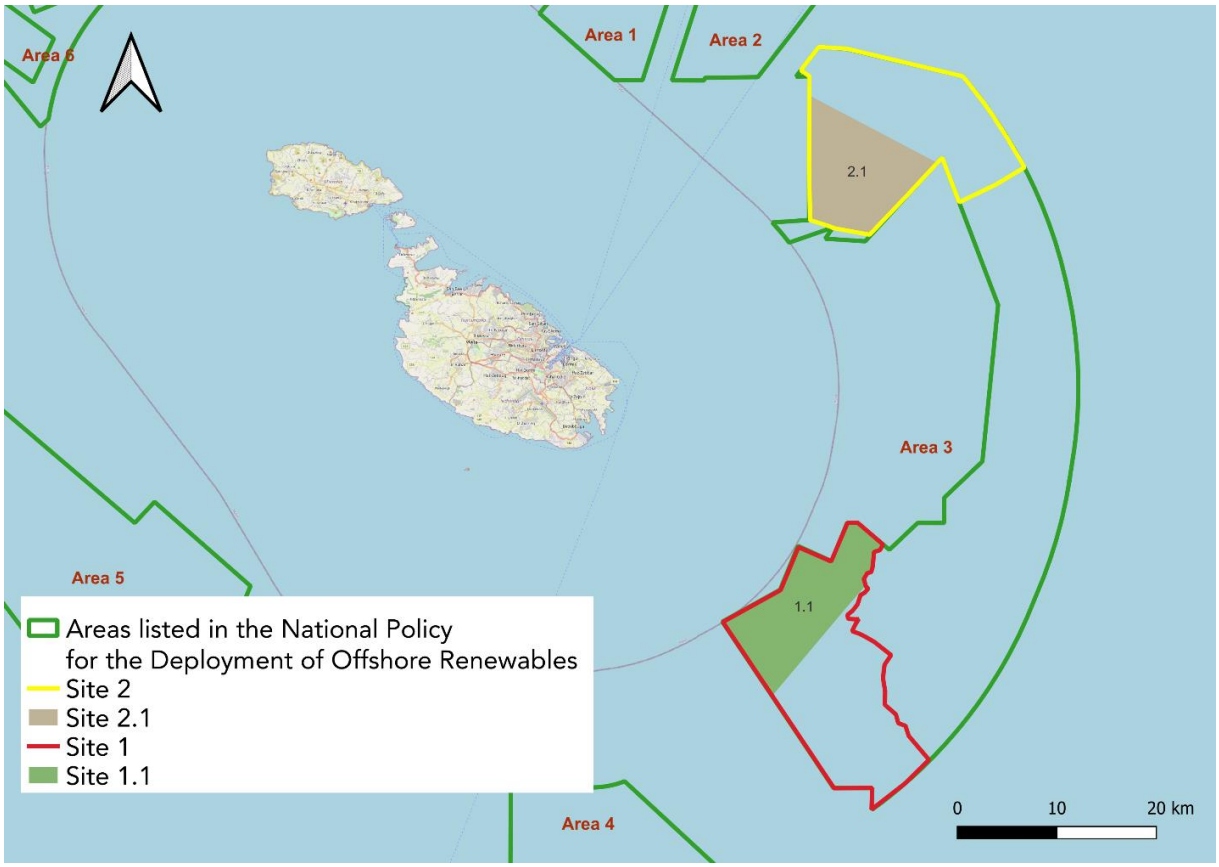
Figure 48 – Area 3 and Area 4 for deployment of floating renewable energy



The bathymetric characteristics of Malta's territorial waters, and those beyond, highly restrict areas suitable for offshore bottom-fixed wind turbines, due to the relative shallower water depth requirements of such technology. However, floating offshore wind technology presents a potential solution for harnessing wind energy in this context. These floating projects offer several advantages, including reduced visual impact and minimized interference with various economic activities that rely on the same areas.

Following a deeper desktop analysis of the areas, including distance from the onshore grid connection points, environmental constraints, sea traffic, water depths, bathymetry, seabed slopes, and preliminary comparative cost estimates, Interconnect Malta narrowed down two areas of approximately 190km^2 and 140km^2 inside Area 3 as the best-suited areas for deployment of RES. Both areas represent more than the area required by a first project, estimated to be around 100 km^2.

Figure 49 – Two areas inside Area 3



Offshore Floating Solar Technology

A preliminary market consultation was also conducted between January and May (including an extension granted in response to a clarification) to assess the market readiness for nearshore floating solar technology projects, specifically photovoltaic farms, in the Maltese Islands. The PMC aims to solicit proposals from operators for the deployment of floating solar technology projects, including photovoltaic farms, within the zone extending up to twelve (12) nautical miles off the coast of the Maltese Islands. This initiative will facilitate the evaluation of investor interest, allowing the Government of Malta to assess the current market preparedness for such projects and support the technical studies being undertaken to proceed with a potential issuance of a competitive call for offers. A total of 13 proposals have been received for the potential development of floating solar farms, with submissions from both local and international operators.

Offshore Floating Wind Technology

A public procurement procedure is expected to be launched to award a concession contract for the supply of renewable energy through the design, build, maintenance, operation and decommissioning of an offshore Floating Wind Farm located in an area beyond the 12NM.

This offshore Floating Wind Project will complement the success of onshore photovoltaic rooftop and solar farms, contributing further to the 'green' energy transition in line with the EU legislative packages of the European Green Deal, Fit-for-55 initiatives and the REPowerEU plans.

Other Technologies

In calculating the projected investment needs for technologies, a number of assumptions were adopted regarding purchasing costs and average technical lifetime. These are presented in Table 21. The assumed technology costs are generally in line with the database provided by the EC, although, when information was available, a number of adjustments were made for specific technologies (such as heat pumps) to better capture costs on the Maltese market. These costs assumptions also consider a certain level of efficiency uptake, in line with the projected WEM and WPM scenarios described in the NECP.

Table 21 - Technology assumptions for technologies in the residential and commercial sectors

Sector	Energy Service	Technology	Investment Cost in € 2015/unit* in €2015/kW	Lifetime
Residential	Appliances	Clothes dryers	551*	12
		Dishwashers	489*	12
		Refrigerators and freezers	704*	12
		Washing machines	600*	12
	Lighting	Lighting	5*	
	Cooking	Cooker, oven and hobs (electric)	342*	20
		Cooker, oven and hobs (gas)	357*	20
	Space heating	Heat pump air	194	17
		Electric	150	20
		LPG	134	20
		Biomass	150	20
	Water heating	Solar	1,986*	15
		Heat pump water heater	1,698*	15
		Electric	220*	10
	Space cooling	Heat pump air	194	17
Services	Electric appliances	Office lighting	9	
	Space heating	Heat pumps (electric)	258	17
		SH boiler (diesel)	118	20
	Water heating	WH boiler (electric)	122	20
		WH boiler (diesel)	110	20
	Air conditioning	Electric heat pumps	258	17
	Cooking	Cooker (electric)	176	20
		Cooker (LPG)	183	20
Industry	Electric uses	Motors (small)	129	30
		Machinery	579	30
		Drying and cooling	487	30
		Heat processing	325	30

4.2 DIMENSION DECARBONISATION

4.2.1 GHG Emissions and Removals

i. Trends in current GHG emissions and removals in the EU ETS, Effort Sharing Regulation and LULUCF sectors and different energy sectors

When analysing the trends in current GHG emissions and removals under the EU ETS, the Effort Sharing Regulation, the LULUCF sector and different energy sectors, it is crucial to make reference to Malta's National Inventory of Greenhouse Gas Emissions and Removals 2024, as prepared by the Malta Resources Authority on behalf of the Ministry for the Environment, Energy and Regeneration of the Grand Harbour, and submitted under the United Nations framework Convention on Climate Change (UNFCC) [193]. This section presents a summary of Malta's GHG emissions trends over the past three decades, highlighting key developments and sectoral contributions that have shaped the nation's environmental impact and its ongoing efforts to mitigate climate change.

Table 22 - Historical GHG emissions by sector (Gg CO2 eq.). Source: GHG Inventory Report 2024.

Year	Energy	Industrial Processes and Product Use (IPPU)	Agriculture	LULUCF	Waste Management/ Waste	Total with LULUCF	Total without LULUCF
1990	2,434.94	7.50	108.51	-9.91	75.22	**2,616.26**	**2,626.17**
1995	2,460.35	9.07	107.38	-9.30	113.97	**2,681.49**	**2,690.78**
2000	2,477.85	12.64	105.01	-8.91	153.99	**2,740.59**	**2,749.49**
2005	2,659.91	41.62	91.17	-0.03	196.73	**2,989.40**	**2,989.43**
2010	2,628.25	129.03	84.77	13.99	123.28	**2,979.31**	**2,965.32**
2015	1,698.35	215.14	84.43	1.19	150.61	**2,149.73**	**2,148.53**
2020	1,603.37	213.58	86.30	8.54	182.57	**2,094.38**	**2,085.83**
2022	1,777.35	213.13	86.09	0.77	186.09	**2,263.44**	**2,262.67**

Table 22 illustrates historical GHG emissions trends for Malta from 1990 to 2022. From 1990 to 2010, Malta experienced an overall rise in GHG emissions, primarily driven by the Energy sector, which includes electricity generation, transportation, and the use of fossil fuels across various economic sectors. A notable reduction in emissions occurred in 2015, with a 39% decrease from 2005 levels. This significant decline was largely due to the commissioning of Malta's first electricity interconnector (2015) and the construction of the 200MW CCGT plant and LNG facilities in Delimara (2016), which contributed to a steady reduction in overall emissions. In 2020, Malta achieved its lowest recorded

[193] Malta Resources Authority (2024), Malta's National Inventory of Greenhouse Gas Emissions & Removals. Available at: https://cdr.eionet.europa.eu/mt/eu/govreg/inventory/envzfbmyw/

GHG emissions; however, the period following 2020 continues to show a strong link between total emissions and those from the power generation sector. Furthermore, there has been an upward trend in emissions from other sectors as well. This includes the rise in emissions associated with the use of fluorinated gases (F-gases) within the Industrial Processes and Product Use (IPPU) sector, as well as emissions from waste management. Concurrently, emissions from road transport, which also form part of the Energy sector, have continued to grow.

The relationship between national total emissions and GDP can be observed in the Table 23 which shows the emissions intensity of Malta's economy. There is a consistent decrease over the years.

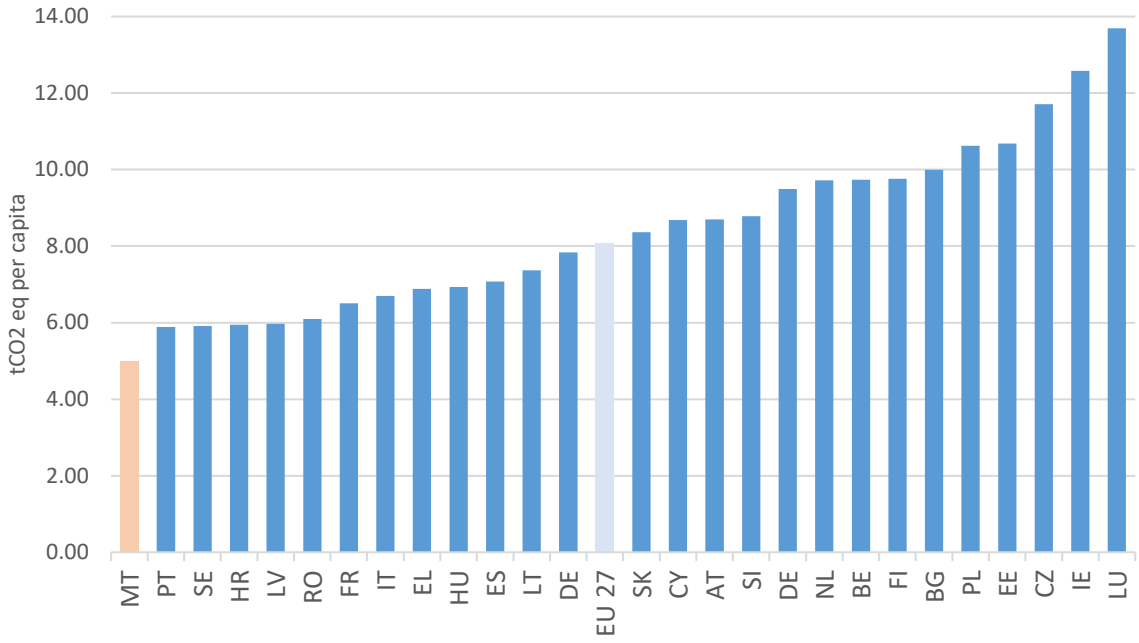
Table 23 - Trends in emissions (tCO2 eq.) compared to GDP. Source: GHG Inventory Report 2024.

	Emissions/GDP (with LULUCF)	Emissions/GDP (without LULUCF)
1990	951.56	955.17
1995	876.40	879.44
2000	704.71	705.99
2005	579.43	579.43
2010	437.12	435.07
2015	215.04	214.92
2020	160.37	159.71
2022	134.17	134.12

With regards to emissions per capita, Malta registered a drop in total emissions per inhabitant over the 2012-2022 horizon, falling from 7.44 tonnes of CO_2 equivalent per person in 2012 and decreasing to 4.18 tonnes of CO_2 equivalent per person in 2022, translating into a reduction of 44% from 2012 levels. This contrasts well to the average of the EU27 block, which measures at 8.62 tonnes of CO_2 equivalent per person[194]. Malta managed to secure a stronger decrease in emissions per capita over the mentioned period when compared to the EU's emissions per capita, which dropped only by –13% over the same period. Currently, Malta has amongst the lowest rate of emissions per capita, when taking into account national emissions amongst the EU27 Member States, as is demonstrated in Figure 50.

[194] Raw data extracted from European Commission, EDGAR - Emissions Database for Global Atmospheric Research database, own calculation.

Figure 50 – Emissions per capita by Member State, 2022. Source: European Commission, EDGAR - Emissions Database for Global Atmospheric Research[195].



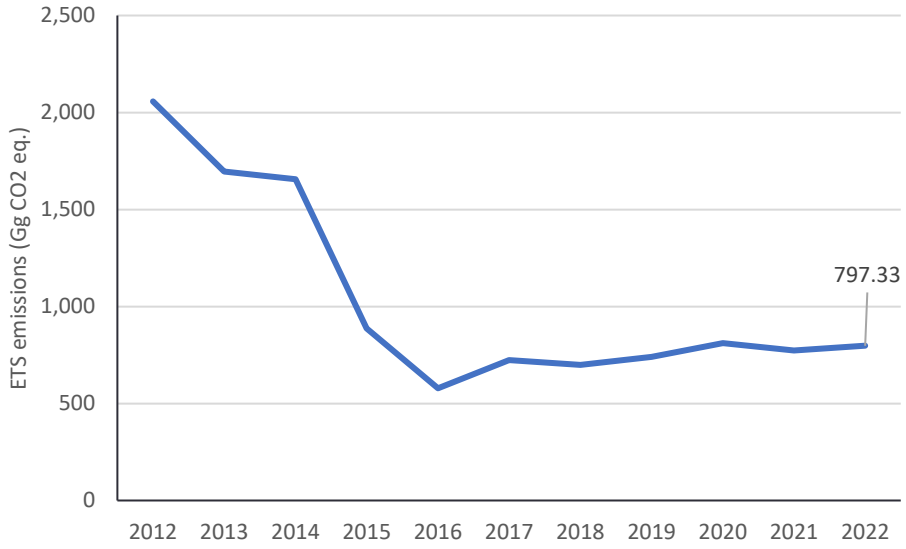
GHG emissions trends in Emission Trading System (ETS) and Effort Sharing Regulation (ESR)

Emission Trading System (ETS)

As explained in section 2 and 3 respectively, for the case of Malta, only the conventional power generation plants of electricity fall within the scope of the EU-ETS. The ETS in Malta in 2022 covered the three plants used for electricity generation, with one other installation currently exempted as per Article 27a of the ETS Directive. These three plants reported 797.33 kt CO_2 verified emissions of carbon dioxide from fuel combustion activities in 2022 (Figure *51*). Notably, there has been a decline in CO_2 emissions over the last few years, particularly due to the upgrades in the electricity generation sector, and the significant investment in renewable energy.

[195] National emissions exclude emissions from international bunkers, which, by international convention, are reported as memo items and not included in national totals.

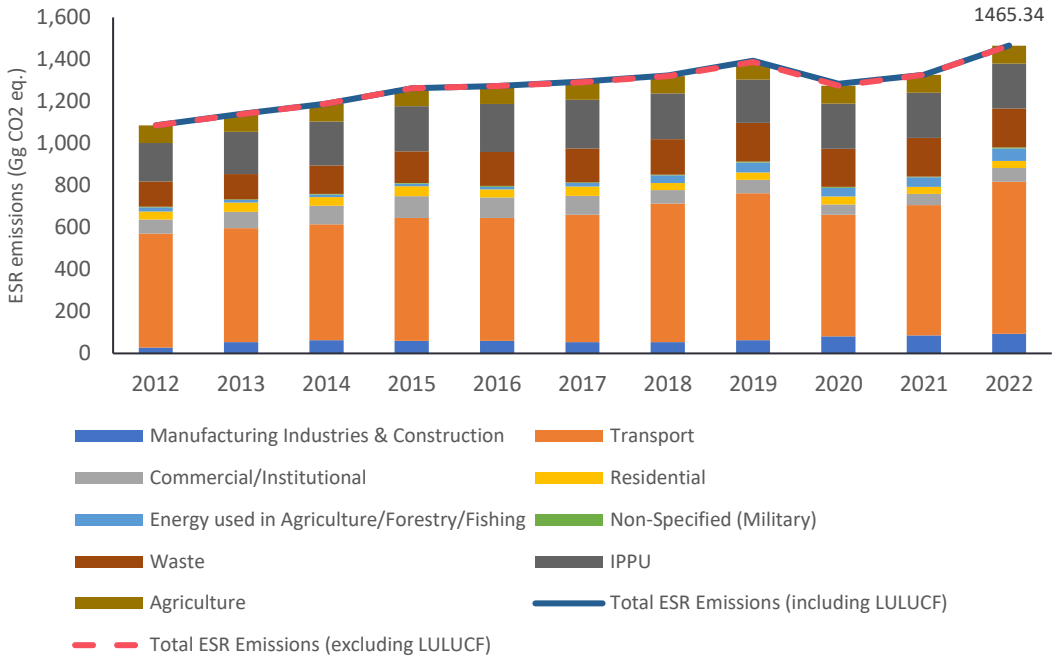
Figure 51 – ETS Emissions Trend. Source: GHG Inventory Report 2024; disaggregated based on activities falling under the ETS.



Effort Sharing Regulation (ESR)

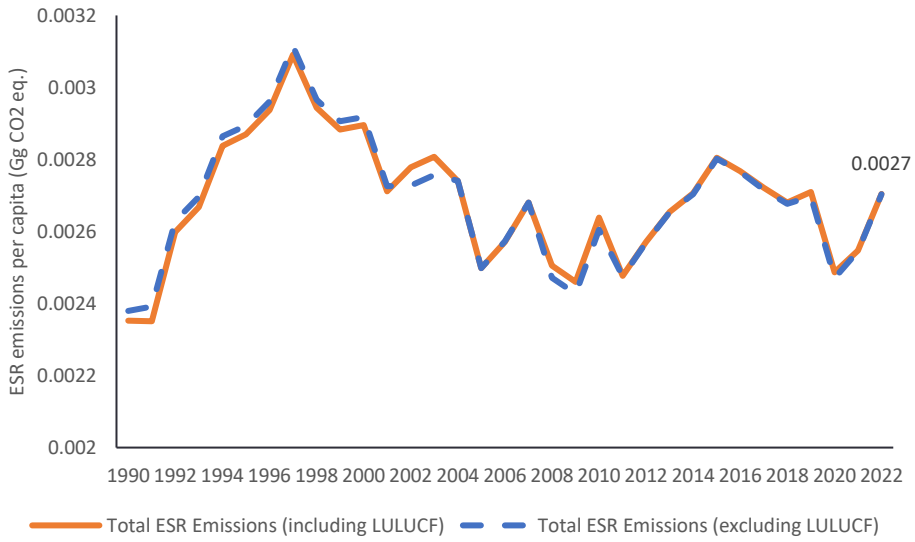
The Effort Sharing Regulation applies national emission targets across sectors which do not fall within the existing ETS. These sectors include transport, IPPU, waste, manufacturing industries and construction, the commercial, institutional and residential sectors, and agriculture. The emissions profile of ESR sectors is provided in section 2.1.1. The overall emissions have been increasing throughout the period under review, as shown in Figure 52. Key contributing activities include road transport, and commercial and institutional use. As can be expected, decreases were evidenced during the COVID period (2020 and 2021) owing to the impact that the pandemic had on the transport sector and the overall economy.

Figure 52 – ESR emissions trend. Source: GHG Inventory Report 2024; disaggregated based on activities falling under the ESR.



Over the time period from 1990 to 2022, there have been minimal fluctuations in per capita ESR emissions. The changes observed have been relatively minor, with the per capita ESR emissions in 2022 (including LULUCF emissions) registering at a mere 0.0027 gigagrams of CO2 equivalent. Notably, there was a decrease in emissions in 2020, which can be primarily attributed to the global impact of the COVID-19 pandemic. This may be seen in further detail in Figure 53.

Figure 53 - Per capita ESR emissions trend. Source: GHG Inventory Report 2024; disaggregated based on activities falling under the ESR.



Emission trends by gas

Carbon dioxide (CO2) emissions contribute the biggest share of total national emissions (ETS and non-ETS) with the trend mirroring that of total national emissions changes. Between 1990 and 2003 CO_2 accounted for more than 90% of total national GHG emissions, whereas between 2015 and 2022, CO_2 accounted for less than 80% of total emissions (Figure 54).

In 2022, CO_2 emissions (with LULUCF) amounted to 1,774.18, which were 26.6% lower when compared to 1990 levels. In 2022, CH4 emissions (227.37) were 62.7% higher than 1990 levels, while N2O emissions (56.66) were 4.5% lower. No emissions were recorded/estimated in 1990 for PFCs. Whilst PFC emissions in 2022 are negligible, HFC emissions stood at 204.97 in 2022, making it the third largest emitter in Malta (Table 24).

Figure 54 - Greenhouse gas emission trends by gas, 1990-2022. Source: CAA.

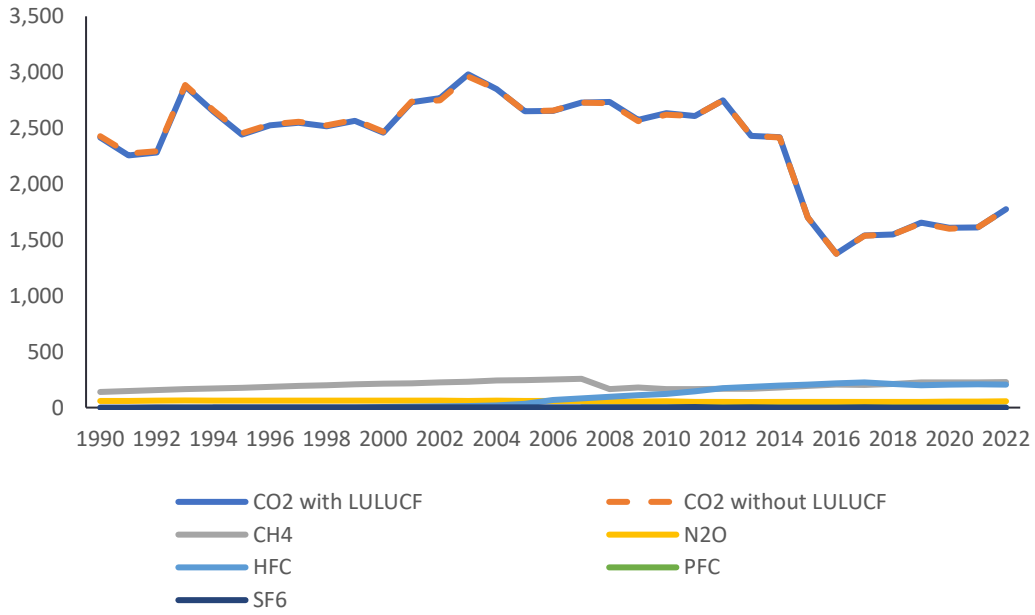
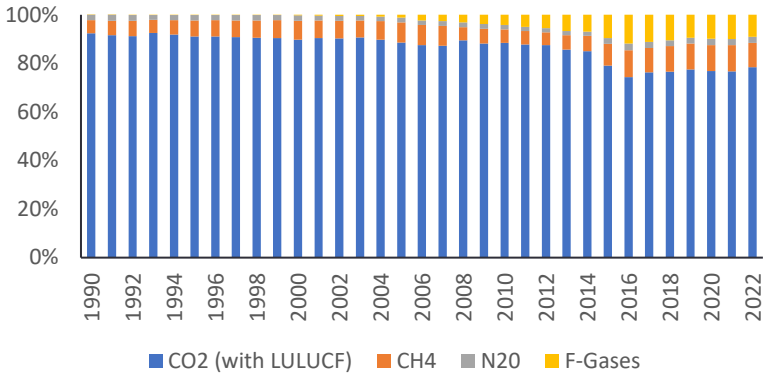


Table 24 - Greenhouse gas emission trends by gas. Source: CAA.

	CO2 W/O LULUCF	CO2 (with LULUCF)	CH4	N2O	HFC	PFC	SF6	Total W/O LULUCF	Total With LULUCF
1990	2,427.40	2,417.14	139.76	59.35			0.01	**2,626.52**	**2,616.26**
2005	2,649.76	2,649.49	245.51	58.64	34.15		1.61	**2,989.67**	**2,989.40**
2010	2,619.14	2,633.00	166.09	56.18	122.21	0.00	1.84	**2,965.45**	**2,979.31**
2011	2,608.05	2,608.59	163.97	50.50	143.98	0.00	4.83	**2,971.33**	**2,971.87**
2012	2,748.88	2,749.45	168.80	50.32	174.17	0.00	0.56	**3,142.73**	**3,143.30**
2013	2,429.45	2,429.93	166.84	49.88	185.60	0.00	2.85	**2,834.62**	**2,835.10**
2014	2,417.10	2,418.11	180.30	50.95	196.50	0.00	0.70	**2,845.54**	**2,846.54**
2015	1,699.36	1,700.42	193.48	50.89	204.64	0.00	0.29	**2,148.66**	**2,149.73**
2016	1,375.60	1,376.39	205.69	51.78	218.18	0.00	0.14	**1,851.40**	**1,852.18**
2017	1,536.87	1,539.38	202.48	51.03	225.18	0.00	1.02	**2,016.57**	**2,019.08**
2018	1,547.40	1,548.88	210.82	50.00	211.42	0.00	0.31	**2,019.95**	**2,021.43**
2019	1,648.78	1,654.53	226.31	51.93	200.95	0.00	0.34	**2,128.31**	**2,134.06**
2020	1,600.39	1,608.35	225.33	53.72	206.56	0.00	0.41	**2,086.42**	**2,094.38**
2021	1,610.85	1,610.89	226.43	52.79	209.08	0.01	0.14	**2,099.31**	**2,099.35**
2022	1,773.99	1,774.18	227.37	56.66	204.97	0.01	0.25	**2,263.25**	**2,263.44**

Figure 55 - Percentage share by gas of total GHG emissions. Source:CAA.



The trend in relative share of each gas in total GHG emissions is worth noting (Figure 55). The share of CO_2 is decreasing, a trend that becomes especially evident in the second half of the time-series. This is due to two main factors: the trend in CO_2 absolute emissions, especially the decrease maintained over recent years, and a growth in emissions of HFCs. The latter will be explored in further detail later in this section.

Carbon dioxide emissions and removals

As shown in Figure 56, the absolute majority of CO_2 emissions reported by Malta are generated by the energy sector, making up 78.5% of total national CO_2 emissions, with relatively smaller amounts attributed to IPPU (9.4%), LULUCF (reporting net emissions, 0.03%) and waste (8.2%). Within the energy sector, the category Energy Industries, primarily the power generation sector, had a share of 35.2% of total national CO_2 emissions while transport had a share of 31.97% in 2022 (Figure 57).

Figure 56 - CO2 emission trends by sector. Source: CAA.

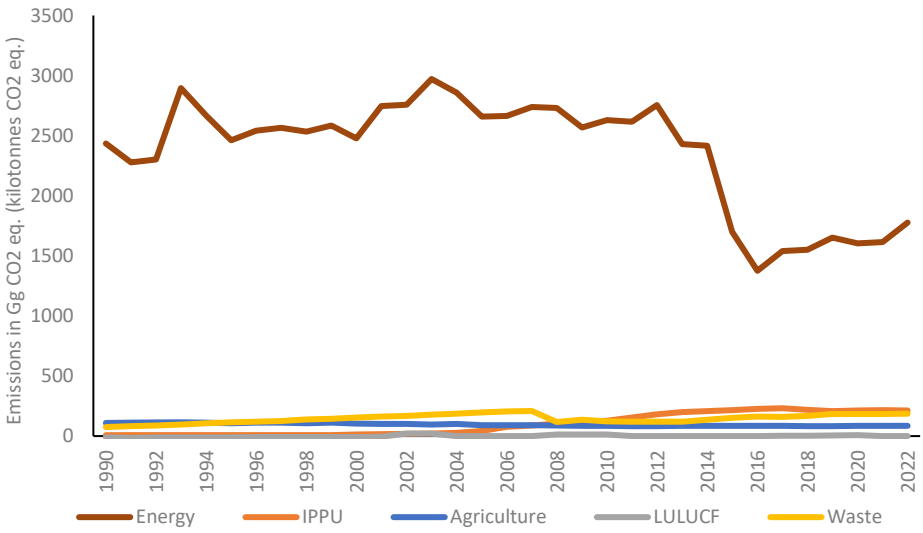
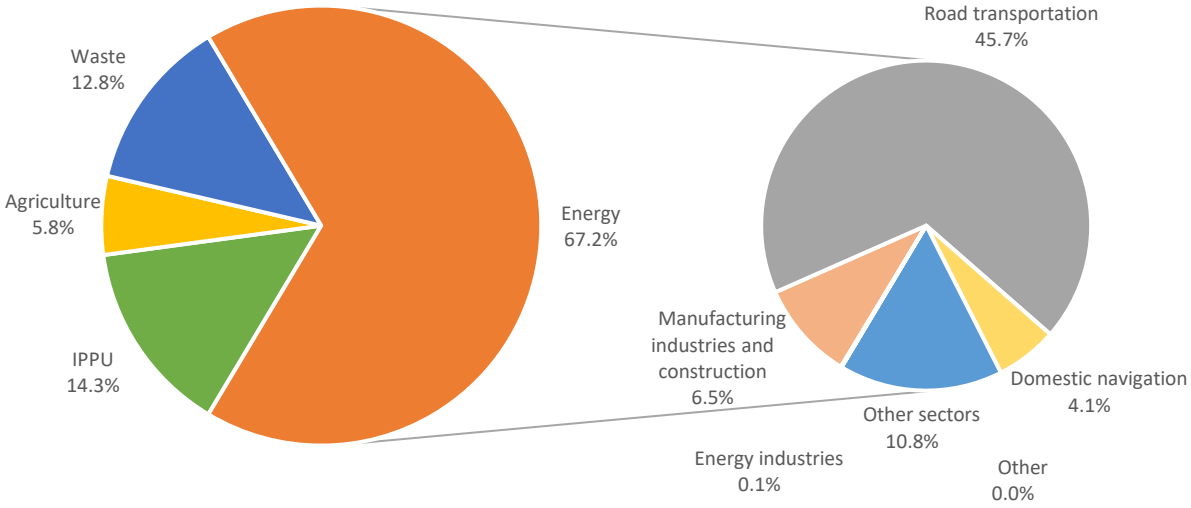


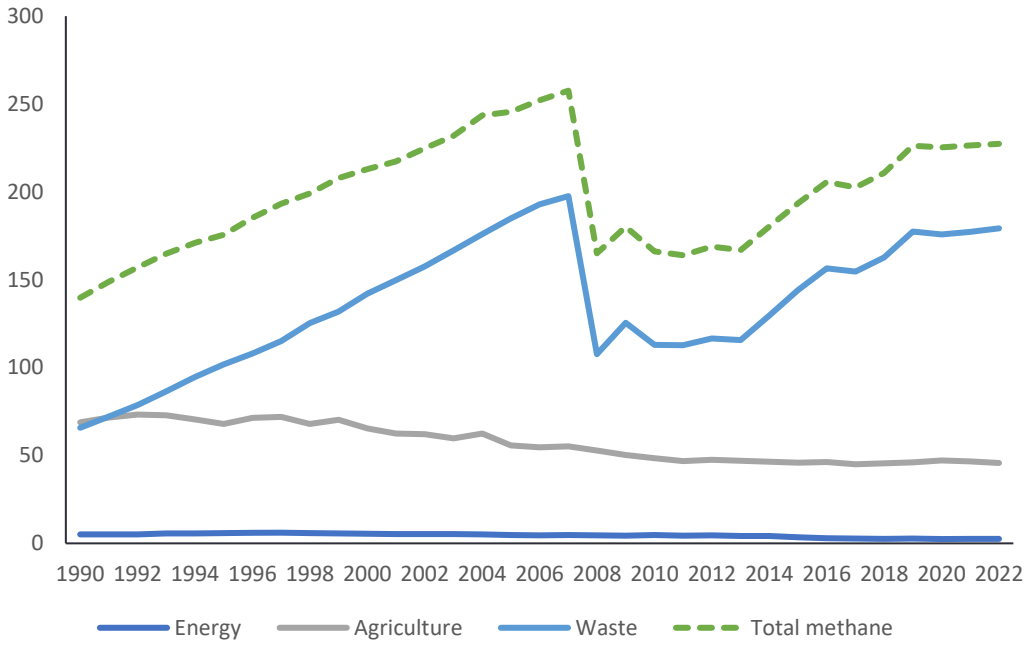
Figure 57 - Share of category as a percentage of total CO2 emissions in 2022. Source: CAA



Methane emissions

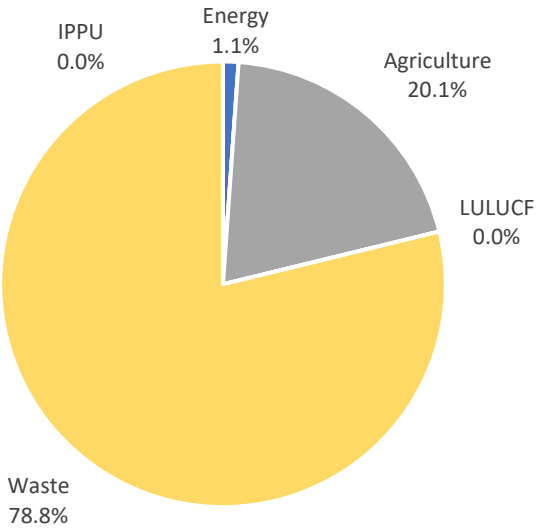
The waste and agriculture sectors are the two main contributors to total national CH4 emissions (Figure 58), with the share from the waste sector increasing over time. In 2022, the waste sector accounted for 78.8% of total methane emissions, with agriculture accounting for a 20.1% contribution. The new EU Methane Regulation mandates that industries involved in fossil gas, oil, and coal within Europe are required to accurately track, observe, document, and confirm their methane emissions, adhering to the most rigorous monitoring protocols. Additionally, these sectors must take action to reduce these emissions. In the Maltese context, the Energy sector has a minimal impact on methane emissions with only 1.1% of methane emissions resulting from the energy sector. LULUCF and IPPU sectors do not contribute to CH4 emissions.

Figure 58 - CH4 emission trend by sector. Source: CAA.



As may be seen in Figure 59, methane emissions in the waste sector are mainly the result of activities concerning solid waste disposal in waste dumps/landfills. In the agriculture sector, the main source of methane emissions is enteric fermentation in cattle. No methane emissions are reported for the IPPU and LULUCF sectors.

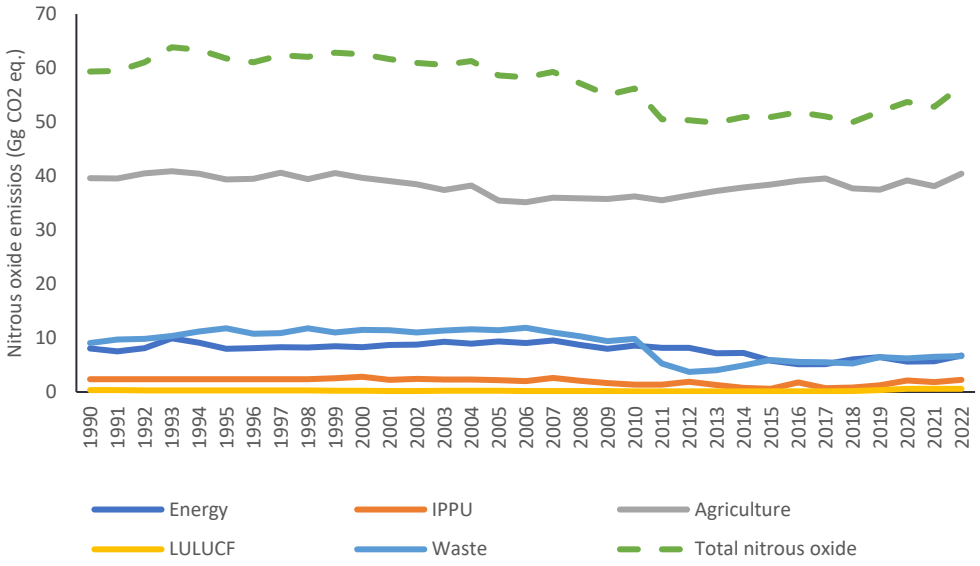
Figure 59 - Share of total national CH4 emissions in 2022. Source: CAA



Nitrous oxide emissions

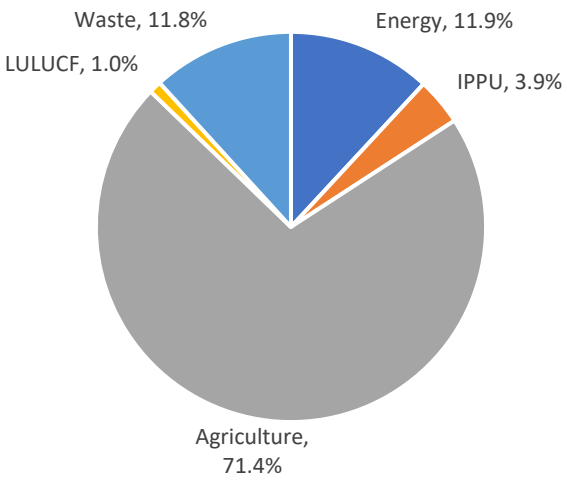
The main source of nitrous oxide emissions in Malta is the agricultural sector. Smaller, but still relatively important contributing sectors are waste and energy, with an even lower share for IPPU and LULUCF sectors (Figure 60).

Figure 60 - N2O Emission trends by gas, total and by sector. Source: CAA.



In 2022, the agriculture sector accounted for 71.40% of the national total nitrous oxide emissions, a slight increase from its 66.7% share in 1990 (Figure 61). Previously, the relative share of the energy sector had been increasing over time, while that of the waste sector had been decreasing. However, recent data indicates that this trend has been reversed, with nitrous oxide emissions facing a steady growth from 2012 to 2022 in the Waste sector, and the Energy Sector facing a decline in Nitrous Ox between 2013 to 2021.

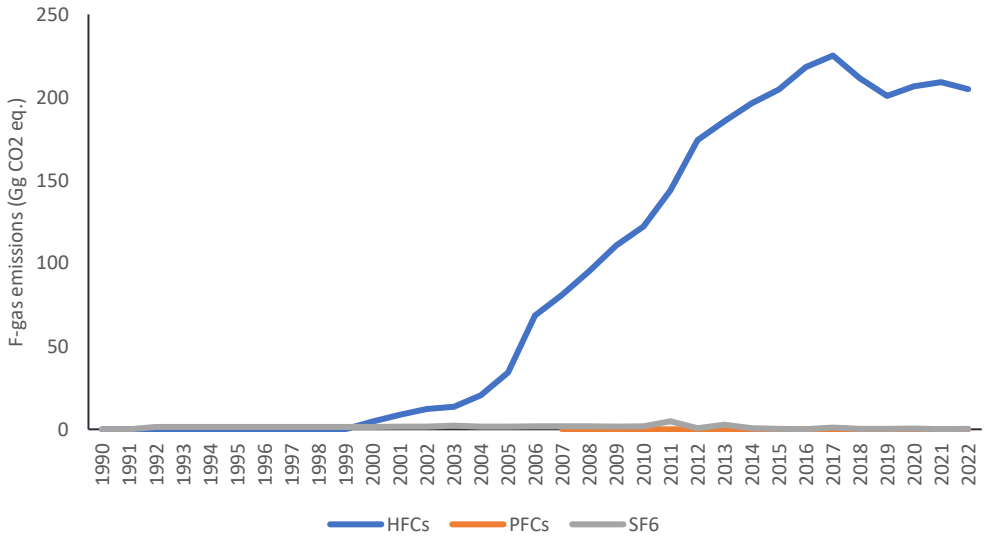
Figure 61 - N2O Emissions by sector. Source: CAA



Emissions of fluorinated gases (F-gases)

Fluorinated greenhouse gases in Malta, which are reported under the IPPU sector, cover hydrofluorocarbons (HFCs), perfluorocarbons and sulphur hexafluoride. No emissions of nitrogen trifluoride are reported in Malta. HFCs are the most important class of fluorinated gases reported by Malta, in terms of their contribution to Malta's F-gases. The rapid increase in emissions of HFCs, especially since the early 2000's is clearly evident from Figure 62 and coincides with the growing demand for building cooling solutions. The refrigerants R407C, R410A, R427A, R428A, and HFC-32, all HFC-based, have been predominantly used in stationary air conditioning systems, replacing the older ozone-depleting refrigerant R22, which is not included in GHG emissions reporting. The shift to HFC refrigerants occurred post-EU accession in 2005, marking the beginning of HFC emissions from stationary air conditioning in Malta. In 2022, emissions from HFCs accounted for 96.2% of the total emissions in the IPPU sector.

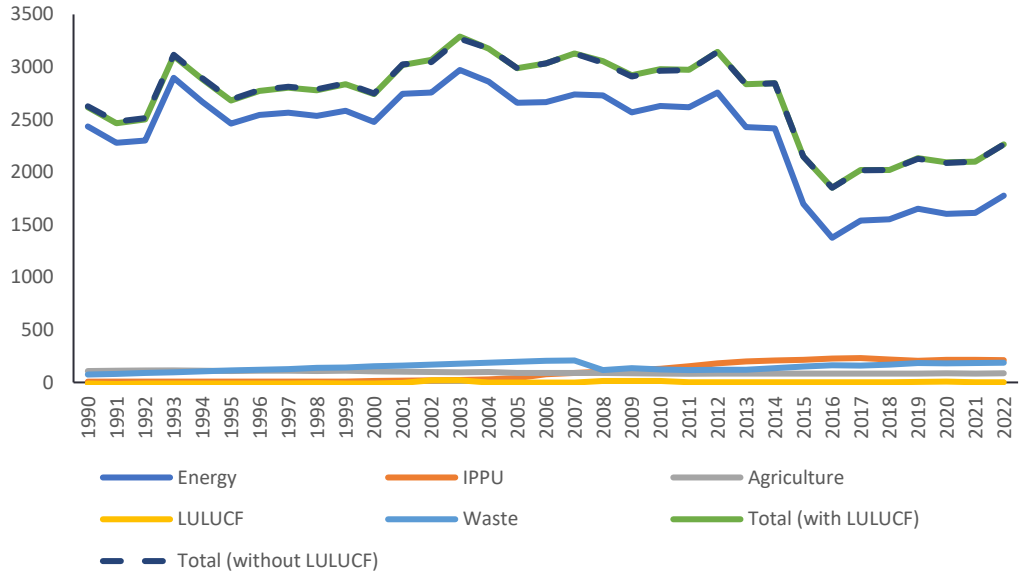
Figure 62 - F-Gases emission trends by gas: HFCs, PFCs, SF, totals by gas. Source: CAA



Emissions trends by sector

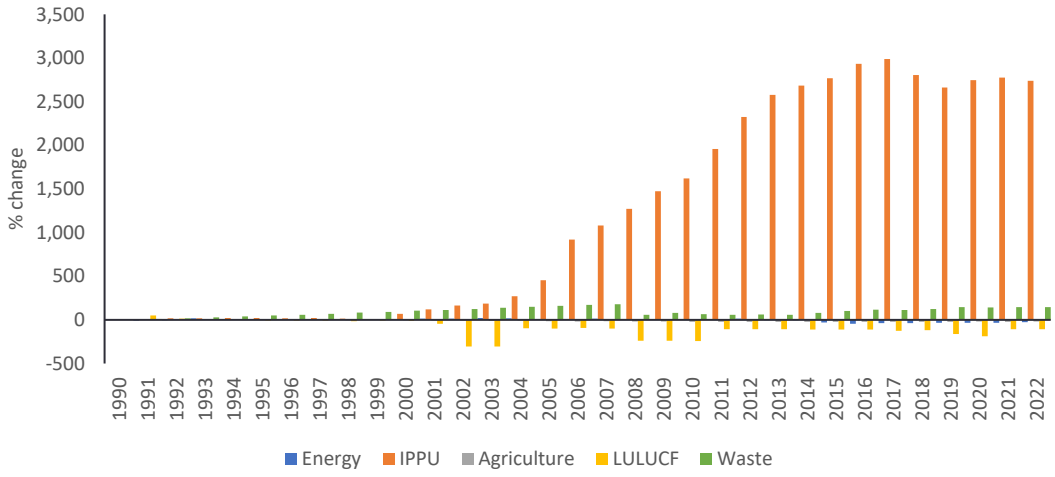
The contribution by each sector to Malta's emissions between 1990 and 2022 are presented in Figure 63.

Figure 63 - Share by sector of total GHG emissions. Source: CAA.



As already mentioned, the energy sector accounts for the majority of GHG emissions for Malta. In 2016, Malta registered a decrease in carbon emissions mainly due to changes in the energy sector owing to the electricity interconnection and the shift from heavy fuel oil to natural gas in power generation. However, since then, Malta has been facing a steady increase in emissions. Furthermore, emissions from the IPPU sector, strongly represented by emissions of HFCs, are showing a substantial rate of increase, particularly since 2000. This is evident from Figure 64.

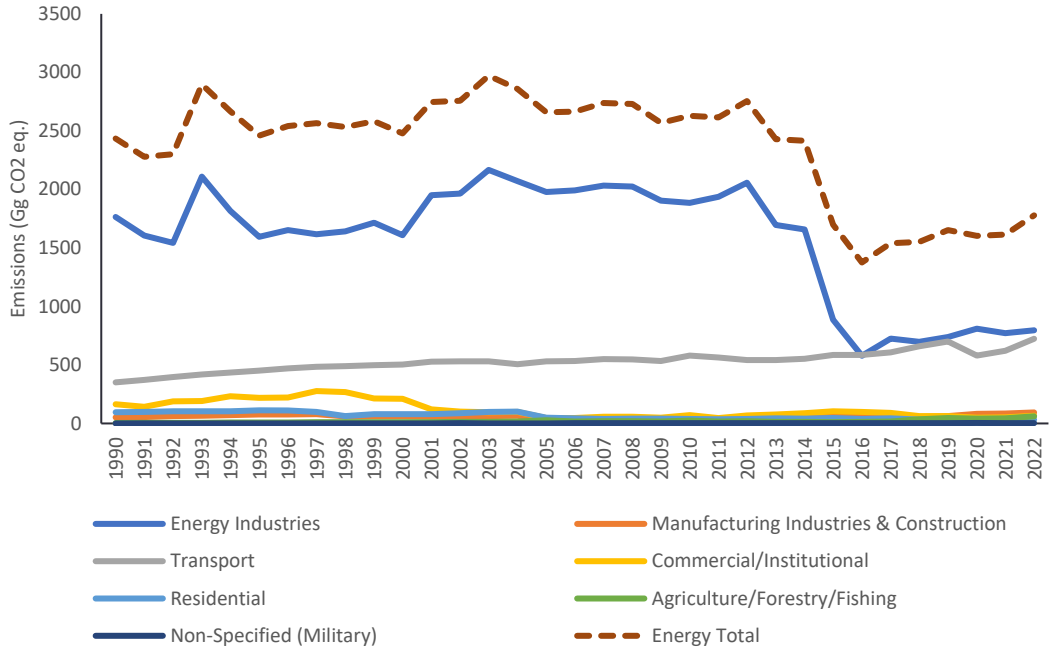
Figure 64 - % change in Sectoral emissions since 1990. Source: CAA.



Energy sector emissions

The trend profile for the Energy sector can be split into two main trends, namely a general increase in emissions up to 2012, followed by a rapid decrease over the space of the next few years until 2016, with emissions rising again in 2017 (Figure 65). In 2022, the energy sector contributed to circa. 78.5% of Malta's total GHG emissions. Energy sector emissions have decreased by 27% since 1990, and by 33.2% since 2005.

Figure 65 - Emission trends in the energy sector. Source: CAA.



The sharp change in the trend for emissions from category Energy Industries (1A1) clearly shows the potentially high impact of focused policies and measures targeted towards an activity which is defined by a relatively small number of clearly identifiable point sources, especially in the context of a small country such as Malta. Up to 2012, the growth in emissions reflects growing demand for energy, most notably in electricity generation and transport. The significant efficiency gains achieved in the energy generation sector post-2012 have had a greater impact on the overall sector emissions in recent years: these gains have been achieved through investment in new, more efficient local generation capacity, the sourcing of electricity through an interconnector with mainland Europe, and the shift from the use of heavy fuel oil to natural gas as well as the increasing role and deployment of renewable energy sources, in particular solar PV. The increase in emissions observed in 2017 compared to 2016 is mainly due to a renewed shift towards indigenous electricity generation, as opposed to sourcing electricity through the interconnector, though the impact is markedly subdued because of the shift to natural gas as the main generation fuel.

The trend of road transport emissions has increased. The stock of licenced vehicles in Malta stood at 424,904 by the end of 2022. According to the NSO, a total of 4,992 newly licensed vehicles were added

to Maltese roads in 2022, with 60% of these vehicles being passenger cars and another 33% being motorcycles and e-bikes[196].

The strong influence of the energy sector on national GHG emissions can be shown further when one compares the relative year-to-year change (Figure 66) in energy emissions and the change from 1990 emissions (Figure 67) when compared to the same assessment for total national GHG emissions.

Figure 66 - Annual percentage change in Energy sector emissions year-on-year. Source: CAA.

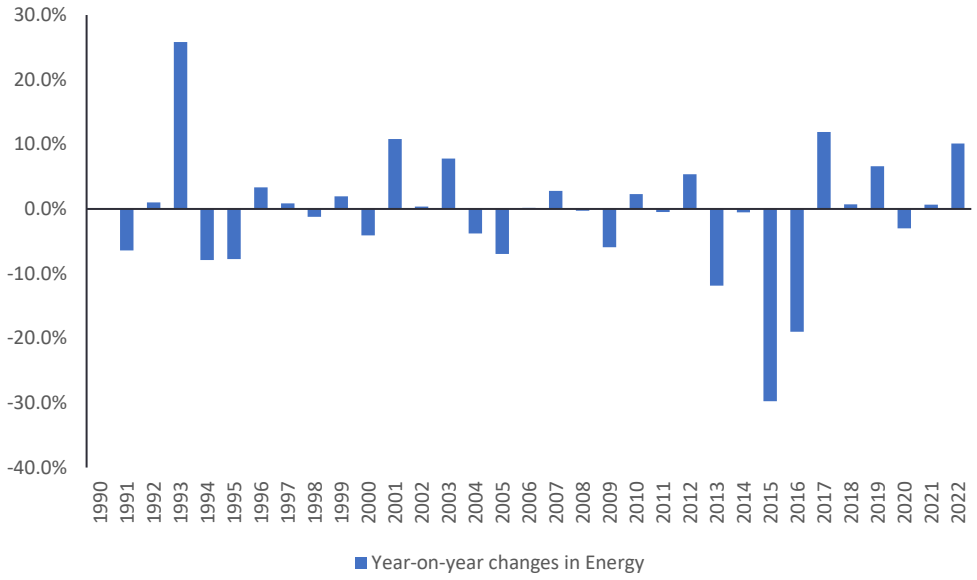
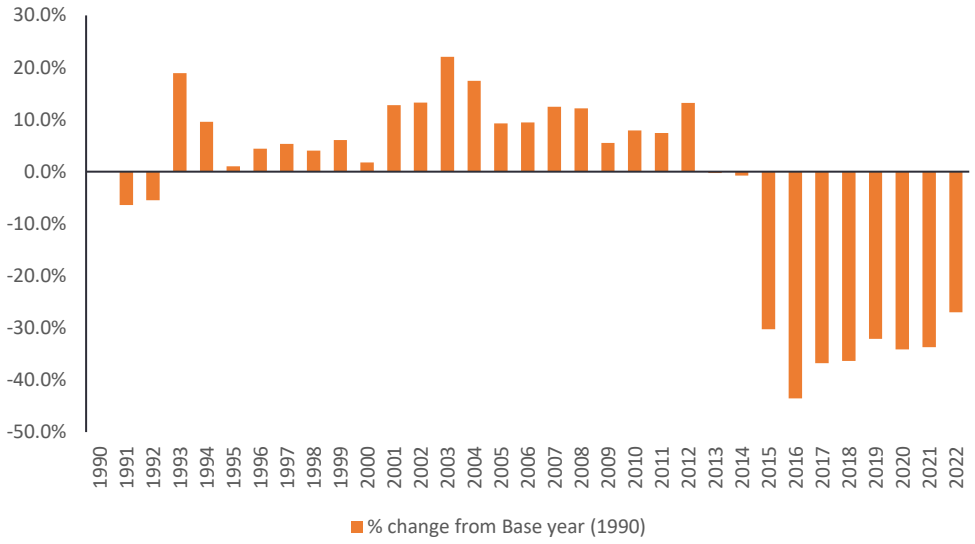


Figure 67 - Annual percentage change in energy sector emissions compared to base year (1990). Source: CAA.

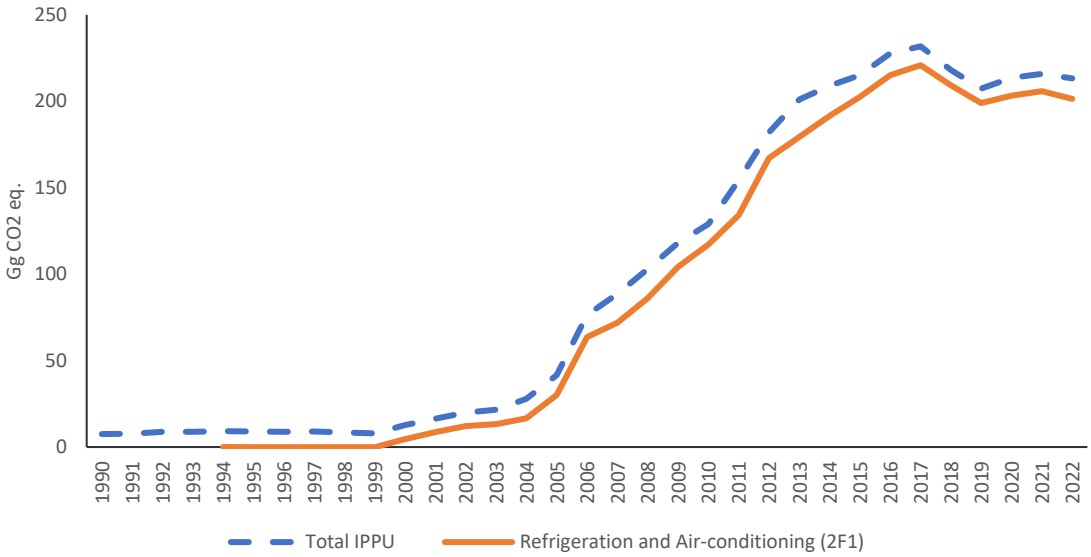
[196] NSO (2023), Motor Vehicles: Q4/2022. Available at: https://nso.gov.mt/motor-vehicles-q4-2022/



IPPU sector emissions

The emissions trend profile for the IPPU sector (Figure 68) are clearly dominated by the emissions trend of HFCs, particularly from the category 'Refrigeration and Air-conditioning'. This category accounted for 94.5% of all direct GHG emissions in the IPPU sector in 2022. Emissions from other industrial processes are minimal or even non-existent, considering the nature of the industrial sector in Malta, where industrial activities found in other countries either do not exist or only take place at very small scales. The contribution of the IPPU sector to the total national GHG emissions in Malta amounted to 9.4% in 2022. IPPU sector emissions have increased by 2740% since 1990, and by 412% since 2005.

Figure 68 - Emissions trends for sector IPPU. Source: CAA.

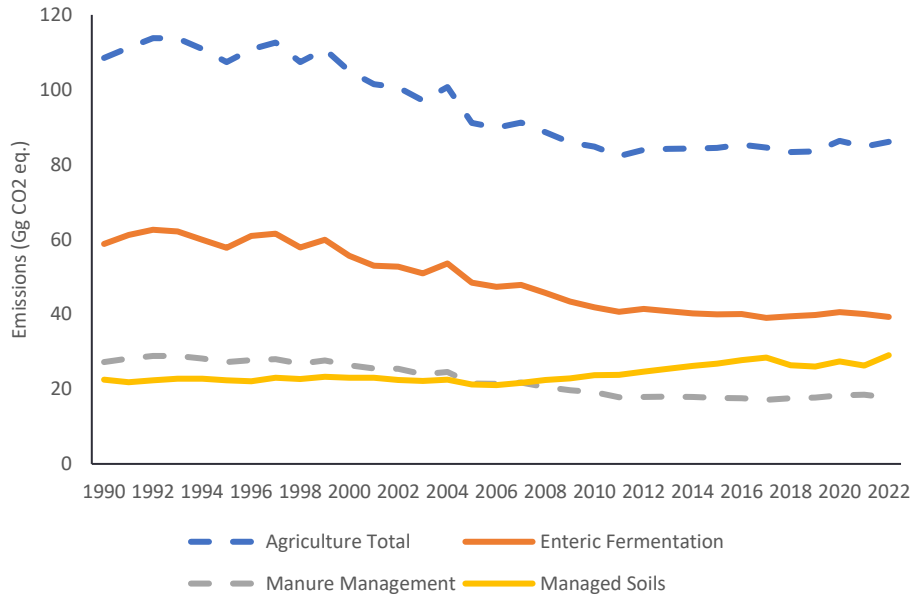


Agriculture sector emissions

In general, the agriculture sector is not a major contributor towards total national emissions. When compared to 1990, in 2022 the agricultural sector saw a decrease in emissions of around 20%. Enteric Fermentation accounted for around half of the agriculture emissions (45.7%), while manure management accounted for 20.6% and agricultural soils accounted for 33.7% of total emissions (Figure 69). There are only two gases which are reported in the agricultural sector -nitrous oxide and methane. Methane emissions originate from enteric fermentation and manure management, while nitrous oxide emissions are emitted from manure management and agricultural soils.

Since 1990, livestock populations have decreased significantly, resulting in a reduction of methane emissions from enteric fermentation and manure management. Furthermore, the total agricultural area, Utilised Agricultural Area (UAA) and fodder crop land, has also decreased, leading to the fall in nitrogen application rates and the nitrous oxide emissions. Related to this, agriculture sector emissions have decreased by 21% since 1990, and by 6% since 2005.

Figure 69 - Emissions trends for sector Agriculture. Source: CAA.

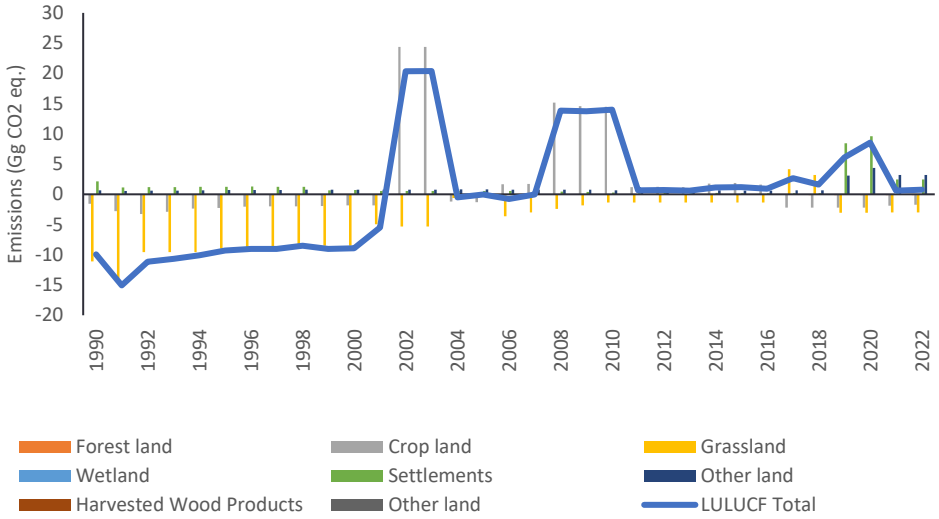


LULUCF sector emissions and removals

The LULUCF sector includes the categories of Forest Land, Cropland, Grassland, Wetlands, Settlements and Other Land, where CO_2 is the main GHG emission source and sink from the various categories. Non- CO2 emissions including N2O and CH4, also occur in this sector. The LULUCF sector in Malta represented a net removal of -9.91 kt CO2 eq. in 1990, decreasing to a net removal of -0.03 kt CO2 eq. by 2005, and then progressing to 0.77 kt CO2 eq. by 2022 (Figure 70). The sector accounted for less than 1% of Malta's total GHG emissions in 2022. The main source of emissions throughout the whole time-series was represented by the land transitioning to cropland, whilst land transitioning to grassland represents the main sink. As discussed in further detail in section 2.1.1, Malta has inherent circumstances that limit the potential for reductions of emissions through carbon sequestration. These

include the high population density, limited land availability, as well as the local climactic conditions, including limited rainfall.

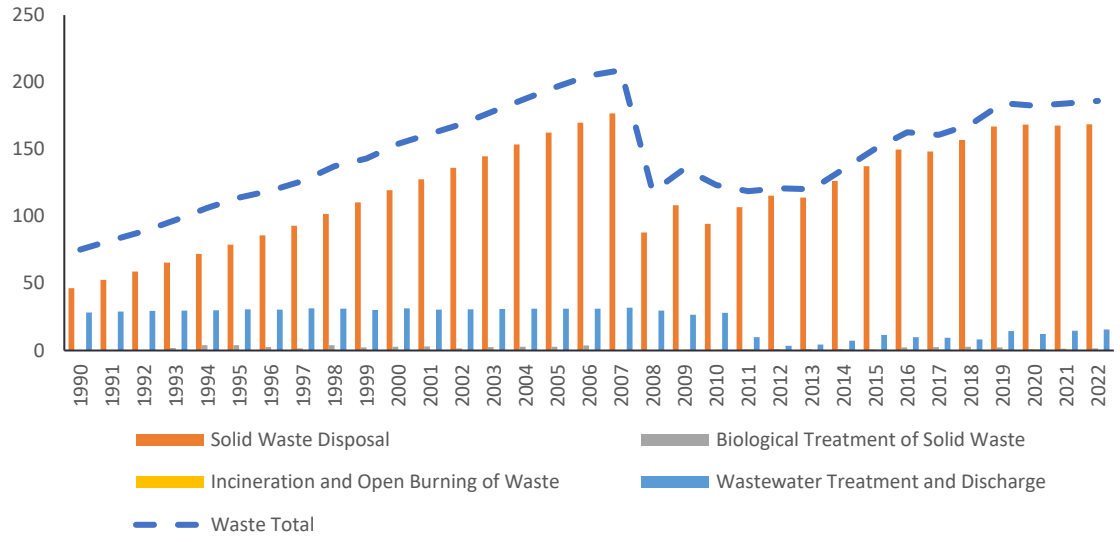
Figure 70 - Emission trends in LULUCF sector. Source: CAA.



Waste sector emissions

The trend of emissions from the waste sector is greatly influenced by the profile of emissions for the category 'Solid Waste Disposal', which, in 2022, contributed to 90.6% of all waste sector emissions (Figure 71). In 2022, the waste sector contributed to 8.22% of Malta's total GHG emissions. Emissions within Malta's waste sector showed a consistent upward trend until 2007, at which point a marked decrease occurred, primarily attributable to a reduction in emissions from solid waste disposal. This decline was largely a result of the operational start of the Material Recovery Facility at the Sant Antnin Waste Treatment Plant. Despite the initial reduction, emissions from the waste sector began to rise again after 2009, with solid waste disposal remaining the principal source of these emissions. Waste sector emissions have increased by 147% since 1990 and reduced by 5% since 2005.

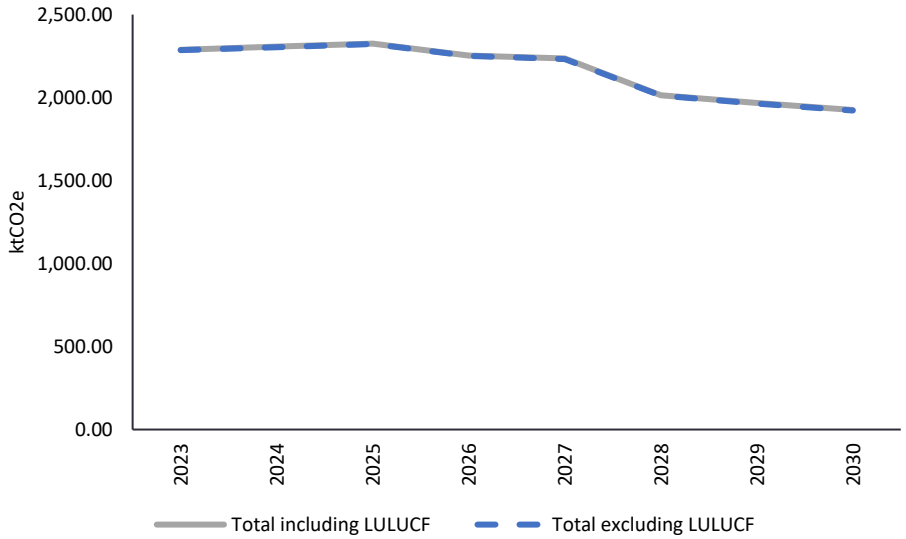
Figure 71 - Emission trends in waste sector. Source: CAA.



ii. Projections of sectorial developments with existing national and EU policies and measures at least until 2040

Figure 72 below shows the projected emission profile in the WEM scenario.

Figure 72 – Projected emissions in WEM scenario, with and without LULUCF (kt CO2 eq). Source: CAA.



Energy sector projections

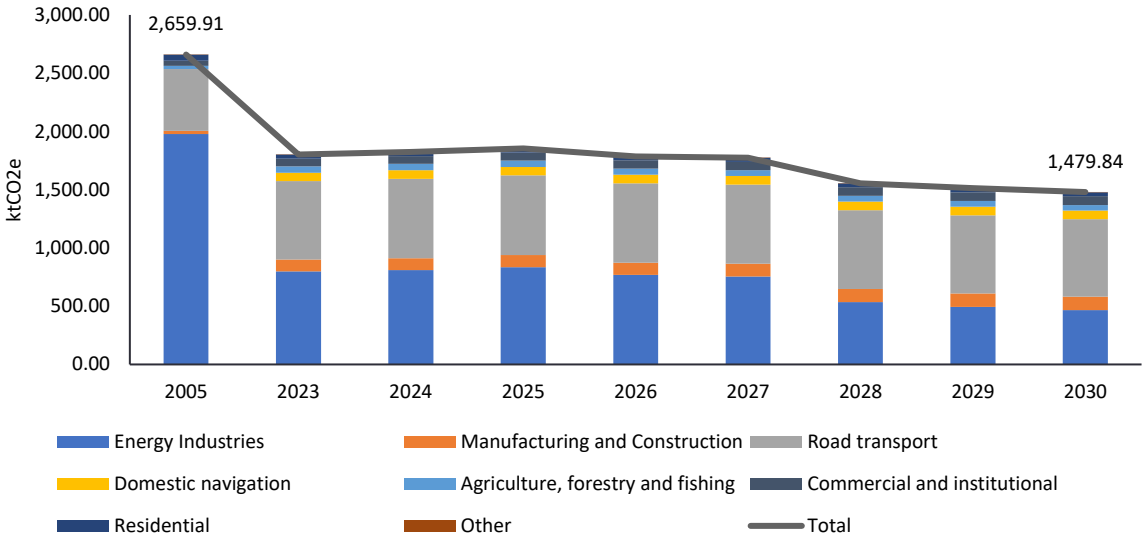
The projections in the WEM scenario indicate that Malta's GHG emissions are influenced by energy demand and usage in the power generation, transport (road and domestic navigation), industry, and buildings sectors. Therefore, emission reductions are largely dependent on the electricity supply sources (Figure 73).

A number of existing measures are expected to impact GHG emissions in the energy sector, including the following:

- For power generation, the key measures include the commissioning of the second interconnector, but also increased solar PV installations, increased battery storage, and energy efficiency initiatives within industry and services, amongst others. Emissions from Malta's CCGT plants will initially rise in order to accommodate increasing electricity demand but will be offset by the second interconnector and RES, leading to a significant decrease in emissions.
- GHG emissions from buildings are projected to have reduced energy use through new legislation on building fabric and high-efficiency technologies. Malta's industry, lacking carbon-intensive industries, will benefit from efficiency improvements in SMEs.

Projected emissions in the transport sector are expected to decline as a result of the electrification shift, supported by policy measures that encourage EV uptake and the expansion of the necessary charging infrastructure.

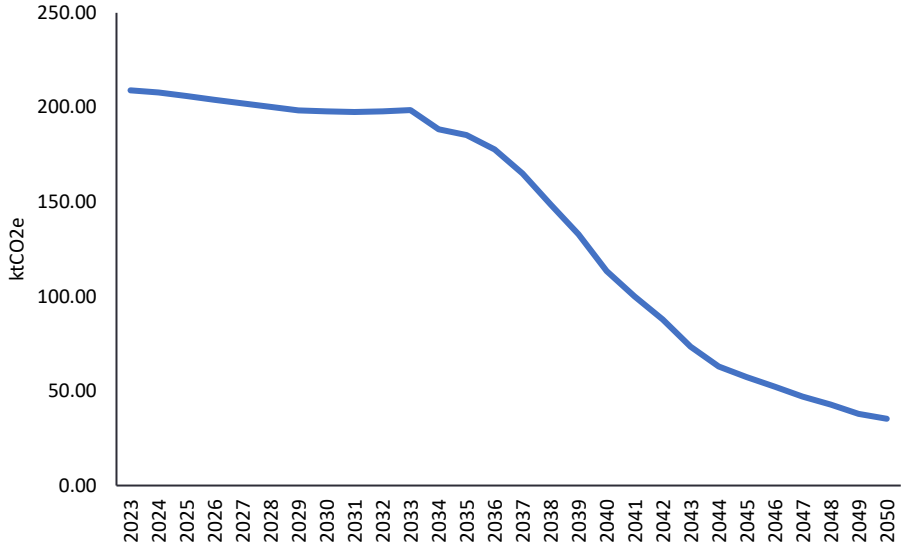
Figure 73 - Total emissions from the energy sector (WEM scenario). Source: CAA.



Industrial processes and product use (IPPU) projections

Under the WEM scenario for the IPPU projections, estimated emissions from the Refrigeration and Air Conditioning category 2F1 were calculated to predict emissions of F-gases, expressed in tons of CO2 equivalent, for Malta from 2022 to 2050, as shown in Figure 74. These estimates consider projection elasticity parameters, initial stock and import values, the amount of refrigerant charge per unit for different types of equipment, leakage rates from existing equipment, and emissions at the end of a unit's life.

Figure 74 - Stock emissions in IPPU, WEM Scenario. Source: CAA.



Total projected emissions estimated using the F-gases Forecast Model are expected to fall and stabilise by 2033. The stability of emissions prior to 2033 is due to the offsetting effects of economic growth, as

well as the stricter limits imposed on the Global Warming Potential (GWP) of gases. Also, stricter limits on GWP are projected to dominate emissions levels.

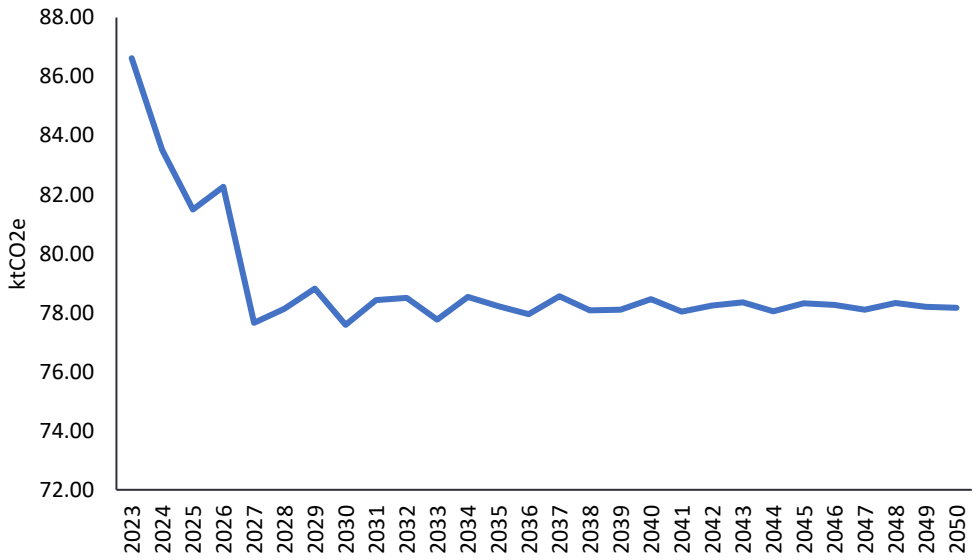
Agriculture projections

The WEM scenario for agriculture (Figure 75) is based on the 'Manure and Slurry Management' measure. Projections for the period up to 2030 show that all livestock waste will be transported to newly established Animal Waste Treatment Plants, where the liquid part of the waste (80%) will undergo treatment to be converted into reusable water. The solid part of the waste (20%) will be transformed into bio-fertilizer. As a result, animal waste will no longer be spread directly on fields. Instead, an amount equivalent to the 20% solid fraction of all animal waste will be used as organic nitrogen on the soil. Consequently, the contribution of animal nitrogen to soil will effectively be zero kilograms of nitrogen per year by 2030.

In this scenario, it is anticipated that the solid fraction equivalent (the 20%) will be allocated to the stream of Organic N applied to soils, rather than to the stream of Animal manure N applied to soils.

The liquid fraction, which accounts for the other 80% and would typically be considered part of the waste sector, will be processed into new water. Therefore, this fraction will no longer be associated with either the waste or the agriculture sector.

Figure 75 - Agriculture GHG Emissions, WEM scenario. Source: CAA.



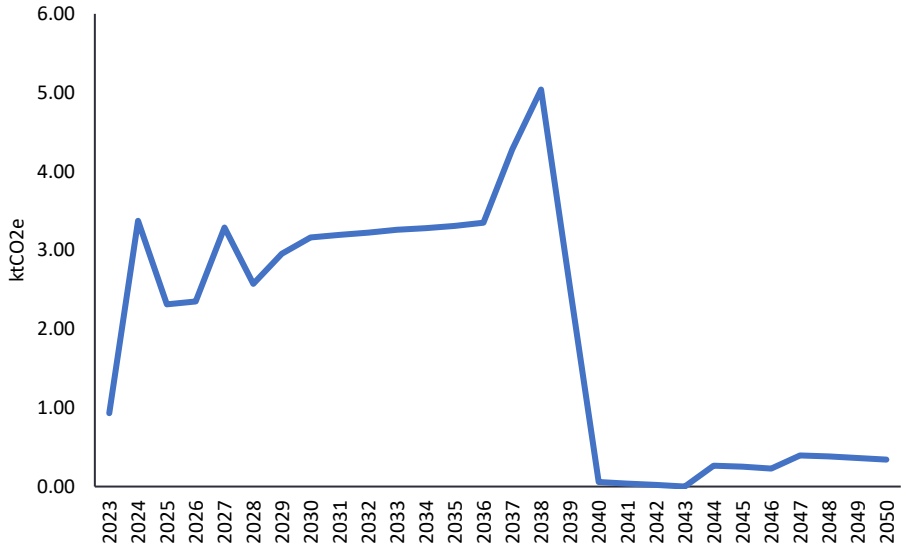
LULUCF projections

The LULUCF sector model is a tool used to estimate GHG emissions and removals associated with land use activities. The model operates on the principle that emissions and removals can be calculated by multiplying an activity rate by an emission factor. This approach assumes a linear relationship between the intensity of an activity and the emissions or removals it causes.

In comparison to the 2019 NECP, there have been updates to the land use areas transition matrix, which affects the projected future trends in the various LULUCF categories. These changes can influence the overall estimates of emissions and removals within the sector. One consistent measure from the previous NECP is the implementation of afforestation projects, however, due to the geographical constraints of the Maltese islands, the scale of these afforestation projects and the resulting scale of carbon removals are expected to be relatively small.

The methodology for projecting LULUCF emissions and removals has remained the same, utilising models developed by experts from the International Institute for Applied Systems Analysis (IIASA). These models are used to prepare the projections for both the Forest Land category and the broader LULUCF sector. The continued use of these models suggests that they are considered robust and reliable for the purposes of estimating emissions and removals within the LULUCF sector. The projected emissions from the LULUCF sector may be found in Figure 76.

Figure 76 - LULUCF Emissions (WEM). Source: CAA.



Waste projections

The Waste model serves as a tool to estimate GHG emissions within the waste sector up to the year 2050, under the WEM scenario. These estimates are based on data provided by a range of sources, which is then processed into emissions figures using inventory models that align with the IPCC 2006 guidelines. The conversion methodologies employed are consistent with those detailed in the annual National GHG inventory reports.

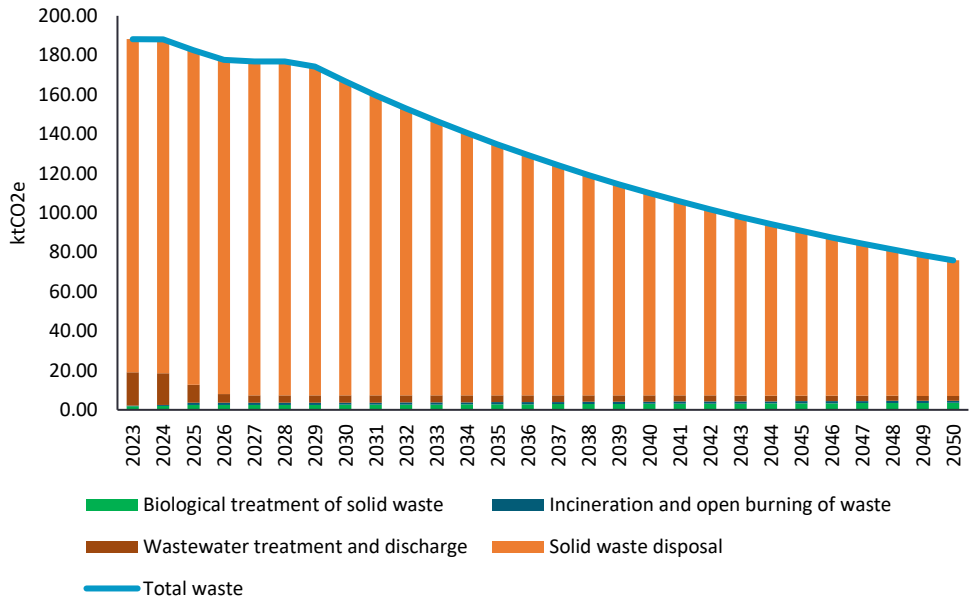
The new Organic Processing Plant (OPP) and the Waste-to-Energy (WtE) facility are both projected to have their first complete year of operation by 2030.

The baseline scenario includes several key measures, which include the introduction of key policy measures and waste-related initiatives such as the mandatory separation of organic and recyclable waste from households and commercial outlets, adjustments to the waste collection schedule to increase the frequency of organic waste pickup and decrease the frequency for mixed unsorted waste,

the introduction of differentiated Gate Fees of the waste management facilities, and the implementation of a Beverage Container Refund Scheme (BCRS). These measures are part of a broader strategy that includes awareness campaigns, improvements in data collection and management, and financing measures, complemented by the planned infrastructure such as the WtE and OPP facilities, as well as educational campaigns. In addition to these baseline measures, a differentiated pricing mechanism has been developed and modelled to assess its impact under various scenarios, including the most ambitious one. These policies and measures are diverting waste away from landfilling thereby reducing emissions.

Furthermore, the Water Services Corporation (WSC) is dedicated to ensuring that all wastewater is treated before being discharged into the sea. To this end, several key measures are in the pipeline. These include the phased upgrading of the Malta North urban wastewater treatment plant, the commissioning of a retrofit for the Sant Antnin urban wastewater treatment plant, and the disconnection of farmyard waste from the wastewater collection network, an initiative that is the responsibility of the Malta Agriculture and Fisheries Agency (MAFA). These measures are collectively aimed at achieving the goal of improved wastewater treatment. The below charts illustrate the total waste emissions (Figure 77), and the emissions per emitting treatment stream, under the WEM scenarios.

Figure 77 - Total Emissions for the Waste Sector by category (WEM). Source: CAA.



4.2.2 Renewable Energy

i. Current share of renewable energy in gross final energy consumption and in different sectors (H&C, electricity, transport) as well as per technology in sectors

Table 25 shows the share of renewable energy in total gross final energy consumption, as well as in the sectors of heating and cooling, electricity and transport. The overall RES share as at end of 2022 stood at 13.4%. Malta's target of 10% overall RES in 2020 was surpassed by 0.7pp. The highest relative share of renewable energy was achieved in the heating and cooling sector.

Table 25 - Share of renewable energy in gross final energy consumption, total and per sector 2010 – 2022. Source: Eurostat, SHARES Tool.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Heating & Cooling[197] (%)	7.3	12.0	13.4	15.4	15.0	14.6	16.9	19.3	22.8	23.6	23.0	32.8	38.0
Electricity (%)	0.0	0.5	1.1	1.6	3.3	4.3	5.7	6.8	7.7	7.5	9.5	9.6	10.1
Transport (%)	0.0	2.0	3.2	3.5	4.7	4.7	5.3	6.8	8.0	8.9	10.6	10.5	10.5
Overall RES share (%)	1.0	1.9	2.9	3.8	4.7	5.1	6.2	7.2	7.9	8.2	10.7	12.7	13.4

In 2022, the total final energy consumption of renewable energy reached 1,043.95 GWh, growing at an average rate of 19% per year over the period 2017-2022 (Table 26).

Table 26 - Final renewable energy consumption, in GWh[198]

	2017	2018	2019	2020	2021	2022
Total renewable energy consumption (without multiplicators) (GWh)	449.18	512.11	567.28	671.98	858.12	1,043.95

This growth is attributed to the continuous deployment of PV installations, increased use of biofuels on the Maltese market and the contribution of heat pumps. This is to be compared to a mere 6.11

[197] Excludes ambient heat from heat pumps in 2010-2011.

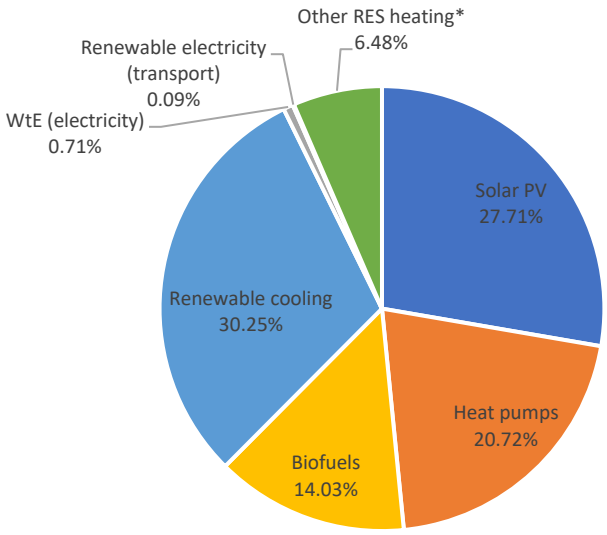
[198] Eurostat (2022), Summary results SHARES 2022. Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_c__custom_11900954/default/table?lang=en

GWh of RES consumption in 2005, when a handful of solar water heating systems were practically the only RES technology in Malta.

The Government's current policy in RES remains that of fully exploiting the potential of effective indigenous RES. PV technology has proven to be the most robust and fastest-growing technology, owing much to the successful history of public and Government initiatives to promote this technology. Malta also enjoys high incoming solar radiation, with the yield of PV systems among the highest in Europe. The total cumulative installed capacity at the end of 2022 stood at 222.6 MWp. Over 93% of the installations (amounting to circa 45% of the capacity) are installed in the residential sector[199]. New initiatives promoting PV investments have been launched such as the 2024 Renewable Energy Sources Scheme, which encourages the increased usage of renewable energy generated in Malta. This scheme provides four different options for PV systems which can include inverters and/or batteries.

Figure 78 presents the distribution of RES in final energy consumption of renewable energy in 2022. Renewable cooling from heat pumps accounted for the largest share, contributing to 30.25%, followed closely by solar PV technology at 27.71% of renewable energy consumption. Additionally, there has been a steady increase in the use of heat pumps for heating purposes (20.72%) and the use of biofuels in transport (14.03%). Other sources of RES include electricity and heat produced from biogas plants and biomass imports.

Figure 78 - Share of RES technologies in consumption in 2022. Source: Eurostat, SHARES Tool.



* Other RES heating includes SWH, WtE(heat), Biomass, and Bioliquids(industry).

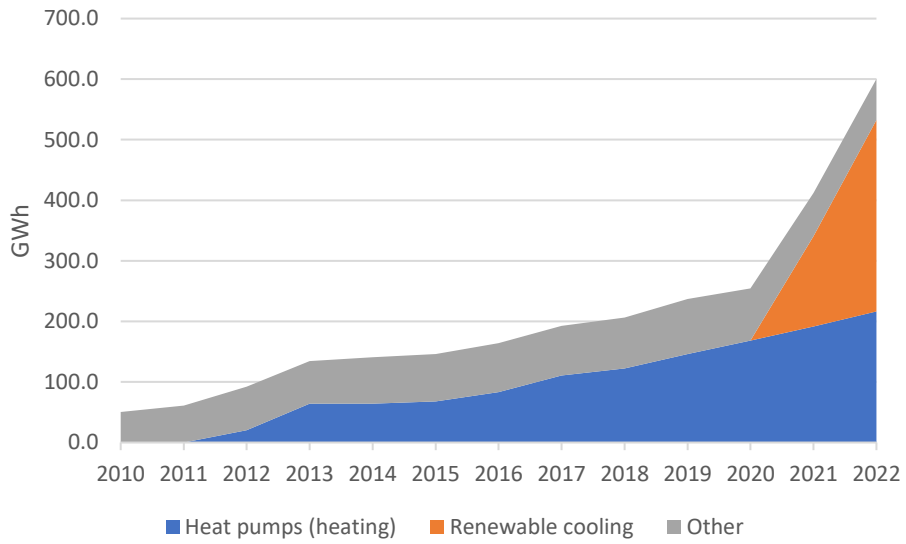
Share of RES in the heating and cooling (H&C) sector

[199]NSO (2024), Renewable Energy from Photovoltaic Panels (PVs): 2023. Available at: https://nso.gov.mt/renewable-energy-from-photovoltaic-panels-pvs-2023/

The share of renewable energy within the heating and cooling (H&C) sector amounted to 600.4 GWh in 2022, increasing from 192.8 GWh[200] in 2017. This steady increase in renewable energy share in H&C is attributable to the use of air-to-air heat pumps for heating and cooling, as shown in

Figure 79. Other smaller contributions by order of significance are solar water heaters, biomass imports, heat produced from mechanical biological treatment plants and bioliquids. The latter are used for industrial processing in the agricultural sector. The contribution of renewable cooling to RES consumption in H&C stood at around 53% in 2022. This was calculated in-line with the methodology found in Annex VII of Directive (EU) 2018/2001. It is worth noting that this figure represents a conservative estimate accounting only for split-unit heat pumps imported in 2021. Contribution from the relevant stock of installed heat pumps has not been included so far as data is being collated. There is no district heating network in Malta and there are no plans for the development of any such services either, since, as shown by past studies, such an option would not be cost-effective.

Figure 79 - Renewable energy consumption in the heating and cooling sector between 2010 and 2022. Source: Eurostat, Summary Results SHARES Tool 2022.



Due to its typical warm Mediterranean climate, the major application for heat pumps in Malta has traditionally been for ambient cooling. This has resulted in buildings being fitted with reversible air-to-air split-units. In response to lower electricity tariffs, the utilisation of heat pump technology for heating purposes increased, supplementing or, in some cases, replacing the use of either LPG heaters or electric filament heatersThe number of split-unit heat pumps in 2022 is estimated at 577,650. The

[200] Ambient heat from air-to-air heat pumps for 2010 is estimated to have provided 40 GWh, making the total figure for RES_H&C 90 GWh as opposed to 50 GWh. However, in the published energy balances and energy statistics, ambient heat from heat-pumps is not calculated before 2012, that is, prior to the publication of Commission Decision 2013/114/EU which established the guidelines for Member States on calculating renewable energy from heat pumps.

share of units installed in the residential sector remains at 70%.. Their utilisation in SMEs and large enterprises for both heating and cooling has also been on the rise.

Solar Water Heaters (SWH), predominantly installed in the residential sector, offset a good percentage of energy consumption which would otherwise be used or water heating. However, their use is limited in summer when ambient temperatures are high and hot water demand is low even though their yield is at its maximum. Since 2005, a number of grant schemes promoted the use of solar water heaters for households, which led to an increase in RES-H generation by an average of 4.3 GWh/year from 2006 until 2017. In 2021, the estimated number of solar water heaters in the residential sector stood at 15,039.After a peak in 2010, the uptake of this scheme has been decreasing steadily with increase in RES-H generation falling below 1 GWh/year in recent years. This downward trend can be attributed mainly to consumer shift towards PV systems, developments in the construction and renovation of buildings linked with limited roof accessibility and reliability concerns accentuated by the prevalence of hard water in Malta.

Biomass imports comprised primarily of wood charcoal, fuel wood and wood pellets. These were used for heating purposes by approximately 10,000 households[201] (2021) that have a wood or pellet burning stove or fireplace. The number of establishments in the services and industry sectors using biomass for heating is negligible. A total of 13.2 GWh of biomass was consumed in 2022.

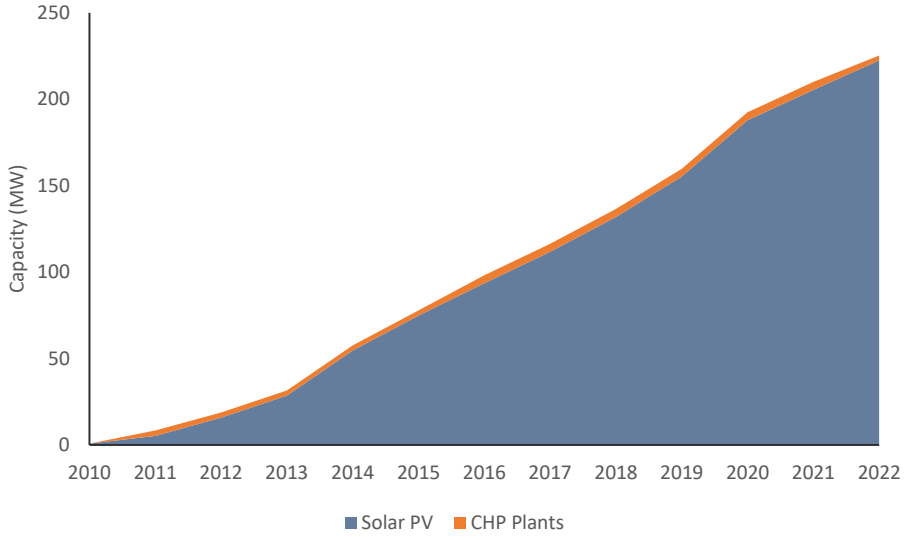
Renewable energy generated from waste treatment in the form of heat contributed to just 11.54 GWh in 2022. This contribution is attributed to the combined heat and power (CHP) plant and Regenerative Thermal Oxidiser (RTO) facilities at Malta North Mechanical and Biological Treatment Plant and Ta' Barkat Sewage Treatment Plant. During 2021, Sant' Antnin Mechanical Biological Treatment Plant was non-operational, and no renewable energy in the form of heat was produced at the Marsa Thermal Treatment Facility and the Maghtab Environmental Complex. Waste management policy in Malta is driven by Malta's Long-Term Waste Management Plan 2021 – 2030, with strategic objectives including maximising the resource value of waste, implementing waste prevention initiatives, reforming the collection system and building the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta's Waste Package targets.

Share of RES in the electricity sector

Renewable electricity generation capacity in 2022 comprised of 225.3 MW contributing to 297 GWh and representing a renewable energy share of 10.1% of the total electricity consumption. Whilst electricity generation from PV systems is the main contributor towards renewable electricity, other sources include cogeneration plants treating waste and sewage. The combined PV installations amounted to approximately 222.6MWp, with cogeneration plants contributing an additional 2.8 MW. Compared to the previous year, an additional 17 MWp of PV capacity was installed in 2022. The share of RES-Electricity increased from 0.3% in 2010 to 10.13% in 2022 (Figure 80).

[201] Number of households owning a wood/pellet burning stove or fireplace decreased from 12,000 in 2017 to 10,000 (-17%) in 2021.

Figure 80 – Installed renewable electricity capacity between 2010 and 2022. Source: Eurostat, SHARES Tool.



Share of RES in the transport sector

In line with Directive 2009/28/EC, all Member States were required to meet a 10% share of RES in transport in 2020. Malta achieved a share of 10.71%, exceeding the sectoral transport target. The calculation methodology for the sectoral RES-transport target for 2030 was revised through Directive (EU) 2018/2001. RES consumption in the transport sector in 2022 reached 148 GWh, which based on the revised methodology translates to 10.5% RES share in transport. The lack of an on-road mass transport system, such as rail, largely limits the electrification options in Malta. As at 2022, RES in the transport sector is almost exclusively the result of imported biofuels (Figure 81), with renewable electricity in transport having a minimal role. The dominant biofuels used in Malta are Hydro-treated Vegetable Oil (HVO) and FAME biodiesel.

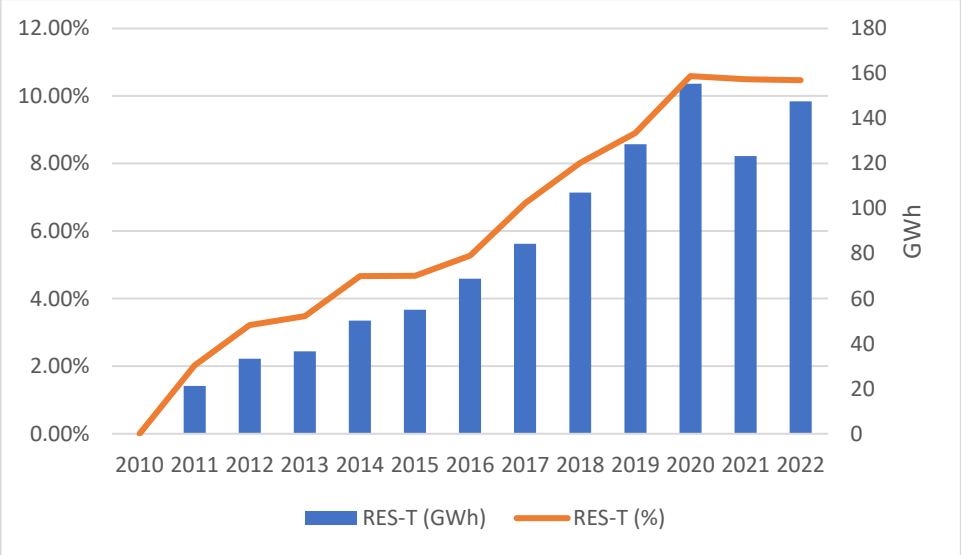
Malta requires that biofuels placed on the market fulfil the necessary sustainability criteria and comply with EU directives and local legislation. In order to achieve an increasing penetration of biofuels in the transport sector, Legal Notice 68/2011 was published in 2011. This introduced a 'substitution obligation' for biofuels, by which importers and wholesalers of automotive fuels are obliged to place on the market a minimum biofuel content as a percentage of the total energy content of fossil diesel and petrol. This was amended by Legal Notice 336 of 2021, which sets a minimum biofuel content of 14% in 2030 and includes a sub-target for advanced biofuels. Fuel suppliers are obliged to blend biofuels in conventional automotive fuels, taking into account the possibility of double counting biofuels listed in Annex IX of Directive (EU) 2018/2001. To supplement diesel blending, the use of HVO was introduced by fuel importers in 2015. In 2022, 135.55 GWh of HVO were consumed in the road transport sector, which accounts for more than 92.4% of the biofuels consumed in transport. Suppliers are allowed to use their discretion in determining the blend of biofuels, provided that the minimum biofuel content stipulated in local legislation is met. This decision is informed by various factors including the source of biofuel, prices and the multiplicator mechanism set in Directive (EU) 2018/2001, as amended by Directive (EU) 2023/2413.

Apart from biofuels, RES consumption in transport includes a portion that is attributed to renewable electricity used by electric vehicles. By the end of 2022, the total number of EVs across all vehicle

categories, including both battery EVs (BEVs) and plug-in hybrid EVs (PHEVs), stood at 11,626. This marks a considerable increase considering that in 2020 the number of EVs stood at 3,318. EVs accounted for 2.7% of the stock of licensed motor vehicles[202].

The primary advantage of electric vehicles is their lack of tailpipe emissions, which leads to a potential reduction in GHG emissions, provided that the energy used to charge these vehicles comes from a mix that includes renewable sources and efficient generation. Malta has committed to an ambitious goal of decreasing emissions within the transport sector, aiming for the electrification of an equivalent of 65,000 vehicles by 2030. To facilitate this shift towards cleaner transportation, the government has allocated funds to support further investment in EVs.

Figure 81 -Renewable energy consumption in transport and RES-T development between 2010 and 2022. Source: Eurostat, SHARES Tool.



ii. Indicative projections of development with existing policies for the year 2030

The With Existing Measures (WEM) scenario encompasses the current policies and measures aimed at promoting and supporting renewable energy, extending their implementation until 2030 as originally envisioned in the 2019 NECP's With Policy Measures (WPM) scenario. Malta's contribution to the EU-level renewable energy sources (RES) target is detailed in Section 2.

[202] NSO (2023), Motor Vehicles: Q4/2022. Available at: https://nso.gov.mt/wp-content/uploads/News2023_023.pdf

4.3 DIMENSION ENERGY EFFICIENCY

i. Current primary and final energy consumption in the economy and per sector

The data on Malta's energy consumption from 2017 to 2022 is presented in the following manner: Table 27 illustrates the primary and final energy consumption comparable to the targets found within the Energy Efficiency Directive, while Table 28 provides a similar comparison of these two indicators, with the addition of ambient heat contributions from heat pumps.

Table 27 - Primary and final energy consumption by sector (excluding ambient heat), ktoe

	2017	2018	2019	2020	2021	2022
Primary energy consumption	805.1	824.4	873.2	743.1	767.5	886.6
Final energy consumption	622.3	660.7	697.7	545.5	585.8	698.7

Table 28 - Primary and final energy consumption by sector (including ambient heat), ktoe

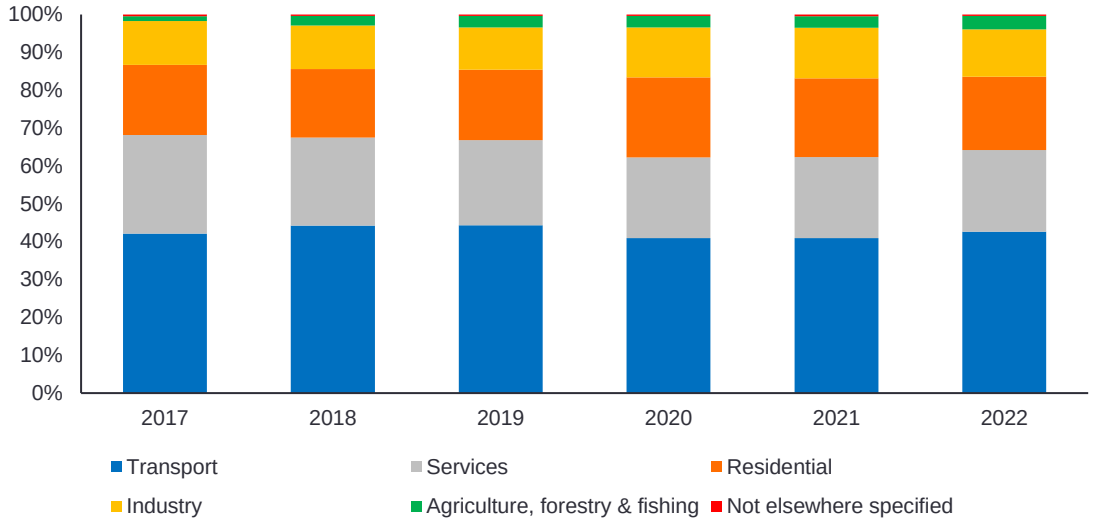
	2017	2018	2019	2020	2021	2022
Primary energy consumption	814.6	834.9	885.7	755.6	784.0	905.2
Final energy consumption	631.8	671.2	710.2	560.0	602.2	717.3
of which						
Transport	346.7	384.6	406.5	205.3	292.3	377.9
Industry	57.2	58.8	61.0	66.2	70.0	74.0
Services	128.4	119.6	122.6	106.4	112.1	127.7
Residential	91.1	93.0	101.5	105.9	109.5	114.4
Agriculture, forestry and fishing	6.4	13.2	16.6	15.0	15.7	20.9
Not elsewhere specified (other)	2.0	1.9	2.0	2.0	2.5	2.4

The distribution of final energy consumption by sector (including ambient heat from heat pumps) is shown in Figure 82[203]. Prior to 2020, the transport sector (which includes road, national navigation and international aviation) accounted for more than half of the final energy consumption. Restrictions imposed to contain the COVID-19 pandemic resulted in reduced mobility and tourism-related activities. The share of energy in the transport sector declined to 36.7% and 48.5% in 2020 and 2021 respectively, increasing to 52.7% in 2022. On average, the other predominant energy consumers are the services and residential sectors, followed by the industry sector. In 2022, services and residential

[203] Eurostat (2024), Complete energy balances. Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_c/default/table?lang=en

sectors accounted for 17.8% and 15.9% of the final energy consumption, whilst the industry sector contributed to 10.3%.

Figure 82 - Final energy consumption by sector 2017-2022. Source: Eurostat.



ii. Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling

In Malta, the residential and services sectors are the primary contributors to the nation's heating and cooling demand[204]. The local climate dictates a greater need for cooling during the hot summer months compared to heating in the milder winter. Without public district heating and cooling networks, this demand is efficiently met by air-to-air heat pumps, which have become prevalent in both residential and commercial settings. These versatile units also serve heating needs by operating in reverse during cooler periods.

Despite the potential benefits of Combined Heat and Power (CHP) systems, which produce both electricity and heat, their adoption remains limited to a few facilities. In 2016, the government launched a tax credit scheme to encourage the implementation of high-efficiency CHP units. However, the response was disappointingly low. The challenges to CHP adoption in Malta are multifaceted: the warm climate leads to a diminished demand for heat, extending the return-on-investment period for such systems. Additionally, legislative restrictions on the storage of gas-fired engines hinder their installation and operation, further limiting the viability of cogeneration in Malta.

[204] The Energy & Water Agency (2024), Comprehensive Assessment on the Potential for Efficiency in Heating and Cooling in Malta.

The feasibility of investing in district heating and cooling network infrastructure, in the absence of existing infrastructure, is constrained by several factors. Malta's small size and low thermal loads are significant barriers. The widespread adoption of other energy-efficient and renewable technologies further diminishes the appeal of such networks. These circumstances collectively undermine the case for district heating and cooling in Malta, with the potential for alternative solutions expected to continue to dominate the market.

iii. Projections considering existing energy efficiency policies, measures and programmes for primary and final energy consumption for each sector at least until 2040

Article 4 of Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023, concerning energy efficiency requires that Member States collectively ensure a reduction of energy consumption of at least 11.7 % in 2030 compared to the projections of the 2020 EU Reference Scenario so that the Union's final energy consumption amounts to no more than 763 Mtoe. Member States are required to make efforts to collectively contribute to the indicative Union primary energy consumption target amounting to no more than 992.5 Mtoe in 2030.

The indicative targets for Malta provided by the Commission for Primary Energy Consumption (PEC) and Final Energy Consumption (FEC) in line with the 2020 EU Reference Scenario and the formula set in Annex I of Directive (EU) 2023/1791 are 829 ktoe and 687 ktoe (adjusted to 0.68Mtoe following the application of the "ambition gap mechanism" respectively. Quantifiable projections developed by Malta are notably higher, resulting in indicative targets for PEC and FEC of 964 ktoe and 800.5 ktoe respectively. The discrepancy which has also been referred to the European Commission in line with Article 4 of the Energy Efficiency Directive mainly stems from differences between the sectoral projections in the 2020 EU Reference Scenario and Malta's updated projections which now take into consideration more recent trends and statistics, including for years between 2018 and 2022.

Malta recognizes the imperative of making its equitable contribution toward the overarching EU-wide target. It is noteworthy to highlight that Malta currently maintains one of the lowest final energy consumption per capita within the European Union. Consequently, while efforts are steadfastly directed towards reducing energy consumption, there are intrinsic challenges and inherent limitations on the extent to which further cost-efficient reductions in energy consumption can be achieved. Malta is steadfast in its commitment to ensuring that such efforts do not unfairly burden its population or impede economic growth. Hence, it is imperative for Malta to strike a balance between pursuing environmental commitments while ensuring that the measures taken are pragmatic and socially, and economically sustainable.

Projections for primary and final energy consumption under the WEM scenario are shown in Figure 83 and

Figure *84* respectively.

Figure *84* includes a projection for final energy consumption under the WEM scenario, excluding heat pumps, by sector. The highest consuming sector is expected to remain the transport sector, with road

transport contributing to over 57% of the total share of transport in 2023 and going down to around 51% by 2040.

Figure 83 - Projections for primary energy consumption (excluding ambient heat) under WEM scenario

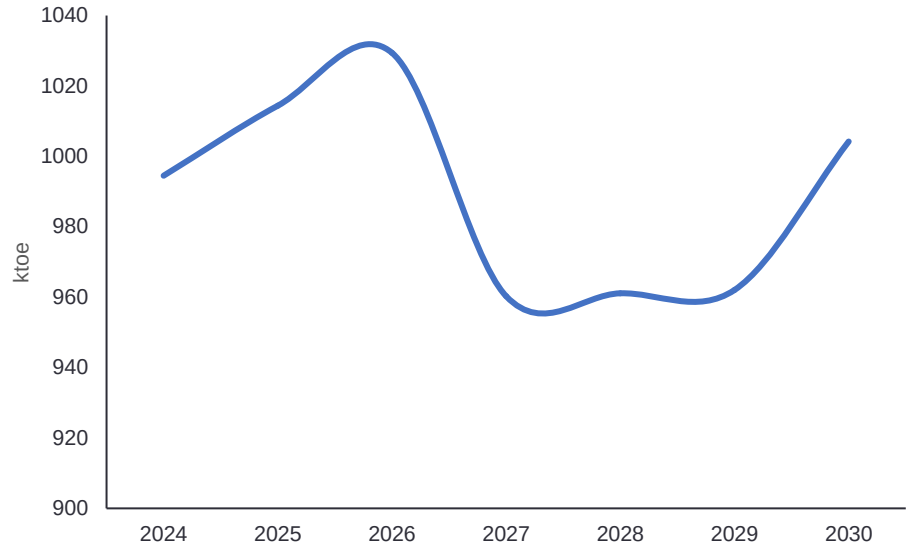
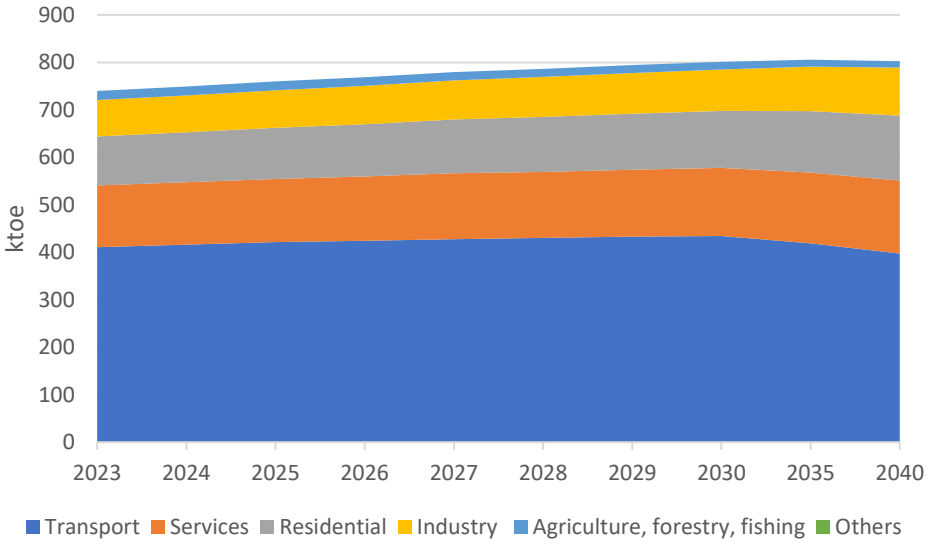


Figure 84 - Projections for final energy consumption (excluding ambient heat) under the WEM scenario



iv. Cost-optimal levels of minimum energy performance requirements resulting from national calculations according to Article 5 of EPBD (Directive 2010/31/EU)

The Minimum Energy Performance Requirements which came into force in 2016 that mandate minimum overall energy performance levels, cost-optimality studies were carried out in line with EPBD requirements.

A further update has come into force as from 1 July 2024 with the entry into force of the new Technical Guidance Document F[205]. The document is organized into three distinct reports covering dwellings, non-dwellings and technologies. They outline the energy performance standards applicable to various residential and commercial building categories. These standards serve as a baseline for energy efficiency, focusing on the building envelope and setting forth minimum performance levels on the permissible glazing areas, amongst others, to optimize both heating and cooling processes. In addition to the specifications for the building fabric, the guidelines present strategies for diminishing the overall energy consumption of buildings through the integration of on-site renewable energy sources. These include solar photovoltaic installations, heat pump systems and solar thermal collectors, which can contribute to a significant reduction in primary energy demand.

Furthermore, the Technical Guide F includes requirement on the efficiency of technologies, such as those of heat pumps and boiler heating systems. They mandate additional provisions for domestic hot water systems, including the implementation of advanced controls for heating systems. The standards also call for increased efficiency in lighting systems and the adoption of comprehensive control mechanisms for system regulation.

[205] Building and Construction Authority (2024), Technical Document F Part 1. Available at: https://bca.org.mt/guidance-documents/

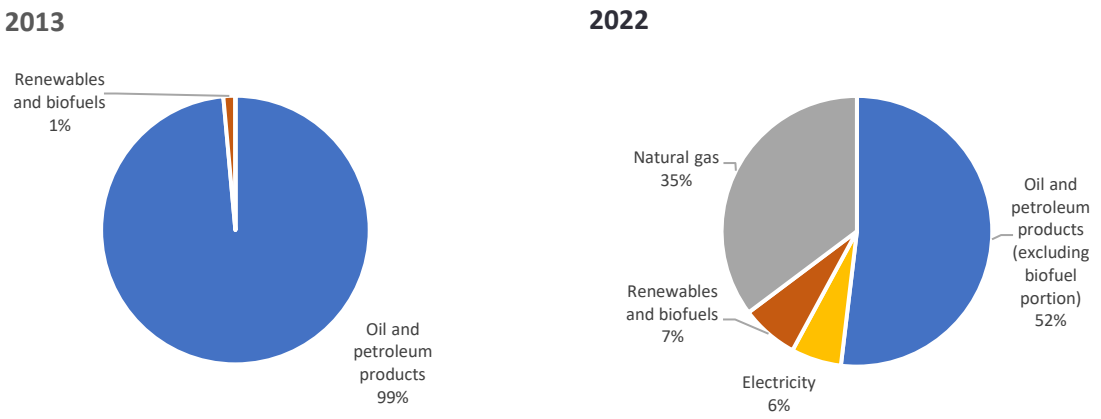
4.4 DIMENSION ENERGY SECURITY

i. Current energy mix, domestic energy resources, import dependency, including relevant risks

Energy mix

The diversification of energy sources and suppliers achieved over the last years constitutes an important milestone for Malta, a country which has limited indigenous energy sources. The commissioning of Malta's first interconnector to mainland Europe in 2015, ended the island's isolation from the European energy network, and provided increased security of supply and flexibility of electricity services. The energy mix as a share in gross inland consumption in 2013 and in 2022, as shown in Figure 85, portrays the effects of diversification and the recent reforms of Malta's energy system. The high dependency on oil and petroleum products decreased from almost 99% in 2013 to 52% in 2022[206]. The rest of the energy mix in 2022 is made of 35% natural gas, 7% renewable energy and 6% electricity imports via the interconnector. Whilst the share of renewable energy is increasing on an annual basis, Malta's reliance on oil and petroleum products (mainly in the transport sector) and natural gas (for electricity generation) continues to be significant, as the demand for energy continued to grow.

Figure 85 - Malta's energy mix for 2013 vs 2022. Source: Eurostat



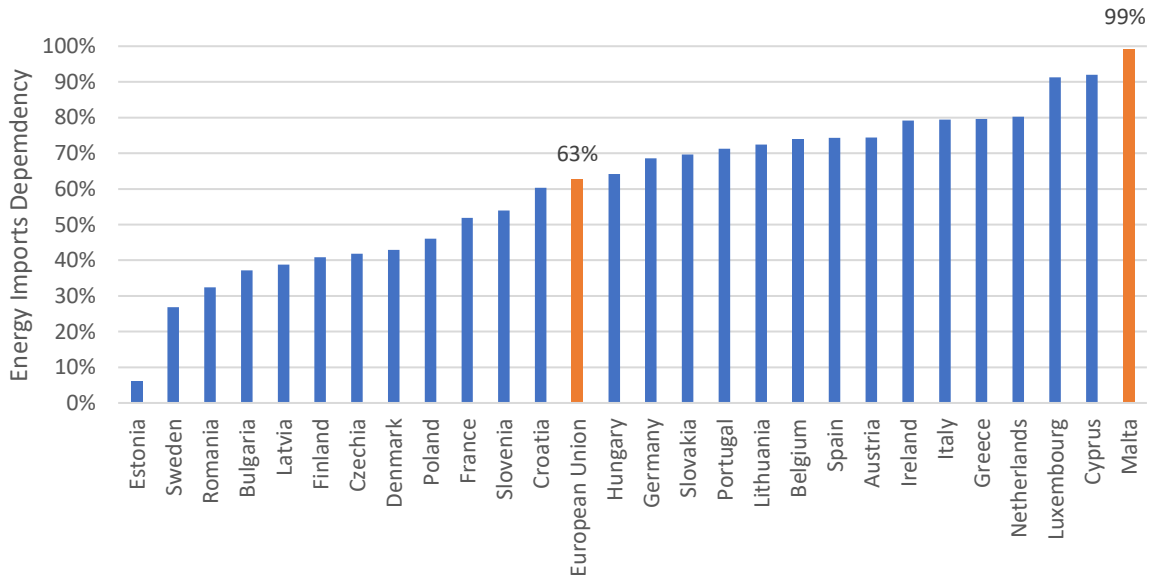
Energy dependency

The 'energy imports dependency rate' is defined by Eurostat as the ratio between the total net energy imports as a proportion of total gross inland consumption and fuels supplied to international maritime

[206] Eurostat (2024), Malta's simplified energy balances, Gross Inland Consumption. Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_s__custom_11963304/default/table?lang=en

bunkers.[207] In 2022, Malta's energy imports dependency reached 99% as all energy sources, apart from renewables, are imported. Malta stands out as the Member State with the highest dependency rate in the EU, and contrasts with the EU average of 63%, as shown in Figure 86. However, it's crucial to note that a substantial portion (71%) of Malta's net imports is attributed to maritime bunkering, which serves international shipping rather than domestic consumption. Since a significant portion of Malta's net imports is used for maritime bunkering, the standard dependency rate might overstate the country's reliance on imported energy for its own consumption. In fact, when excluding maritime bunkering, Malta's dependency on imported energy for gross inland consumption results in 97%. The island's strategic geographic position in the Mediterranean Sea has historically established it as a hub for maritime activities, which significantly contributes to the share of energy imports for marine bunkering purposes. This further underscores the critical challenges Malta faces in ensuring energy security and sustainability and highlights the importance of Malta's intention to further diversify its energy mix and increase its renewable energy share.

Figure 86 - Import Dependency across the EU for 2022. Source: Eurostat.



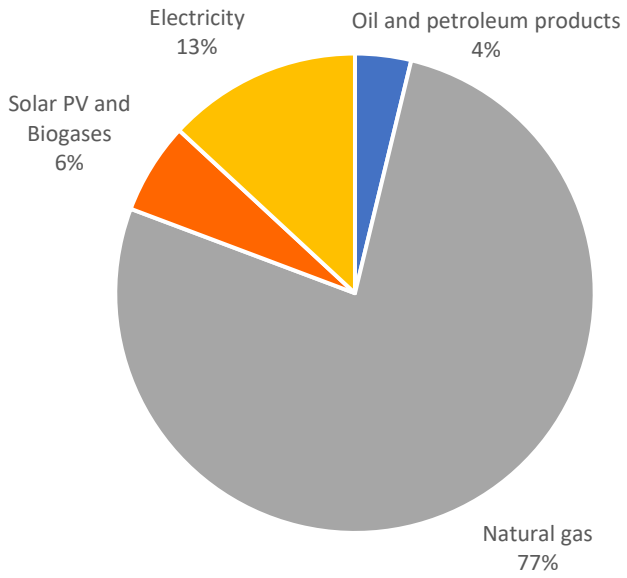
Electricity generation mix

The diversification of energy and supply sources and restructuring of the power generation sector achieved in recent years was an important milestone for Malta. Over the last decade, Malta has transformed its energy mix used for electricity generation from one based on heavy fuel oil and gasoil to a more sustainable energy mix based on natural gas, electricity imports through the Malta-Italy electricity subsea connection and increased deployment of renewable energy sources.

[207] Eurostat (2024), Shedding light on energy in Europe – 2024 Edition. Available at: https://ec.europa.eu/eurostat/web/interactive-publications/energy-2024

Malta's first interconnector with mainland Europe was commissioned in 2015. Following significant investments in a new generation plant and the conversion of an existing plant in 2017, natural gas replaced heavy fuel oil as the main fuel for local electricity generation. In 2022, natural gas formed around 77% of the electricity generation mix, electricity from the interconnector covered 13.1%, renewable energy sources (solar PVs and biogases) amounting to 6.2% and oil and petroleum products covering the remaining portion at 3.8% (Figure 87). Gasoil-fired back-up generation is only used in case of emergencies, such as during unavailability of gas-fired generation infrastructure or during outages of the electricity interconnector. The 60MW diesel-fired power facility, which has been commissioned in 2024, is intended to serve primarily as a contingency measure to accommodate demand surges during peak summer periods, until the second interconnector is operational.

Figure 87 - Malta's electricity generation mix for 2022



LNG deliveries

LNG is currently imported via marine carriers and held in a floating storage unit which supplies gas to two gas-fired power plants, Delimara 3 and Delimara 4. There are no onshore LNG or gas storage facilities in Malta and no gas distribution networks. Natural gas is used solely for the purpose of electricity generation. The establishment of the LNG facility further diversified the sources of supply, as it provides access to an unlimited number of sources of LNG on the international market. The LNG that has been delivered to Malta at the Delimara power plant facility between 2017 and 2022 originated from eight different countries as shown in

Table *29*. On average, during this time period, 69% of the LNG deliveries originated from South America, as shown in Figure 88. Gas deliveries to the power generation sector in Malta within the same time period are provided in

Table *30*[208] below.

Table 29 - LNG deliveries by sources of origin, 2017-2022. Source: Eurostat.

m^3 of LNG	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
South America	325,226	324,759	505,146	488,822	430,704	429,800
Africa	119,008	189,823	91,174	0	0	0
Europe	13,525	10,047	14,356	0	0	0
USA	39,982	100,060	14,907	111,634	216,066	204,059
Total	**497,741**	**624,689**	**625,583**	**600,455**	**646,769**	**633,859**

Figure 88 – Average LNG deliveries by country of origin for 2017-2022, %. Source: Eurostat[209].

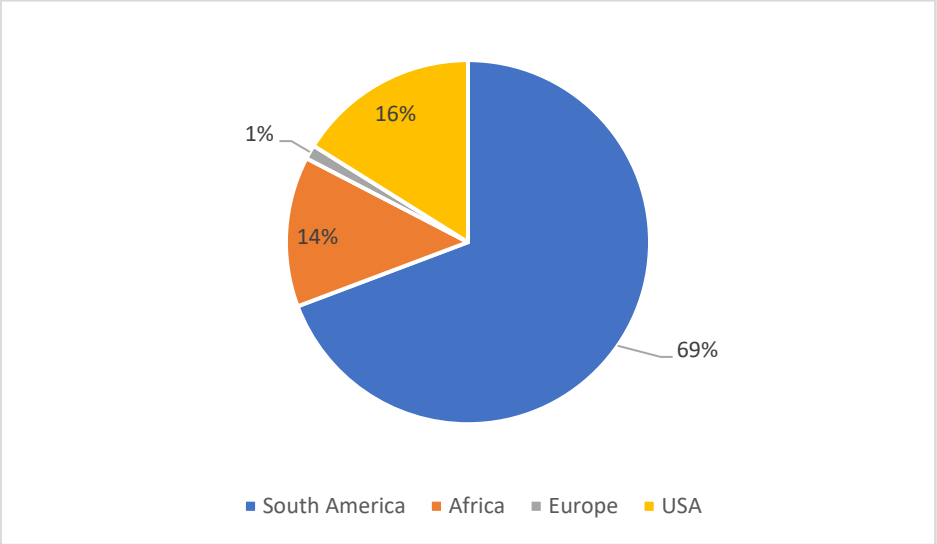


Table 30 - Gas deliveries to the power generation sector in Malta, 2017-2022. Source: Regulator for Energy and Water Services.

Gas deliveries	bcm[210]	TJ[211]	GWh
2017	0.27	10,776	2,993
2018	0.35	13,614	3,782
2019	0.37	14,230	3,952
2020	0.38	14,802	4,112
2021	0.38	14,811	4,114

[208] Eurostat (2024), Imports of natural gas by partner country - monthly data. Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_ti_gasm__custom_8243667/default/table?lang=en

[209] Eurostat (2024), Imports of natural gas by partner country. Available at: https://ec.europa.eu/eurostat/databrowser/view/NRG_TI_GASM/default/table?lang=en

[210] Standard Temperature and Pressure (15°C, 760mm Hg)

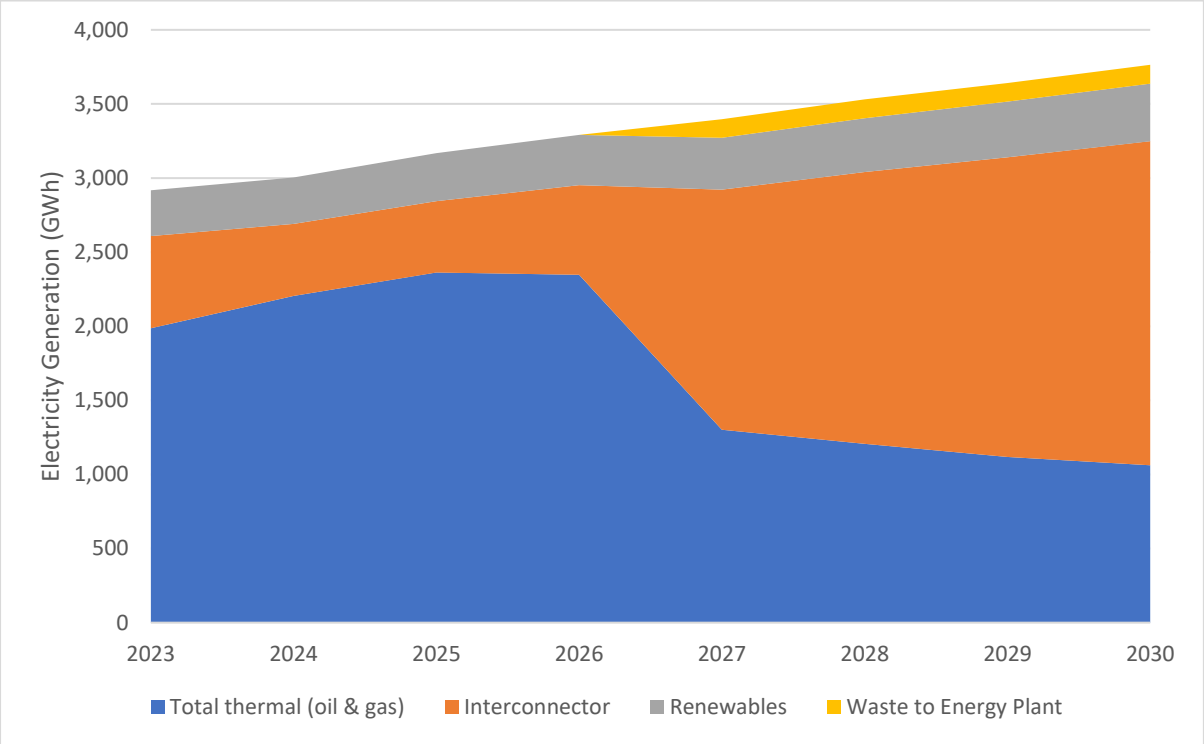
[211] Based on average higher heating value

2022	0.38	15,014	4,170

ii. Projections of development with existing PAMs at least until 2040

In the period until 2030, the electricity generation mix shall see major investments in infrastructure projects (Figure 89). Natural gas will still be a major contributor to the electricity generation mix, with significant but declining use projected up until 2030. This will be achieved through the commissioning of the second interconnector. Renewable electricity is also expected to increase its share in the electricity mix. Apart from the projected increase in electricity generated from solar PV, a waste-to-energy plant and additional biogas generation is also expected to increase once a new organic processing plant is in operation.

Figure 89 – Electricity generation by source in the WEM scenario



As Malta looks beyond 2030, the electricity generation mix for the decade spanning until 2040 remains under consideration. Current projections indicate that the electricity demand for the period 2031-2040 will surpass the capabilities of existing electricity generation infrastructure, thus requiring further investment to ensure a reliable power supply. The government is evaluating a number of infrastructure investments, including the potential deployment of a third interconnector, the construction of an additional gas-fired power plant, the development of a hydrogen-ready pipeline and additional battery energy storage systems. These considerations are being analysed to identify the most effective combination of options that align with Malta's energy policy objectives, particularly energy security, as well as a combination of options that take into account the longer-term goal to move towards climate neutrality by 2050. The government's approach is holistic, prioritizing not only the

sustainability element of the energy sector, but also the security of the country's electricity supply and the affordability for consumers. The aim is to create a resilient and flexible energy system that can support Malta's economic growth and climate commitments.

Net import dependency

Net import dependency is expected to remain at a level between 96.4 – 98.2% under the WEM scenario.

4.5 DIMENSION INTERNAL ENERGY MARKET

4.5.1 Electricity Interconnectivity

i. Current interconnection level and main interconnectors

At the end of 2022, Malta had an interconnection level of 25%, well above the 2030 interconnection target of 15%. Malta currently has one electricity interconnection with Italy with a transfer capacity amounting to 200MW in summer and 225MW in winter, while Malta's net nominal generation capacity in 2022 was 766MW, including solar PV installations. The interconnection level is calculated as a ratio between import interconnection capacity and net installed generation capacity. The details of 200MW HVAC interconnector are outlined in Table 31.

Table 31 -Details of existing Malta-Sicily electricity interconnector.

Characteristics	Details
Starting point	Substation in Sicily – Ragusa
Landing point in Sicily	Marina di Ragusa
On-shore route (Sicily Marina di Ragusa to Ragusa)	18.992km
Off-shore route	98.735
Landing point Malta	Qalet Marku
End point Malta	Maghtab substation
On-shore route Malta	Included in the offshore route length
Average depth	110m
Voltage rating	220 kV AC
Nominal capacity	200MW
Total length of interconnector	117.727 km

ii. Projections of interconnector expansion requirements (including for the year 2030)

As indicated in the section above, Malta's electricity interconnection level is well above the 15% EU interconnection target for 2030 required by the Governance regulation. Details on the planned second electricity interconnector with Italy are described in detail under section 2.4.2, point (ii).

4.5.2 Energy Transmission Infrastructure

i. Key characteristics of the existing transmission infrastructure for electricity and gas

As described in Section 2.4.2 related to national objectives and targets in the area of energy transmission infrastructure, in Malta there is no electricity transmission system. Malta has an electricity distribution network and Enemalta plc. fulfils the role of the DSO. The electricity supply sources connected to the Maltese electricity grid and dispatched by Enemalta include conventional power generation plants and the Malta-Sicily interconnector connecting the Maltese electricity grid to the European grid. Renewable energy sources are self-dispatched. Enemalta is also responsible for procuring the energy it uses to cover energy losses and reserve capacity in its system according to transparent, non-discriminatory, and market-based procedures.

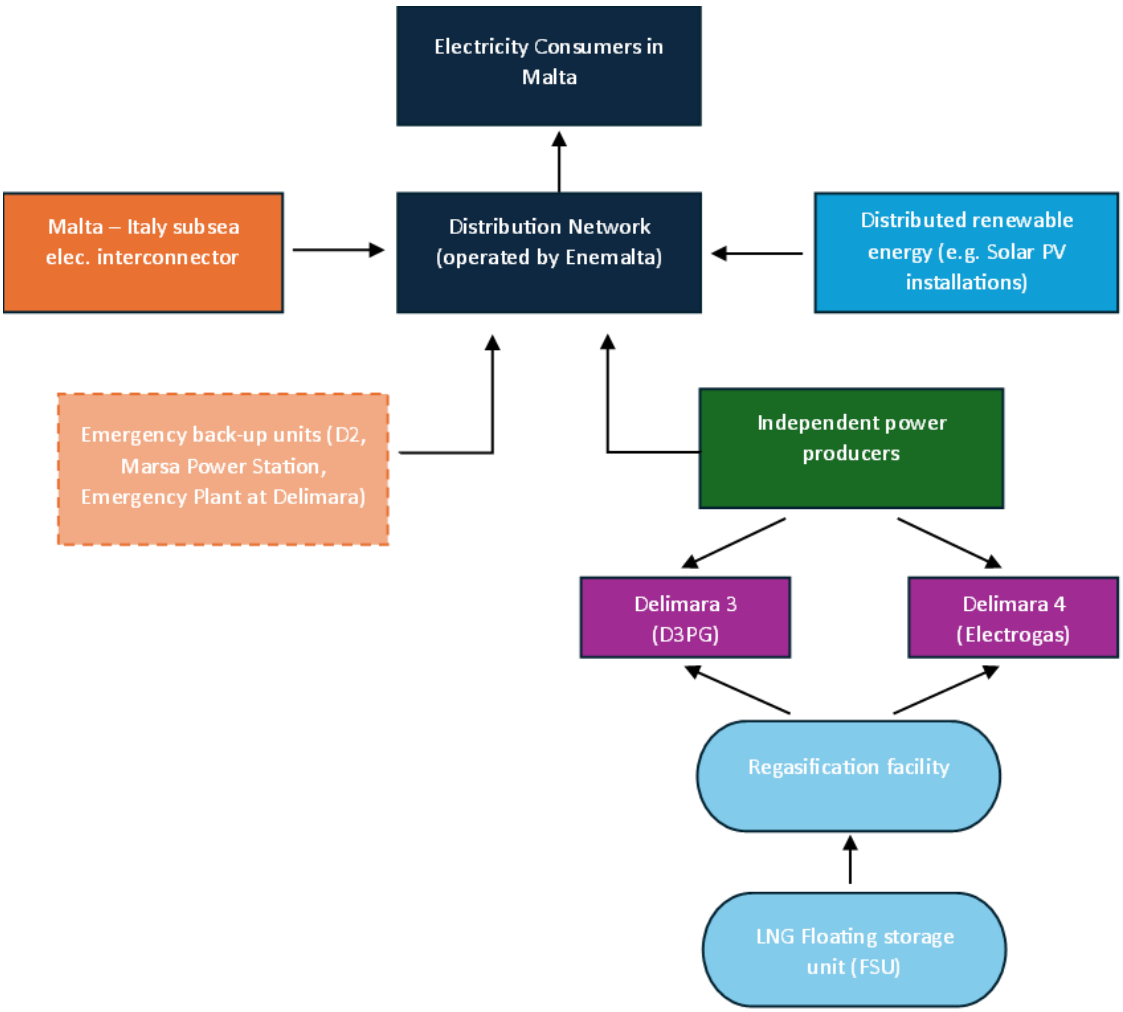
Early in 2024, Enemalta issues a tender for the lease and operation of a 60MW Power Plant, for a contract operation term of 27 months.[212] This diesel-fuelled power plant shall be dispatched as backup in the case of an event where Enemalta experiences a shortfall in its sources of supply to the National Electricity Grid to meet demand and can be used for a maximum of 500 hours a year and will consist of two containerized gasoil-fired generators. The plant will be made available on standby, to ensure continued supply of electricity to customers, up until the second interconnector for Malta is commissioned.

The Maltese electricity grid has a consumer base consisting of domestic and residential consumers, accounting for approximately 37% of total load, and industrial and commercial consumers, accounting for the rest of the load.

A schematic of Malta's current electricity sector is shown below.

[212] Parliament. Mt (2024), Lease and Operation of a 60MW Power Plant. Available at: https://parlament.mt/media/127429/pq18092.pdf

Figure 90 - Simple schematic of Malta's current electricity sector

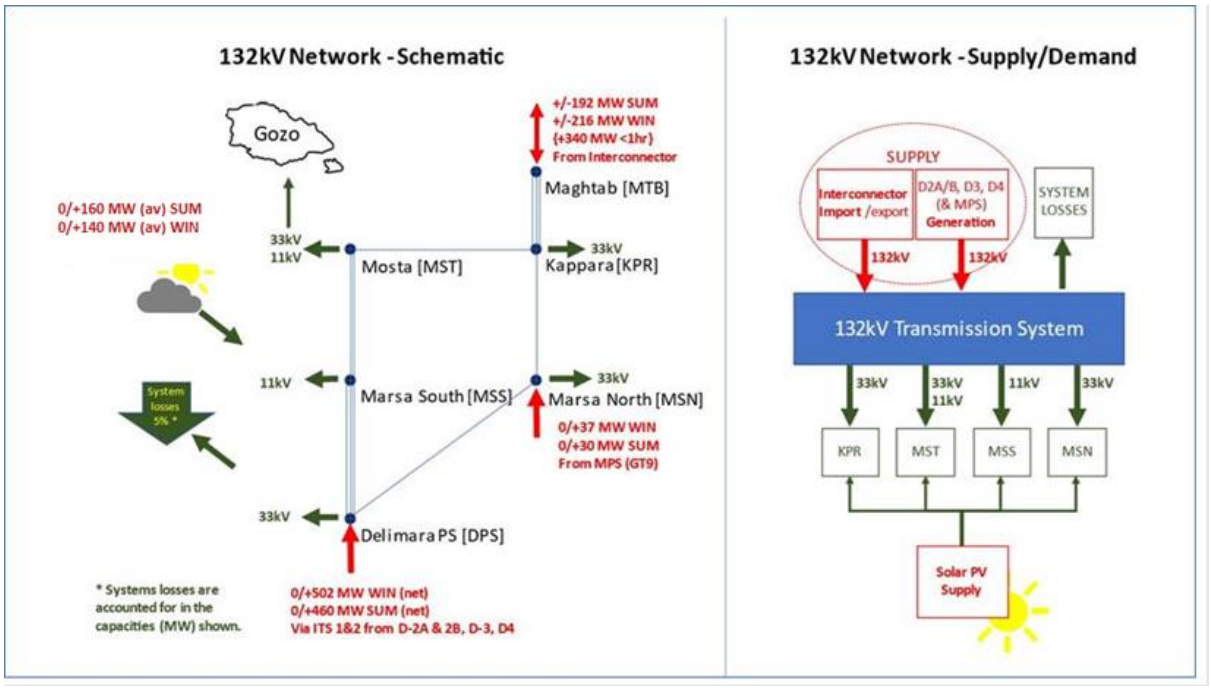


ii. Projections of network expansion requirements at least until 2040

Malta currently only has a distribution network, which is continuously being expanded; this section goes into more detail on the local network.

The local distribution grid network has three voltage levels, i.e. 132kV, 33kV, and 11kV. Reinforcement of the 11kV network is a continuous process following increase in demand. The seasonal peak load on the 33kV Distribution Centres (DC's) is monitored and measured against respective DC installed transformer capacity, so that the necessary expansions (installation of additional transformers, or erection of new DC's) are affected before the N-1 reliability standard is breached. Reinforcement of the 33kV network is affected to sustain these DC expansions. With regards to the 132kV network, while this network presently caters for N-1 requirements, Enemalta is planning for reinforcement of the 132kV network in view of projected increase in demand. Enemalta is also studying the reinforcement of the 132kV network required for Malta's grid to be self-sufficient in the eventuality of long-term unavailability of the Malta-Sicily Interconnector.

Figure 91 - Schematic of Malta's 132 kV electricity network. Source: 'National Electricity Crisis Scenarios Report' sent to the European Commission pursuant to Article 7(1) and (3) of the Risk Preparedness Regulation.



With the projected increase in demand, Malta is increasing its investment in the electricity distribution network to enhance the security and reliability of electricity infrastructure at all voltage levels.

A €160 million investment has been put forward to increase the distribution network in Malta. Since 2022, more than 200 low voltage feeders have been installed and there are ambitions to continue to increase these numbers. 100 transformer upgrades or switchgear replacements at 11kV voltage levels have been undertaken with targets for 40 11kV/400V new substations per year being set. Between 2022 and 2023, there were also 12 reinforcements at 11kV voltage level undertaken. 11kV and 33kV cables that were required for the new Naxxar DC were laid, and upgrading works at Marsascala DC, Mriehel DC and Tarxien DC have been completed. In 2024, 80km of 11KV cables are planned to be installed which will be translated into 50 grid reinforcements.

Other network expansion requirements which are expected to be completed in the short-term include the following:

- The completion of Naxxar DC and Siggiewi DC
- The upgrading of St. Andrews DC
- New Hospital DC overhaul and upgrade
- New 132kV link between Kappara DC and Maghtab DC
- Upgrade of Mosta DC

The continuous expansion to Malta's distribution network will lead to improvements in the network, leading to enhanced grid stability, strengthening energy security and improving efficiency with decreases in energy losses occurring during distribution.

Apart from the local grid network expansions, another interconnector is planned to be commissioned. The government is currently also evaluating potential network infrastructure investments for the medium term (until 2040). Among the network-related projects under consideration are a hydrogen-ready gas pipeline and a third interconnector. Assessments on these projects are ongoing to determine the most suitable option (described in detail under section 2.4.2, point (i)).

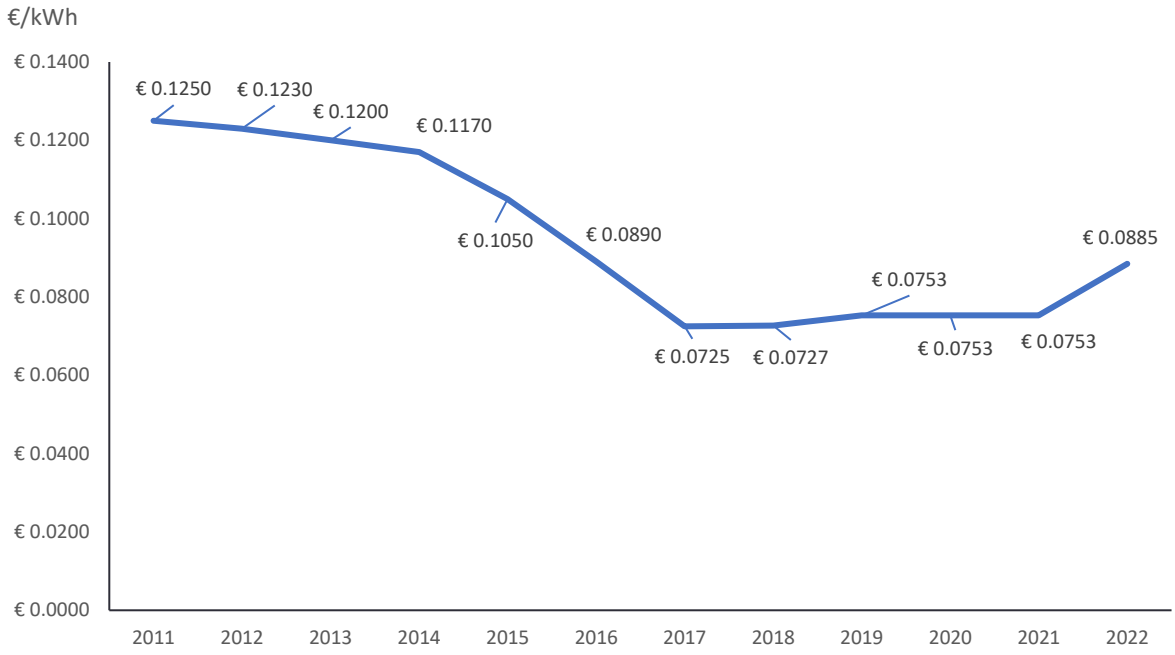
4.5.3 Electricity and Gas Markets, Energy Prices

i. Current situation of electricity and gas markets, including energy prices

As noted in previous sections, there are no liquid wholesale electricity or gas markets in Malta. Enemalta performs the functions of a DSO and is the only electricity supplier to final consumers. A proxy for the wholesale market price of electricity is established by Enemalta and endorsed by REWS[213]. The proxy is defined as the average of the estimated variable cost per kWh incurred by the DSO to meet the demand forecast from local conventional generators and imported electricity. As shown in

Figure *92*, following significant investments in the energy generation infrastructure, the proxy for the market price declined steadily from €0.12,5/kWh in 2011 to €0.071/kWh in 2017, after which it stabilized. Between 2019 to 2021, the proxy stood at €0.07,53 and in 2022 this rose to €0.08,85. This increase can be attributed to higher prices for electricity imported over the interconnector.

Figure 92 - Trends in the proxy for the market price for the years 2011 - 2022. Source: Prices compiled from Legal Notices 71 of 2013, 171 of 2015, 369 of 2016, 120 of 2017, 159 of 2018, 171 of 2019, 36 of 2021, 88 of 2022 and SL 545.40.



Electricity customers remain on a regulated retail tariff. The retail tariff paid by consumers for electricity covers the costs and revenues related to the operation of the distribution network, apart

[213] As there is no liquid wholesale market in Malta, the proxy for the market price is used to establish a reference price for electricity generation. This is published on an annual basis under Subsidiary Legislation 545.34 entitled "Electricity Regulations."

from those related to imported electricity, generation and supply activities. The method used for tariff regulation is based on the full cost recovery method.

Retail tariffs are composed of a fixed annual service charge and a unit (kWh) consumption tariff structure. The fixed service charge differs between a single-phase service and three-phase service and between residential/domestic and non-residential premises. Consumers with a service connection capacity rating over 60 Amps/phase are required to also pay the maximum demand tariff.

The electricity tariff uses a rising block structure whereby higher tariffs are applicable for higher annual consumption tiers. The tariff structure differs between residential (e.g. primary residence), domestic[214] and non-residential premises. As per the eco-reduction scheme, households that consume less than a pre-defined threshold receive a direct rebate on 15-25% of their electricity bills. This policy is meant to incentivise energy efficiency and lower consumption. Additionally, a night and day tariff is available for non-residential consumers with annual consumption over 5 GWh. A 5% VAT is applied to the household tariffs.

Electricity tariffs are officially established as per Electricity Supply Regulation (S.L. 545.01) and are published in the Government Gazette. These tariffs are also accessible online on the Regulator's website[215], as well as on the websites of Enemalta plc and ARMS Ltd. The approved electric vehicle charging tariffs are also published online, with tariffs for off-peak hours (between 12am-6am, 12pm-16pm and Sundays all day) being relatively more attractive.

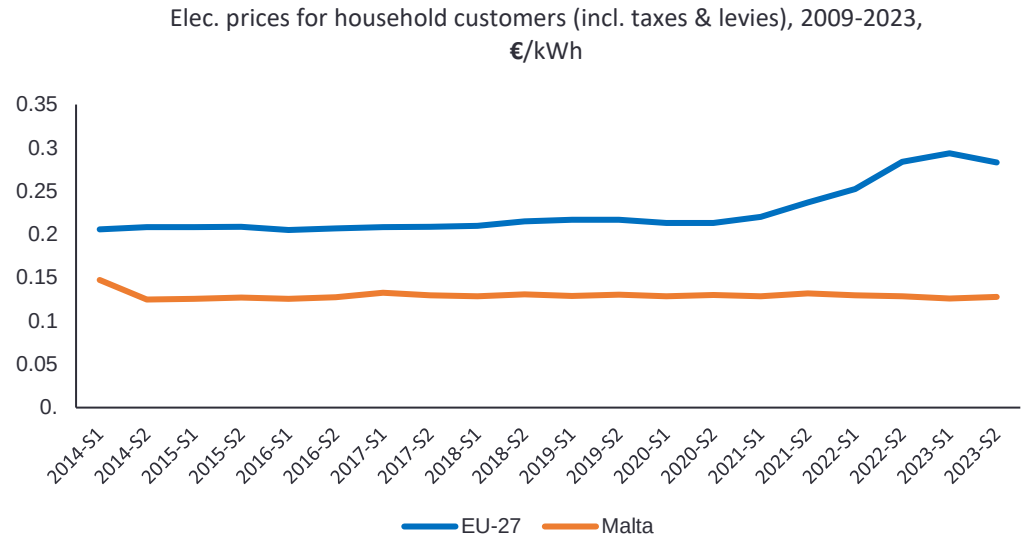
Following significant investments in energy infrastructure over the past decade, Malta's consumers benefitted from a reduction in electricity bills. The average electricity price for household customers in Malta covering the period from 2014 to 2023 (Figure 93[216]) amounted to 0.1419 €/kWh, which is lower than the EU average of 0.2095 €/kWh. Amidst the energy price surges that began in 2021, the energy subsidies were instrumental in preserving lower electricity costs for consumers.

Figure 93 - Household electricity prices in Malta 2008-2023, €/kWh in the consumption band 2,500-5,000kWh. Source: Eurostat.

[214] Domestic premises are those which are intended for domestic use but are not registered as a primary residence.

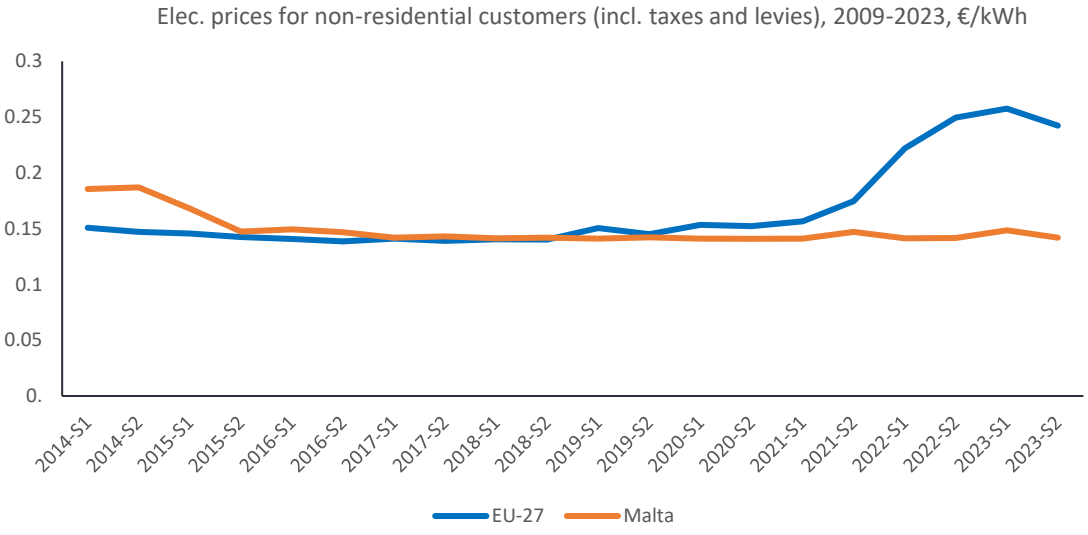
[215] Regulator for Energy & Water Services (2014), Regulated Electricity Tariffs. Available at: https://www.rews.org.mt/#/en/a/13-regulated-electricity-tariffs

[216] Eurostat (2024), Electricity prices for household consumers - bi-annual data (from 2007 onwards). Available at: https://ec.europa.eu/eurostat/databrowser/view/NRG_PC_204/default/table?lang=en



Until 2015-S1, electricity prices for non-residential electricity customers in Malta were above the EU average (Figure 94[217]). This was followed by a period of convergence. Malta has adopted a policy of energy price stabilisation to provide certainty to households and the business community. This was achieved through a mix of combination of diversified energy sources, efficiency improvements in the energy sector and energy subsidies. This policy was also maintained during the pandemic and energy crisis, to shield consumers from the volatility of global energy markets, providing economic relief and stability.

Figure 94 - Electricity prices for non-residential customers (including taxes and levies) for years 2009-2023, in €/kWh, for consumption band 500-1999 MWh. Source: Eurostat.

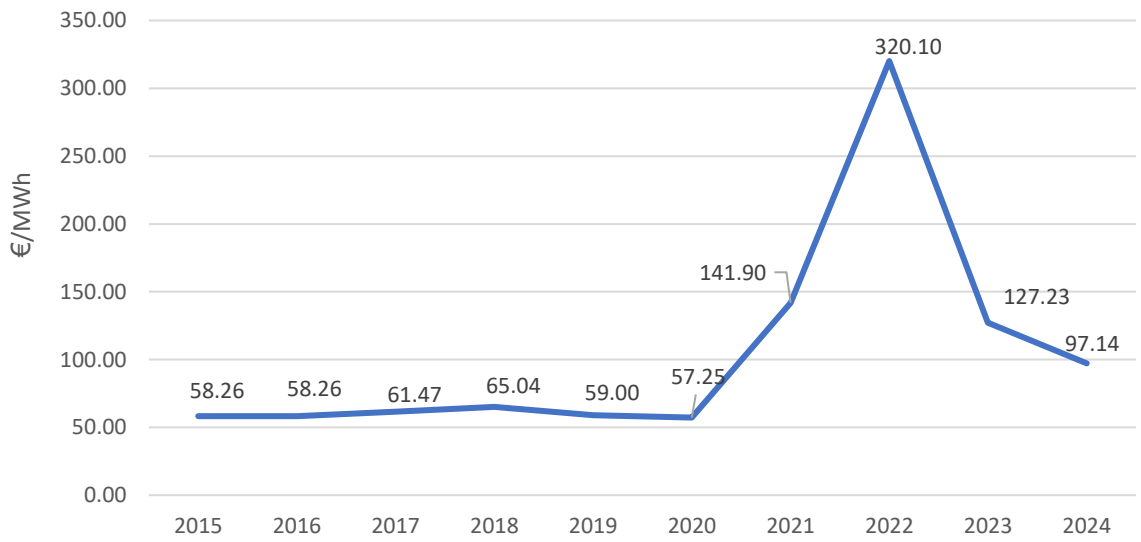


[217] Eurostat (2024), Electricity prices for non-household consumers - bi-annual data (from 2007 onwards). Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_205/default/table?lang=en

Given the existence of regulated retail tariffs, electricity consumers in Malta were shielded from the recent electricity price spikes resulting from the conflict in Ukraine.

Nevertheless, as from 2021, Malta experienced high prices of electricity imports from the wholesale electricity market in Italy, which in summer 2022 peaked at around 870 €/MWh. These have gradually begun to fall, where in 2023, the prices of electricity imports peaked in at 400 €/MWh. End-use electricity consumers were shielded through regulated retail tariffs and a general measure adopted by Government intended to maintain the retail prices at pre-energy crises levels. Electricity imports over the interconnector are required to meet approximately 20% of Malta's electricity demand. The remainder is met by conventional gas-fired power generation sources and indigenous renewable energy sources. Gas volumes in Malta are subject to a long-term gas supply contract, under which the price of imported LNG is indexed to the international price of oil as of April 2022.

Figure 95 - Average €/MWh based on price for imported electricity. Source: Enemalta.



ii. Projections of development with existing policies and measures until at least 2040

The projected evolution of energy prices under both the WEM and WPM scenario, including the price projections used in the Malta's NECP modelling framework, are included under Section 5.1.i .

4.6 DIMENSION RESEARCH, INNOVATION AND COMPETITIVENESS

i. Current situation of the low-carbon-technologies sector and its position on the global market

Clean Energy Transition Partnership (CETPartnership)

The CETPartnership aims to drive the clean energy transition and support the EU's goal of becoming the first climate-neutral continent by 2050. By pooling national and regional RDTI funding, it seeks to develop a broad range of technologies and system solutions essential for this transition. The Partnership gathers more than 51 partners/funding organisations from 30 EU Member States and Horizon Europe Associated Countries. Between 2022 and 2027, these countries/ funding organisations will collectively contribute an estimated €100 - €130 million annually to launch Joint Transnational Calls (JTCs) for R&I projects, co-funded by the EU.

Xjenza Malta, formerly known as the Malta Council for Science and Technology, within the Ministry for Education, Sport, Youth, Research and Innovation (MEYR), has committed €3.5M for the duration of the Partnership.

The CETPartnership's Strategic Research and Innovation Agenda (SRIA) has identified eight main challenges within the clean energy transition. Transition Initiatives (TRIs) are thematic configurations working together on a specific thematic challenge. The Internationalisation Unit at Xjenza Malta is a participant (at different levels) in a number of TRIs focused on the heating and cooling transition, integrated net-zero emissions energy system, enhanced zero emission power technologies and integration in the built environment.

To date, the CETPartnership has launched two JTCs, in 2022 and 2023. These calls resulted in four submitted projects involving Maltese applicants, with a total funding request of approximately €1 million. Two projects involving the University of Malta were successfully selected for award, with approximately € 432,194 of requested funds. The awarded projects are:

- FlexBIT - Flexibility Exploitation for residential tertiary and industrial buildings
- TenSyGrid - Tensors for System Analysis of Converter-dominated Power Grids

In September 2024, the CETPartnership launched its third JTC. Xjenza Malta has started an extensive dissemination campaign to ensure that all relevant stakeholders will inform of this funding opportunity in this thematic area.

The CETPartnership Joint Calls follow a 2-stage process, structured across 10 distinct modules, each addressing specific topics and/or challenges that applicants must tackle within their project proposal.

Table *32* provides a list of the Call Module Numbers for 2024. In Malta, applicants could request up to €500,000 in funding to participate in the CET Partnership consortium.

Table 32 - 2024 Clean Energy Transition Partnership (CETPartnership) Call Modules

Call Module Number	Title
CM2024-01	Data spaces and interoperability
CM2024-02	Energy system flexibility: renewables production, storage and system integration
CM2024-03A	Advanced renewable energy (RE) technologies for power production (Research-Oriented Approach)
CM2024-03B	Advanced renewable energy (RE) technologies for power production (Innovation-Oriented Approach)
CM2024-04	Carbon capture, utilisation and storage (CCUS)
CM2024-05	Hydrogen & renewable fuels
CM2024-06	Heating and cooling technologies
CM2024-07	Geothermal energy technologies
CM2024-08	Integrated regional energy systems
CM2024-09	Integrated industrial energy systems
CM2024-10	Clean energy integration in the built environment

Xjenza Malta also launches bilateral calls for proposals with China (SINO-Malta) and Turkey (Xjenza Malta- TÜBİTAK) focusing on various thematic areas, including the blue and green transition. The total budgetary commitment available for the local R&I community in 2024 for these two calls is of € 1.7 million, with this amount being matched by the foreign funding entities involved.

Xjenza Malta-TÜBİTAK collaboration forms integral part of the PRIMA programme – a Partnership that support research amongst Mediterranean countries and encourages collaboration between North Mediterranean (EU countries) and South/East Mediterranean countries (North African). Until 2023, the main thematic areas for Xjenza Malta-TÜBİTAK where PRIMA related (namely Water Management, Sustainable Farming Systems and Agro-food Value Chain), while in 2023 these areas were expanded to include additional fields of research.

This expansion led to the award of the SMACORT project, which focuses on the 3D manufacturing of sustainable coating materials for building retrofitting and energy efficiency. The project aims to provide sustainable solutions to meet the growing energy demands of buildings through energy-saving approaches, ultimately transforming the construction industry in both Malta and Turkey. The project budget per country is approximately €100,000.

Xjenza Malta also manages the SINO-Malta Bilateral Fund jointly with the Ministry of Science and Technology of the People's Republic of China. This Fund, which supports amongst others, projects on the blue and green transition, stemmed from the Agreement on Scientific and Technological Cooperation signed back in 2002, and allows for projects of up to €200,000 per country.

Table 33 - Projects funded under SINO Malta Fund

Call Module Number	Beneficiary
Reducing AirCraft Taxiing emissions through energy recovery and storage (REACTIVE)	University of Malta
dual fuel engine and dynamic Behaviour Improvement for Marine Application	University of Malta and Gozo Channel
Ecological Natural Fibre Reinforced Composites (ECO-Composite)	University of Malta
Green Laser Post-Processing in Additive Manufacturing (GLAM)	University of Malta
High Reliability and High-Power Density Starter/Generator System for MEA (SG Drive)	University of Malta
Hybrid Energy Storage System (HESS)	University of Malta

FUSION Programme

FUSION is a national funding programme that drives and supports local R&I, as well as providing the necessary support for researchers to turn their innovative ideas into a market-ready solutions. FUSION is supported through Malta Government funds and is managed by Xjenza Malta as the Managing Authority. The main objectives of the FUSION are to raise the level and profile of locally funded research, to ingrain R&I within the Maltese economy, to spur knowledge-driven and value-added growth, and to sustain improvements in the quality of life. These can be achieved since research results and innovation have the potential of translating themselves into commercial activities which generate a multiplier effect on the economy, by increasing Malta's competitiveness through the creation of additional high-value and knowledge intensive employment opportunities in Malta's priority industries. Table 34 contains a list of relevant projects funded under FUSION.

Table 34 - Projects funded under FUSION

Project Title	Beneficiary
Investigating the Thermal Performance of Subsea Energy Storage Accumulators with a 2-Phase Fluid transition	University of Malta
Green Algae to Solve Emerging problems in food security (GREASE)	University of Malta
Exploring the Potential of achieving Subsea Air Isothermal Compression using offshore pipelines in Long Duration Energy Storage Applications	University of Malta
3D Printed Batteries	University of Malta

Empowered consumer-side battery energy storage systems for enhanced network reliability	University of Malta
Active support of decarbonised weak power distribution networks	University of Malta
Virtual Kinetic Energy from Solar 1.0	Foundation for Innovation and Research
Robust Optimisation Framework for PVs and EVs Integration at Low Voltage Network	Foundation for Innovation and Research
Augmenting Offshore Wind Farm Production using Lighter-than-Air Parafoils	University of Malta
Towards Organic Structures for Advanced Solid-State Energy Storage	University of Malta
Smart Single Phase Motor Soft Starter without Starting Capacitor (HDMS)	University of Malta
A Kinetic Energy Recovery System for a Landing Aircraft (KERS)	University of Malta
Medsolar - Optimised Solar Roof Installations for Local Requirements	University of Malta
The research and development of an integrated hybrid electric drive system for a hydrofoil boat	University of Malta
SMTB - A battery powered, remote electricity scheduling and control system using LPWAN Technology	IoT Solutions Ltd.
Sustainable Utilisation of Seaweed for Transparent and Innovative Packaging	Natural Edge Ltd.
Floating Liquid-piston Accumulator using Seawater under Compression - Development of a Hydro-Energy Storage System for Offshore Multi-Purpose Floating Platforms	University of Malta
A Smart Micro Combined Heat and Power System (MICROCHP)	University of Malta
Novel Evaporative Cooled Battery Technology (NEVAC)	University of Malta
DOUBLE C-BLOCK - Thermal and Acoustic insulation of buildings	University of Malta
AIRSAVE - Improving the sustainability of compressed air systems through continuous monitoring	University of Malta
Development and Analysis of an Industry 4.0 System to Autonomously Improve the Sustainability of Pneumatics	University of Malta
Commercialisation of the microCHP: A compact, hybrid DC Combined Heat and Power Unit	Abertax Kemtronics Ltd.
Irrigoptimal - A new integrated operational management system based on Artificial Intelligence to tackle water scarcity	Westrade Ltd.
REcycled Stone & Concrete Insulated Unit	University of Malta
Waste Management Solution	IOT Solutions Ltd.

Projects by the University of Malta

The next section enlists a diverse portfolio of projects which aim to make significant contributions to R&I across the multiple dimensions, including energy efficiency (Table 35), decarbonisation (

Table *36*, Table 37) and energy security (Table 38), and other R&I initiatives (Table 39). These initiatives vary from tackling the complexities of industrial energy consumption, exploring the potential of renewable energy sources, or aiming to ensure a reliable energy supply, all while addressing the challenges posed by climate change.

Table 35 - Projects aligning with the Energy Efficiency Dimension

VacuUM: Innovative Mold Vacuum System	Trapped air in mould cavities often leads to defects like incomplete filling, which operators typically try to correct by increasing pressure, thus using more energy. The project seeks to provide a solution in the form of a compact, cost-effective vacuum system that operates on less energy.
CONFORM: Development and Performance Analysis of Sustainable Conformal Cooling Channels	Development and analysis of innovative conformal cooling channels (CCC) in injection moulding to improve cooling efficiency and part quality while reducing energy consumption.
AIR SAVE: Development and Analysis of an Industry 4.0 System to Autonomously Improve the Sustainability of Pneumatics	Development of an intelligent system which autonomously monitors (using AI to identify and classify inefficiency sources such as leakages, pressure drops and/or worn-out actuators) and controls air and energy consumption of industrial compressed air systems in real time.
HID: Hybrid Inverter Drive	A smart device that allows variable speed operation, but when fixed speed operation is required, the device shall connect the motor directly to the mains with bypass relays and switch off the inverter for loss savings.
Double-C Concrete Block	Developing a prototype building block with integral insulation properties.
DETOCS – Decarbonising the Tourism Industry Post COVID-19 Support	Mobilising mutual learning, identifying good practices and devise policies to decarbonise the Tourism Sector.
ZERCO2 – Promotion of Near Zero CO2 Emission Buildings due to Energy Use	Devising policies to decarbonise public buildings and social housing through active sharing of good practices from European Regions.
Research Collaboration for Deep Renovation of the First Social Housing Block in Malta to Near Zero-Energy Levels	Developing the first deep renovation social housing project from inception to final project implementation. This involves a deep renovation and post-testing of a 40-family housing block in Zabbar to finally produce a blueprint policy to be applied in other housing projects.

Table 36 - Projects aligning with Decarbonisation: Renewable Energy Sources

MUSICA: Multiple Use of Space for Island Clean Autonomy	The aim of the project is to provide a full suite of Blue Growth solutions for a small island including three forms of renewable energy (RE): wind, Photovoltaic (PV) and wave, innovative energy storage systems on the Multi-use Platforms (MUP), smart energy system for the island, desalinated water and green support services for island's aquaculture.
FORTRESS (A Floating Offshore Breakwater for Supporting Marine Renewable Energy around Islands)	Integrating offshore energy storage systems within floating breakwater platforms and exploring the viability of multi-use offshore parks in Maltese waters.
SimHydFlow (Simulator for Hydraulic Distributor Flows in Offshore Hydro-pneumatic Energy Conversion Units)	Producing models that optimally manage energy storage systems. The modelling will optimise systems to integrate offshore renewable energy technologies with hydro-pneumatic energy storage systems.
HydroGenEration (Hydro Pneumatic Energy Storage for Offshore Green Hydrogen Generation)	Investigating various technical aspects to enable the coupling of offshore wind generation and a co-located Hydrogen production plant.
FLASC-Optima: Design Optimisation Analysis of Offshore-Based Hydro-Pneumatic Energy Storage Systems	Investigating the performance of Megawatt-scale offshore hydro-pneumatic energy storage systems. The project is conducting advanced research on the Floating Liquid Accumulator with Seawater under Compression (FLASC) concept.
SEA2F: Investigating Thermal Performance of Subsea Energy Storage Accumulators with a 2-Phase Fluid Transition	Conducting fundamental research to understand how the thermo fluid phenomena associated with two phase CO2 within accumulators influence the roundtrip thermal efficiency and energy storage density.
SAICOPES: Exploring the Potential of achieving Subsea Air Isothermal Compression using Offshore Pipelines in Long Duration Energy Storage Applications	Exploring a new subsea air compression process to adapt compressed air energy storage for the offshore environment by exploiting the excellent heat sink characteristics of sea water to achieve isothermal compression at very high compression ratios.
REVOLT: Reducing Energy Generated Intermittency through Voltage Regulation	Proposing and developing a technical solution through detailed design, modelling and simulations of a smart device to perform real-time voltage regulation at the consumer premises to eliminate unwanted disconnection of RES systems.
DISTRICT: Decarbonisation of Ports using Microgrid Technologies with Shore and Offshore Power	Contributing to the green transition of ports by developing strategies to decarbonize the present and future port activities. Port microgrids shall be designed to support port onshore activities. Offshore stations powered from renewable energy sources shall be designed. Both activities shall lead to higher penetrations of renewables.

HESS: Hybrid Energy Storage	Hybrid Energy Storage Solutions (HESS) is a company that contributes towards the green transition of land transportation by developing an Energy Hub Microgrid concept with the aim of maximising the exploitation of green energy.
Sustainable Living Complex	Reducing operational carbon footprint of construction, with the use of renewable energy sources, including ground heat source systems, photovoltaic systems, as well as different systems of delivery of energy and power - it therefore aligns with energy efficiency and renewable energy sources.
Deep Aquifer Ground Source Heat Pumps	The system will be studied in a real-life situation in the Sustainability Living Complex (SLC) project, as one of the energy sources delivering energy to the complex. The project relates to the construction and monitoring of deep aquifer boreholes, to use ground heat as an energy source.
Solaqua – Offshore Floating Solar Platforms	The objective of the project is to develop floating structures and PV systems for offshore deployment at sea.
HydroGenEration – Hydro Pneumatic Energy Storage for Offshore Green Hydrogen Generation	Investigating various technical aspects to enable the coupling of offshore wind generation and a co-located hydrogen production plant.
SIFORCE – Silicon Improvement for Higher Cell Efficiency	Acquiring new knowledge and skills concerning the effects of defect generation and growth mechanisms in commercial silicon crystals on the performance of high-end solar cells.
Offshore Wind Resources Quantification Project (OWRQ)	Quantifying the nearshore wind resource potential. The Light Detection and Ranging (LiDAR) wind measurement unit and a remote power supply system were purchased. The LiDAR Unit was installed at the White Tower, Armier, l/o Mellieħa in late July 2022 as part of a two-year collaboration research project.
IPCosy – Innovative Photovoltaic Cooling System	Designing an innovative solar panel cooling system. IPCoSy is designed to fully develop, design and test an innovative photovoltaic cooling technology for photovoltaic systems.
MEDSolar – Modular, easy to assemble photovoltaic modules and insulating tiles	Designing a low-profile solar PV system adaptable for flat/ Mediterranean roofs.
Development of a Prototype Multi-bladed Wind Turbine System for Electrical Power Generation	Development of a small-scale wind turbine for onshore small-scale wind projects.

Table 37 - Projects aligning with Decarbonisation: GHG Emission Reduction

BIMA – Dual fuel engine technology and dynamic Behaviour Improvement for Marine Application	Using Liquified Natural Gas (LNG) in ship propulsion, especially in dual fuel mode, i.e. diesel and LNG. The focus is on the dual fuel engine technology and dynamic Behaviour Improvement for Marine Application. The main target of the project is to lower emissions.
ATLANTES: Assessment of an emission control area in Maltese ports	The aim of this project is to define measures to implement an emission control area for cleaner shipping operations in the port of Valletta.
RIVIERA: Reducing Emissions with Innovative Marine Power and Propulsion Systems using Alternative Fuels	RIVIERA is aimed at developing new design methods and tools for the integration of alternative fuel systems in innovative shipboard power systems. Replacing fossil fuelled vessels with hybrid/all-electric alternatives reduces GHG emissions and other pollutants.
MedECC Special Assessment Report, Climate and Environmental Coastal Risks in the Mediterranean	This report will support local, national, and regional policy decisions on the conservation, adaptation and mitigation needs to sustain a good quality of life in the Mediterranean.
ReStone	Developing and testing prototype reconstituted stone building products.
Estimating the Much-Needed Gain in New Green Spaces in Malta's Capital City, Valletta	In the case of Valletta, putting up greenery on rooftops is a way of encouraging sustainable practices in a city where vacant land is not available.
Sustainability of Traditional, Historical Roofs in the Mediterranean: A Rediscovered Opportunity for a Carbon Neural Future	The paper discusses a three-year pilot study that developed an innovative methodology combining remote data from UAVs and satellites with on-site measurements to remotely identify traditional and modified roofs and analyse their thermal behaviour. The study aims to support the preservation of traditional roofing by providing data that can contribute to addressing climate-related issues.
Assessing climate change vulnerability of coastal roads	A 2024 article examines the climate change vulnerability of coastal roads, emphasizing the importance of managing transport infrastructure in the face of changing climatic conditions.

Table 38 - Projects aligning with Energy Security

ESTELLE: Energy Storage and Power-to-X technologies for optimal integration of renewable generation	ESTELLE performed detailed design, modelling and analysis on utility scale and behind-the-meter BESS and Power-to-X technologies, to mitigate the impact of RES intermittency whilst providing additional benefits to consumers. The main objective was achieved through high-level intersectoral and interdisciplinary industrial research activities.

Table 39 - Other R&I Projects

UM Research Excellence Award: 'Beyond Pandemics: Improving climate resilience and health systems in small island states'	Aiming to identify existing climate/public health risks and resilience building measures in Small Island States (SIS), This project identifies that existing climate & public health risks & resilience-building measures in Small Island States (SIS), often disproportionately impacted by external shocks.
AIS Joint Research Programme: 'United Nations Development Programme & Archipelagic and Islands States Forum'	The study centres on creating a multi-dimensional tool designed to measure and facilitate swift adaptation to various hazards on volcanic islands. This tool aims to assist decision-makers in charge of public safety in the Caribbean by providing them with a vital resource to refine adaptation strategies for the region's multi-hazard environment. This can be applied to other small island states.
HORIZON EUROPE Marie Skłodowska-Curie Actions (MSCA) Postdoctoral Fellowship: 'Heritage Ecologies: culture, resilience and development in Island States (ECO-HERITAGES)'	Establishing dialogues between the fields of anthropology, heritage, environment, development and island studies, this research aims at enabling operative bridges among disciplines to address issues relating to economic and environmental vulnerability in insular and archipelagic contexts.
HORIZON EUROPE Marie Skłodowska-Curie Actions (MSCA) Doctoral Networks: 'In quest of the human dimensions of MEDiterranean Marine Biodiversity (MEDiverSEAty)'	The MEDiverSEAty project aims to create a unified theoretical framework for Mediterranean Marine Biodiversity Conservation that incorporates both human and biological aspects.
Effects of climate change trends and extreme weather events on circulatory mortality in Malta	This study examines the link between temperature and circulatory mortality in Malta. It found that while the impact of heatwaves on mortality was inconclusive, there was a noticeable increase in cerebrovascular mortality during cold spells. Utilizing a lengthy mortality data series, the study aims to enhance preventive measures and adaptation strategies to lessen the health effects of climate change.
Effects of climate change trends and extreme weather events on respiratory mortality in Malta	The study highlights a global pattern of increased respiratory mortality associated with ambient temperature changes, particularly under various climate change scenarios. It suggests that the heightened risk of respiratory deaths during cold periods may be linked to greater fluctuations in winter temperatures, warranting further research that accounts for physical and socio-demographic factors.
MAELSTROM – Marine Litter Sustainable Removal and Management	MAELSTROM is a project focused on creating scalable and automated technologies that work with renewable energy and alternative fuels to collect, sort, and convert marine litter into valuable materials.

R&I Strategy in Energy and Water 2021-2030

Given the importance that Research, and Innovation plays in the NECP objectives, the Energy and Water Agency developed a ten-year strategy in an effort to strengthen and support R&I that addresses national policy priorities and challenges, and that bolsters national competitiveness and growth in a variety of sectors. Such action was deemed necessary as there were no specific support tools in such fields, as well as no organised structure of reporting or keeping track of what projects entailed and have achieved, what funding opportunities were utilised etc. The National Strategy for Research and Innovation in Energy and Water envisions that during its implementation, it manages to increase coordination between a wide array of stakeholders in the fields of energy and water. This would then lead to a better understanding of how policy priorities can be implemented, what challenges arise, and ultimately boost growth and interaction when coordinating research and innovation activities. The strategy gave way to many R&I activities such as an annual Research and Innovation grant scheme and a baseline study. A key part of the strategy was the establishment of Platform RINEW (Research and Innovation in Energy and Water) which acts as a national observatory on R&I activities within the fields of energy and water, creating the environment for all stakeholders and participating sectors to communicate changes and progress, and ultimately position itself as a one stop shop for anything related to R&I in energy and water in Malta.

Platform RINEW is a key contributor in the running of the Energy & Water Agency's running of the R&I scheme, as meetings with the technical and steering committees (composed of stakeholders within the impacted sectors) are frequently held to discuss progress, participation and changes to the upcoming scheme in order to improve such initiatives. To do so effectively however, and in line with the goals of the strategy, a Baseline Study was conducted. The main objectives for this baseline study were to tabulate and take account of what research projects were developed in both water and energy fields, the amount of funding, any overlaps/gaps (over exhausted themes are identified), and gather any information on the current Maltese R&I landscape. The baseline study also guides further development of the existing support scheme by identifying and organising the eligible themes that offered most potential to be further researched. These categories were: industrial heat recovery and/or spatial cooling system (waste energy), and PV And Battery storage Integration (Solar & Batteries). This was a necessary step in fine tuning the scheme and optimise funding opportunities and mitigate overlaps and repetition – therefore boosting Malta's potential in other fields. Energy Efficiency and Solar Energy have been the most explored areas as denoted by the baseline study, whilst all other renewable energy areas are yet to researched further.

Funding for R&I projects in the Maltese Islands comes from EU funding & Local funding opportunities and schemes, as well as from private funds. The 7 key performance indicators that the Baseline Study accounted for are denoted below. These KPIs, in the fields of R&I, are indicators that provide information on how effective these projects are and are also a progressive approach to compare and keep tabulating such data in the future. These KPIs are:

- KPI 1: Publications - The number of publications per project acts as a measure of the quality that the project and researchers on the project bestow.

- KPI 2: Implementation - The implementation aspect is a measure of how applicable the project is to Malta's different targets, frameworks, and directives.
- KPI 3 & 4: National & EU-Level Funds - The number of projects making use of available funding opportunities.
- KPI 5 & 6: Number of non-Innovative Projects and Innovative Projects working on different themes and sectors - Categorizing the projects working on different sectors and fields within the remits of Energy.
- KPI 7: Number of Researchers - The number of researchers per project and field.

The Energy and Water Research and Innovation scheme

In line with the R&I strategy, EWA introduced a scheme which sought to boost R&I efforts in the fields of energy and water by providing financial support for selected projects within the respective sector. The scheme can support projects within the seven thematic areas established in the National R&I strategy in Energy and Water and has so far awarded circa €1.25 million following the first two calls, supporting 11 projects in total. A new call is launched every year.

Supported projects would need to be completed typically within 2 years and could benefit from a maximum grant of €120,000 (2020 & 2021 call) which has now been increased to €200,000 (future calls). The increase in funding is a result of a change in the structure of the scheme itself, as the first two calls, eligible projects were required to be within TRL (technology readiness level) 2-6, and the scheme now requires projects to reach TRL-7. In an effort to create more collaboration between the three targeted sectors; the Academic, Private Enterprises, and Public Entities, a consortium complied of at least two different partners has become mandatory for a project to be eligible for funding. This structure will also be adopted for the 2023 call.

Five projects were awarded support following the first call which was launched in September 2020, Table 40. Three focused on water whereas another two projects dealt with solar panel optimisation using cooling systems and the deployment of power to X technologies in Malta, respectively.

Table 40 - Malta's R&I Scheme 2020 call beneficiaries

Project Acronym	Theme
Sigma	Track temporal and spatial changes in water content found in groundwater.
Wetsoil	Monitor hydrological water balance
Purilma	Better Quality Potable Water
IPCoSy	Solar panel incorporating the cooling system
Estelle	Deployment of BESS and P2X technologies

Six projects were selected following the second call which was published in March 2021, Table 41. This time round the majority of beneficiaries were working on energy related projects. Two projects complement each other, working on offshore breakwaters and the installation of floating renewable energy systems (res), and the potential of coupling offshore wind generation with a co-located hydrogen production plant. Another two projects focused on solar technologies. Of these, one project studies the effectiveness of different and perhaps cheaper alternatives to solar cells. The other project assesses the effect on efficiencies of PV panels resulting from the dusty environmental conditions of

the island. Finally, the water thematic focused project tackles water scarcity issues of the Maltese Islands as it plans to develop a controlled-source electromagnetic system to map submarine groundwater discharge and offshore groundwater resources. These projects are required to present their results and also publish findings.

Table 41 - Malta's R&I Scheme 2021 call beneficiaries

Project Acronym	Theme
SWAN	Track temporal and spatial changes in water content found in groundwater.
Siforce	Improving the efficiency of silicon-based solar cells
DustPV	A cost-effective dust-related power loss sensor to monitor daily and cumulative energy losses.
Revolt	Focuses on reducing the intermittency of energy generated from renewable sources through voltage regulation for the domestic/residential sectors.
Hydrogeneration	Seeking to investigate various technical aspects to enable the coupling of offshore wind generation and a co-located Hydrogen production plant.
Fortress	Floating breakwaters behavioural analysis in deep seas and Integration of Energy Storage.

For the calls of 2022, the scheme follows a similar structure, but projects are obliged to present an operational prototype in an ideal working environment. Projects as mentioned above can request up to €200,000 and must also form part of a consortium.

The third call, which was launched in June 2022, has two beneficiaries, with both beneficiaries working on energy-related research topics, Table 42. One of the projects will be studying and developing accessories for secondary use for electric battery packs found in electric vehicles once they are no longer deemed suitable for vehicles, whilst the other project will be working on enhancing and improving water-heating on a domestic scale.

Table 42 - Malta's R&I Scheme 2022 call beneficiaries

Project Acronym	Theme
PVpro	Integrated PV-Powered Water heating and battery systems
ReUse	Second life of EV Batteries

For the calls of 2023[218], the projects were also obliged to present an operational prototype in an ideal working environment. Projects could request up to €200,000 and must also form part of a consortium. The call issued in 2024[219] followed a similar structure to that of 2023.

Mediterranean Island Cleantech Innovation Ecosystem (MICIE)

In the second half of 2022, EWA partnered with other entities from Malta, Cyprus and the Netherlands in a joint project funded under Horizon Europe with partners called the Mediterranean Island Cleantech Innovation Ecosystem (MICIE). The project, which started in mid-2022, aims to create an Action Plan to improve research and innovation (R&I) in energy and climate in Malta and Cyprus. The Action Plan is based on several high-level actions resulting from stakeholder interaction workshops carried out in both Malta and Cyprus. In total, eight workshops, evenly split between the two islands, were conducted with relevant stakeholders.

The first workshop brought together relevant stakeholders for a generic workshop to gather R&I Ideas in the field of energy and climate. Post-workshop information analysis was conducted by the project partners, who identified three high-level thematic areas for the second set of workshops. The second set of workshops, consisted of three parallel sessions, addressing each theme. Each stakeholder group was tasked to identify three high-level sub-priorities under their respective themes, and identify the resources needed for each specific sub-priority. From this, actions for the Action Plan were extracted.

The action plan template was developed based on a non-exhaustive list covering the following areas: baseline, stakeholder interaction, actions, resource mobilization, budgets, progress monitoring, and multiannual work programs. Within each section, background information is provided along with guiding principles on how to execute each step, and templates are provided based on these principles.

ii. Current level of public and, if available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers

According to NSO, in 2022, the total expenditure on R&I in Malta amounted to €105.3 million, or 0.6% of GDP[220]. The Business Enterprise sector contributed 61.9% to the total R&I, whereas the Higher Education and Government sectors contributed 36.2% and 1.9% respectively.

The Government Budget Allocations for R&D (GBARD) for 2023 amounted to €50.4 million, an increase of €10.8 million when compared to 2022. Out of this allocation, around €1 million was allocated to R&I

[218] The Energy & Water Agency (2023), R&I Grant Scheme 2023. Available at: https://energywateragency.gov.mt/ri-grant-scheme-2023-3/

[219] The Energy & Water Agency (2024), R&I Grant Scheme 2024. Available at: https://energywateragency.gov.mt/ri-grant-scheme-2024/

[220] NSO (2024), Research & development in Malta: 2022. Available at: https://nso.gov.mt/research-development-in-malta-2022/

in energy whilst €224,000 was allocated to R&I in environment. The GBARD allocation for the past five years is presented in Table 43.

Table 43 - Government Budget Allocations for R&D (GBARD) by year and socio-economic objectives in € (Source: NSO)

	2019	2020	2021	2022	2023
Environment	166,219	382,057	565,343	422,217	224,000
Energy	10,915	200,452	675,575	1,396,750	1,050,000
Total	177,134	582,509	1,240,918	1,818,967	1,274,000

The private sector's Research and Innovation (R&I) expenditure in the fields of environment and energy is presented in Table 31, showing dynamic changes. Expenditure in the environmental sector saw a sharp decline from 2018 to 2019, before partially recovering at 798,209 by 2022. In contrast, R&I expenditure in the energy sector demonstrated a consistent upward trajectory, peaking at €523,420 in 2022. Overall, the total R&I expenditure across both sectors has rebounded in the last years, indicating a renewed focus on innovation in these socio-economically critical areas.

Table 44 -Private Sector R&I expenditure by relevant field of socio-economic objective. Source: NSO.

	2018	2019	2020	2021	2022
Environment	1,306,402	472,484	519,948	886,447	798,209
Energy	84,756	209,492	237,526	320,799	523,420
Total	1,391,158	681,976	757,474	1,207,246	1,321,629

Current Number of Patents

According to Eurostat, a total of 59 patent applications were registered with the European Patent Office (EPO) in 2023. The average number of patent applications for Malta in the past six years, shown in

Table 45, is 59.8.

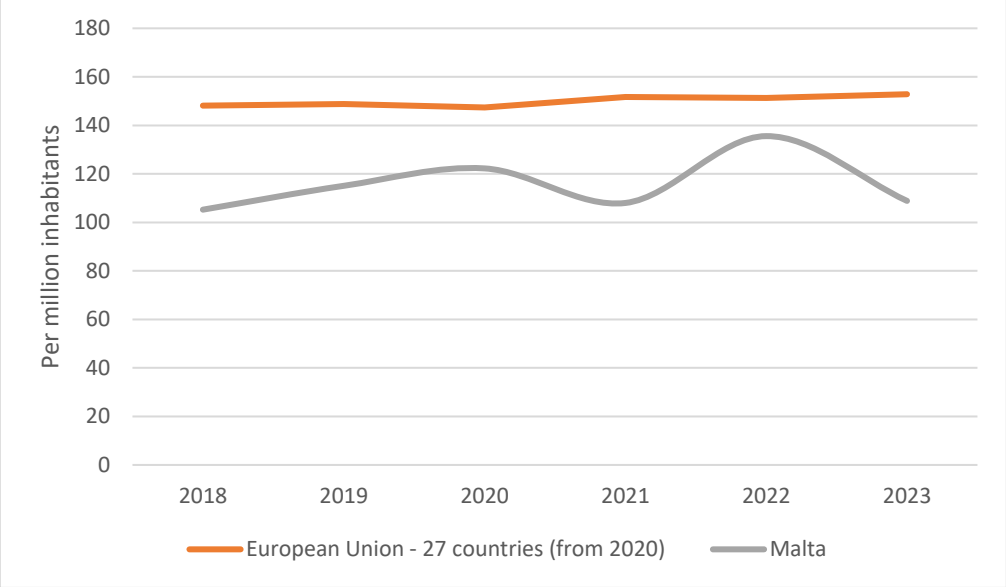
Table 45 – Number of patent applications to the EPO. Source: Eurostat.

	2018	2019	2020	2021	2022	2023
Number of Applicants	51	58	63	56	72	59

The number of patent applications per million inhabitants is lower for Malta when compared to the EU, as seen in Figure 96. In 2023, Malta had 108.85 applicants per million inhabitants, whilst the EU average stood at 152.82 applicants per million inhabitants. Malta was closest to the EU average in 2022, where Malta registered 135.56 applications per million inhabitants compared to the EU average

of 151.25 applications per million. One contributing factor to Malta's lower number of patent applications per million inhabitants could be its economic scale and diversification. As a small island nation, Malta's economy is not as large or as diversified as those of larger EU countries. This smaller economic scale can limit the resources available for private investment in research and development (R&D), which is a key driver of innovation and patent applications. Furthermore, Malta's economy is predominantly service-based, with a significant focus on sectors such as tourism, finance, and gaming. These sectors typically have a lower propensity for patentable technological innovations compared to high-tech or manufacturing industries.

Figure 96 – Patent applications to the EPO per million inhabitants, Malta vs. EU. Source: Eurostat.



Current Number of Researchers

In 2022, a total of 3,419 employees in Malta were engaged in R&I[221]. The highest R&D employment was registered in the Higher Education sector, at 1,664 employees, followed by the Business Enterprise sector, with 1,528 employees. The total number of researchers between 2019 – 2022, as reported by NSO, is shown in Table 46, which shows a steady increased in R&D employment over the time period.

[221] NSO (2024), Research & development in Malta: 2022. Available at: https://nso.gov.mt/research-development-in-malta-2022/

Table 46 - R&D employment between 2019-2022. Source: NSO.

	2019	2020	2021	2022
Government	33	55	164	227
Business Enterprise	1,129	1,369	1,374	1,528
Higher Education	1,408	1,448	1,549	1,664
Total	**2,570**	**2,872**	**3,087**	**3,419**

Out of the total number of researchers (Table 47), an average of 51% are engaged in fields relating to the Energy Union dimensions, that is Natural Sciences, Engineering and Technology and Agricultural sciences. The trend from shows a growing number of researchers within these relevant fields.

Table 47 - Number of researchers by relevant fields of science between 2014-2017 (Source: NSO)

	2018	2019	2020	2021	2022
Natural Sciences	364	357	322	338	367
Engineering & Technology	411	431	518	538	680
Medical & Health Sciences	223	234	246	393	456
Agricultural Sciences	36	20	22	35	40
Social Sciences	306	346	365	380	390
Humanities & The Arts	163	171	178	181	192
Total of relevant fields of science	811	808	862	911	1,087
Total of all fields of science	1,503	1,559	1,651	1,865	2,125

iii. Breakdown of current price elements that make up three main price components (energy, network, taxes/levies)

In Malta, there are four components making up the price of electricity for household and non-households: energy and supply, network costs, excise tax and VAT. These figures are published by the Eurostat on a yearly basis, and can be found in Table 48[222] and Table 49[223].

Malta has one electricity supplier, Enemalta plc, which also performs the functions of a DSO and some of the functions of a TSO, albeit not being considered as a TSO. Enemalta is also responsible to dispatch electricity sources on economic merit within the technical limits. All consumers are on a regulated tariff and electricity prices reflect the overall costs incurred by Enemalta to perform the above functions. The tariffs adopt a rising block structure to incentivise energy efficiency whilst taking due account of the need to secure the competitiveness of local industry.

For both household and non-household prices, the yearly network-associated price component was €0.027 per kWh in 2023. A 5% VAT and an excise tax that is fixed at €0.0015/kWh are also applicable to both. The energy and supply component varies according to the regulated tariff bands as approved by the REWS. Costs associated with security of supply are internalized whereas support for renewable energy is financed through central government budget.

Table 48 -Main price components by tariff bands in the non-household sector in 2023, € nominal. Source: Eurostat.

Year 2023	ALL Bands	Band 1A	Band 1B	Band 1C	Band 1D	Band 1E	Band 1F
	(1A-1F)	<120 MWh	20 MWh -499 MWh	500 MWh – 1099 MWh	2000 MWh – 19,999 MWh	20,000 MWh – 69,999 MWh	70,000 MWh – 149,999 MWh
Energy and Supply, €/kWh	0.1092	0.1906	0.1254	0.1095	0.0916	0.0752	0.0695
Network costs, €,kWh	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270
Excise Tax, €,kWh	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
VAT (taxes/levies) €,/KWh	0.0069	0.0110	0.0077	0.0069	0.0060	0.0052	0.0049
Total, €/kWh	***0.1446***	***0.2301***	***0.1616***	***0.1449***	***0.1261***	***0.1089***	***0.1029***

Table 49 - Main price components for the household sector in 2023, € nominal. Source: Eurostat.

Year 2023	ALL Bands	Band DA	Band DB	Band DC	Band DD	Band DE
	(DA-DE)	< 1000 kWh	1000 kWh - 2499 kWh	2500 kWh - 4999 kWh	5000 kWh - 14999 kWh	>= 15000 kWh
Energy and Supply, €/kWh	0.1108	0.304	0.1103	0.0925	0.1039	0.2487
Network costs, €,kWh	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270
Excise Tax, €,kWh	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
VAT (taxes/levies) €,/KWh	0.0070	0.0166	0.0069	0.0061	0.0660	0.0139
Total, €/kWh	***0.1463***	***0.3491***	***0.1457***	***0.1271***	***0.1984***	***0.2911***

[222] Eurostat (2024), Electricity prices for non-household consumers - annual data (from 2007 onwards). Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_205_c__custom_12692751/default/table?lang=en

[223] Eurostat (2024), Electricity prices for household consumers -annual data (from 2007 onwards). Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_204_c__custom_12692270/default/table?lang=en

iv. Description of energy subsidies, including for fossil fuels

The Government's ambition is to provide its citizens with secure, affordable and clean energy solutions. Malta's recent investment in the energy sector is aimed to build sufficient capacity to match the forecasted growth in electricity demand in the foreseeable future. The strategy hinges on an electricity mix made up of renewables, interconnection capacity and high efficiency generators. Moreover, the plans for the development of a hydrogen ready pipeline between Malta and Sicily remain in place, after having been updated to also enable the transport of pure hydrogen and hydrogen blends in 2023. The necessary permits from Maltese and Italian authorities have been obtained for the pipeline considering natural gas transmission, and its materialisation is contingent upon securing EU funding and the development of the hydrogen market.

Electricity generation from PV continues to be a principal contributor that enables Malta to meet its renewable targets. Support schemes are still issued periodically in line with State Aid Guidelines. Such schemes are usually in the form of feed-in premium or grants, the latter being reserved for small residential systems. They are funded from the central government budget. Standards and Guidelines for PV installations, tailor-made for Malta's specific conditions, have been developed. The standards clearly lay out best practices for improved quality, safety and aesthetics in PV installations.

Whilst the deployment of photovoltaic installation remains the major contributor of renewable energy generation in Malta, it is clear that space restrictions are bound to act as a constraint. It was therefore necessary to consider new opportunities brought about by developments in floating offshore technologies. In this context, a regulatory framework as well as an ad-hoc policy is being developed to support such deployment.

Subsidies are not limited to renewable energy systems. In order to reduce transport-related emissions as well as promote electrification, financial support is provided for the purchase of electric vehicles, conversion of ICE vehicles to use LPG, retrofitting of solar photovoltaic panels on passenger transport vehicles, retrofitting of DPFs and SCR systems on heavy duty vehicles, and retrofitting of battery electric powertrains on motor vehicles.

Malta, as part of the EU, has committed within the international fora 'to accelerate efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies'. Bearing in mind Malta's specificities, there are no plans to phase out any energy subsidies at this particular juncture, while remaining committed to, inter alia, encourage the adoption of technologies that can help reduce greenhouse gas emissions.

5. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES

5.1. IMPACTS OF PLANNED POLICIES AND MEASURES DESCRIBED IN SECTION 3 ON ENERGY SYSTEM AND GHG EMISSIONS AND REMOVALS, INCLUDING COMPARISON TO PROJECTIONS WITH EXISTING POLICIES AND MEASURES (AS DESCRIBED IN SECTION 4).

Malta remains committed to contribute towards the EU collective target of climate neutrality by 2050. The policies and measures outlined in section 3 are in principle based on the packages of measures outlined in the Low Carbon Development Strategy, complimented by other additional policies and measures which have been introduced, adopted or planned following the publication of the LCDS.

The main contributing sectors identified in the LCDS towards GHG emissions in Malta are those related to energy systems, transport and to a lesser extent waste. The impact of the policies and measures identified in the LCDS has been estimated through the compilation of a Marginal Abatement Cost Curve (MACC) within the context of the low carbon development strategy. A Marginal Abatement Cost Curve (MACC) serves as a valuable tool to strategically determine pathways for decarbonization by taking into account cost-effectiveness. In this manner, a balanced approach between GHG emissions abatement and economic costs is ensured. Based on the outcome of the MACC compilation, sectoral measures were identified for the interim (2030) and long term goals (2040, 2050).

The qualitative impact assessment conducted on the NECP update (refer to section 5.2) has been instrumental in ensuring that the proposed updates are in harmony with the strategic directions set forth in the LCDS. This assessment has evaluated the effectiveness, coherence, and synergies of the updated NECP measures with the sectoral actions identified in the MACC, thereby reinforcing the commitment to achieving Malta's decarbonization targets. The assessment also considers the socio-economic implications of transitioning to a low-carbon economy, ensuring that the NECP update supports sustainable development while contributing to the overarching goals of the LCDS.

Country specific challenges and considerations

Malta faces inherent challenges that pose obstacles to successfully reducing emissions. These challenges, previously discussed in other sections, revolve around Malta’s specific circumstances as a small island member state with limited access to raw materials, thereby heavily dependent on imports and trade for economic activity.

The difficulties Malta encounters in achieving emission reduction, as outlined in its NECP 2019, persist and remain relevant. These challenges include:

- Unique characteristics of Malta's energy system and market, such as its small scale, absence of natural gas and district heating and cooling networks, and limited number of suppliers and market players. These factors collectively restrict the range of measures available to meet energy-saving obligations.
- Geographic, environmental, and spatial constraints, such as limited land area and high population density, coupled with a rich but delicate natural environment and climate conditions. These constraints limit the options for modal shifts to reduce carbon emissions, and the economies of scale hinder the adoption of alternative technologies.

Limited mitigation potential due to Malta's service-based economy. With Malta being already one of the lowest emitters per capita, there is limited mitigation potential. This means that there are high mitigation costs and significant socio-economic considerations. Addressing these challenges requires careful consideration and strategic planning to find suitable and effective solutions for Malta's unique circumstances in the pursuit of emission reduction goals.

Air quality

Air quality and decarbonization are closely interconnected since they share common sources of pollution. In fact, the policies and measures outlined in section 3 are in line with the policies and measures specified in the air quality plan issued by the Environment and Resources Authority as per regulations 32 of the Ambient Air Quality Regulations (SL 549.59). This alignment signifies a coordinated approach to address both decarbonization and air quality concerns, ensuring a comprehensive strategy to tackle shared sources of pollution and promote sustainable development.

Water Management

The Maltese islands, with their semi-arid Mediterranean climate, face challenges related to water scarcity. During the summer, there is a general lack of rainfall and limited exploitable surface waters. The primary source of natural freshwater available throughout the year is groundwater, which has been experiencing degradation in quality and quantity due to nitrate pollution and seawater intrusion.

One of the effects on the water quality and quantity status is an increase in extreme storm events and more frequent flash floods. As these extreme events become more common, as a result of climate change, and with the increased urbanisation which occurred over the years, the ground becomes less capable of absorbing water runoff and subsequently the percolation of water runoff into the water table. This diminished absorption will eventually lead to greater run-off, which in turn may cause floods, resulting in damage to infrastructure and property if not properly managed. Proper water resource management becomes crucial to mitigate the impacts of climate change on water availability and to address potential flooding risks effectively.

Since the 1980s, Malta has relied on desalination of seawater to supplement its potable water supply. Water scarcity combined with the effects of climate change on water resources poses significant pressures on the country. Climate change can impact the hydrological cycle, leading to several consequences. In view of this, the NECP aligns with the measures that are set to be committed as part of the development and implementation process of the 3rd River Basin Management Plan which is based on the conjunctive application of water supply diversification and water demand management measures – progressively in an environmentally sustainable manner. Sustainability in this case includes also energy efficiency/management measures, where 11% of measures included under Malta's 3rd River Basin Management Plan are related to Energy efficiency. The Public Works Department (PWD) is also in the process of drafting a manual and a policy guidance document for Green Infrastructure as part of the LIFE IP RBMP Malta Project, led by the Energy and Water Agency. In addition, the PWD is actively implementing five pilot projects to showcase the effectiveness of Green Infrastructure in addressing surface water runoff. These initiatives involve the cleaning and restoration of water courses to improve stormwater infiltration and storage, along with the installation of Sustainable Urban

Drainage Systems in designated play areas. The pilot projects have secured a financial commitment of €2.3 million, with 80% of the funding coming from the EU. Finally, given Malta's reliance on desalination, which together with the other water services being offered by the national water utility, consumes around 6% of the country's total electricity consumption goes towards the production of water, wastewater and reclaimed water services of which 4% goes towards desalination solely), efficiency in the water sector becomes an important aspect. The primary motivation for water sector efficiency is the limitation in the supply of natural fresh water on the island, leading to the necessity of using desalination plants currently meeting 65% of the national water demands. The national water utility water services in Malta aims for better water production and distribution energy efficiencies and endeavours to contain distribution network leakages, currently distinguished by a noteworthy national infrastructure leakage index (ILI) as low as 1.8. This focus on efficiency is also driven by tariff mechanisms that encourage users to stay within the lower 'efficient water use' tariff band. In fact, Malta's National Investment Plan (NIP) has a strong focus on leakage management through the renewal of designated stretches of distribution and transfer mains and less energy intensive desalination and water transfers. Moreover, in 2023, Water Services Corporation (WSC) launched a €25 million issuance of Green Bonds through ClearFlowPlus plc, marking these as the first to be listed on the Malta Stock Exchange. These Green Bonds are funding five major green projects, which were earmarked for their potential to impact WSC's environmental footprint positively and contribute effectively to Malta's sustainability journey. During the same year, disbursement had already kicked off, with the first portion of bond proceeds disbursed to refinance part of the Ħondoq Reverse Osmosis (RO) plant. This plant uses cutting-edge technology to lower the specific energy used in RO production. Other projects include a revamped aeration system for the Ta' Barkat wastewater treatment plant, installation of PVs on existing buildings, a revamp of the non-revenue water billing algorithm and the renewal of potable water mains to reduce leakage and improve water quality.

Efficiency measures in the water sector are essential due to the challenges in addressing the ever-increasing demand for fresh water supply and the limited natural available freshwater resources. Any improvements in the efficiency of water supply would not only benefit the sector but also lead to reduced energy requirements, consequently contributing to the reduction of greenhouse gas (GHG) emissions. By adopting water-efficient practices, Malta can optimize further the current cycle for the production, conveyance and disposal of its water resources, reduce energy consumption from the desalination processes and make significant strides towards mitigating its carbon footprint and supporting overall GHG emission reduction goals. To this effect, the most recent Reverse Osmosis plant that was built in Gozo is considered a 'state of the art' RO plant in terms of its low energy consumption required to operate. This showcases the commitment to fulfil investments that are in line with such objective in mind. Further progress in the water management sector is also being conducted at national/regional level and has contributed to reduced water leakages in the network of circa 100 GWh of energy in the last decade. This was coupled with investments in RO plant upgrades which rendered additional savings of circa 158 GWh over the same period, measuring a total of 258GWh of energy savings between 2014 and 2023.

i. Projections of the development of the energy system and GHG emissions and removals as well as, where relevant of emissions of air pollutants in accordance with Directive (EU) 2016/2284 under the

planned policies and measures at least until ten years after the period covered by the plan (including for the last year of the period covered by the plan), including relevant Union policies and measures.

This section includes a list of the policies and measures under Malta's WPM scenario. The measures that have been modelled within Malta's energy modelling framework are explicitly represented in the results and outcomes of the WPM scenario presented in the sections hereunder. It is important to note that the RES projections and targets presented under the WPM scenario are in line with the revised Renewable Energy Directive (REDIII).

Table 2 below lists the policies and measures which are included in the WEM scenarios respectively. Given that this is an update of the 2019 NECP, a number of measures in the WEM were originally WPM measures in the 2019 NECP. Measures in the WEM are also contributing to the achievement of the 2030 targets. The WPM measures being proposed as part of the NECP update impact only the supply side and thus the energy mix, not the demand side.

Table 50 - All policies and measures under the WEM scenario

PAM Number	Name of Policy or Measure	Modelled PAMs
2	Manure and slurry management	x
	Renovation of public buildings	x
	Incentives for increasing energy efficiency in buildings	x
11	Commissioning of second interconnector	✓
15	Financial incentives to increase renewable energy installations	✓
17	Medium to Large scale Solar PV Installations	✓
20	Utility-scale battery storage solutions	✓
23	Shore-to-ship projects	✓
	EE schemes for industries and services	✓
	Public sector leading by example	x
	Replacement of appliances in vulnerable households scheme	x
	Energy efficient street lighting	✓
	Projects in primary water network and wastewater treatment plants	✓
	Implementation of the f-gases regulation	x
	Electrification of vehicles	✓
	Incentivise active transportation modalities	x
50	National free transport service	✓

	Biofuels substitution obligation (2021-2030)	✓
	Road and infrastructure projects	✓
67	Free public transport for school children	✓
70	High bio-waste capture	✓
72	Waste-to-Energy facility	✓
	Eco-reduction in electricity tariffs	x
	Incineration pre-sorting	x
81	Investments in Agrovoltaics	x

Dimension Decarbonisation – GHG emissions and removals

Projections in the ESR sector

The Government of Malta has demonstrated a strong commitment to reducing emissions through a variety of measures and initiatives. The aggregated effect of the With Existing Measures (WEM) scenario compared to the With Policy Measures (WPM) scenario is illustrated in Figure 97 and Figure 98, providing a comparative analysis for the non-ETS emissions sectors.

Figure 97 - ESR emission projections by sector, WPM Scenario

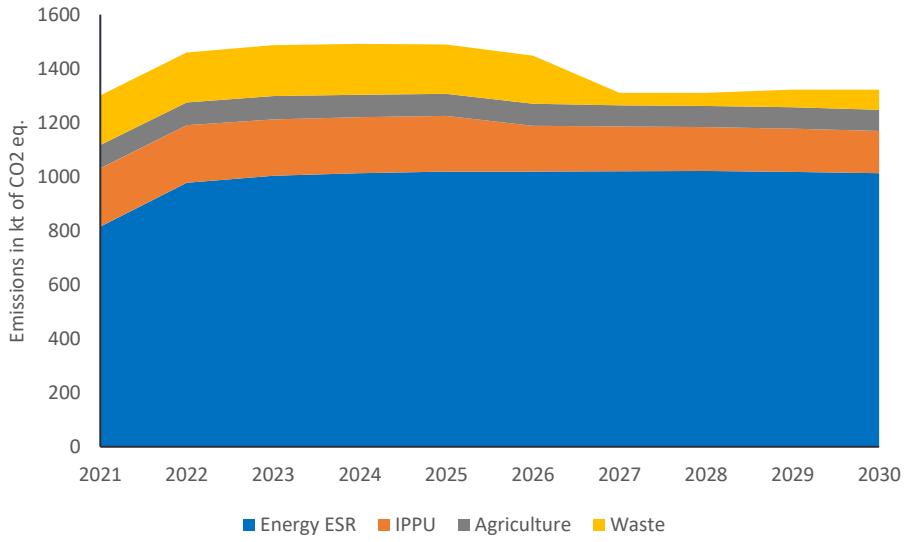
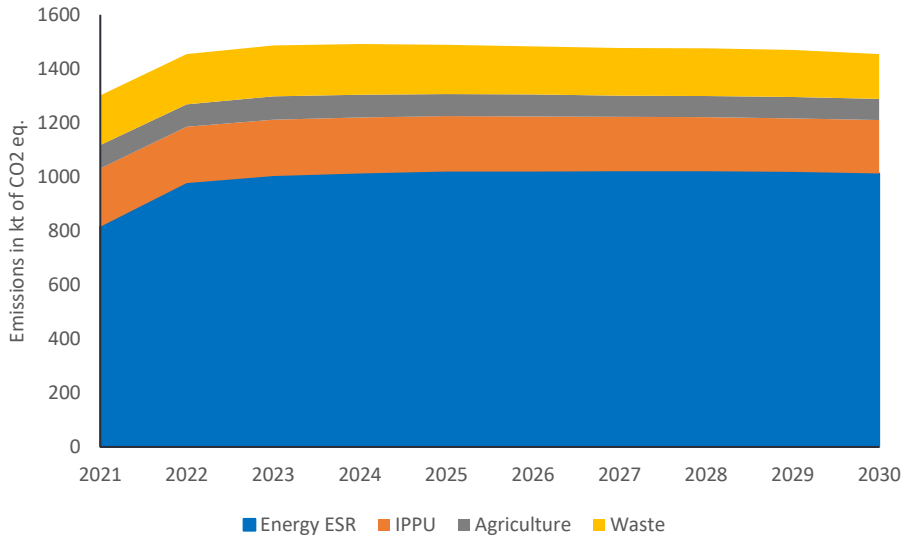


Figure 98 - ESR emissions projections by sector, WEM Scenario



Notably, several measures that were previously part of the WPM scenario in the 2019 NECP have now been incorporated into the WEM scenario in this update, particularly in the transport sector. For instance, the electrification of 65,000 vehicle equivalent is expected to result in savings of 70.73 kt of CO_2. Additionally, the biofuel obligation for petrol and diesel fuel suppliers, results in CO_2 from biomass amounting to 48.45 kt.

Furthermore, the Government is considering additional measures and initiatives for adoption in the transport sector. The Ministry for Transport is developing a comprehensive strategy to enhance the nation's transportation infrastructure. The plan includes key proposals such as implementing a 24-hour economy to alleviate peak-hour congestion, revisiting and optimising public transport routes, and establishing a Coordination of Works committee to streamline road works. It also aims to address parking challenges by expanding park-and-ride facilities and utilizing government properties for parking. To reduce private vehicle usage, the plan is considering financial incentives, carpooling initiatives, and updates to the Employee Transportation Deduction Act. A strong emphasis is placed on sustainable mobility, with proposals for a national walking/cycling strategy. The long-term vision integrates land and sea public transport systems, featuring Bus Rapid Transit (BRT), feeder buses, and expanded ferry services, aiming to create a more efficient and sustainable transportation network for Malta.

A new measure has been included in the waste sector under the WPM scenario, which involves the addition of new gas capture equipment for existing landfills in Malta. This landfill gas extraction measure is expected to have a significant impact by 2030, making it a very impactful measure for the waste sector emissions. The project aims to increase extraction points and biogas generation throughout the landfill once it has been closed, incorporating drilling, necessary pipework, and the construction of biogas wells, as well as the installation of a new Combined Heat and Power (CHP) and Regenerative Thermal Oxidizer (RTO) system.

In line with Regulation (EU) 2024/573 on fluorinated greenhouse gases, Malta will promote the recovery, recycling, reclamation, and destruction of fluorinated greenhouse gases from containers, products, and equipment prior to their disposal. These activities will be performed by appropriately

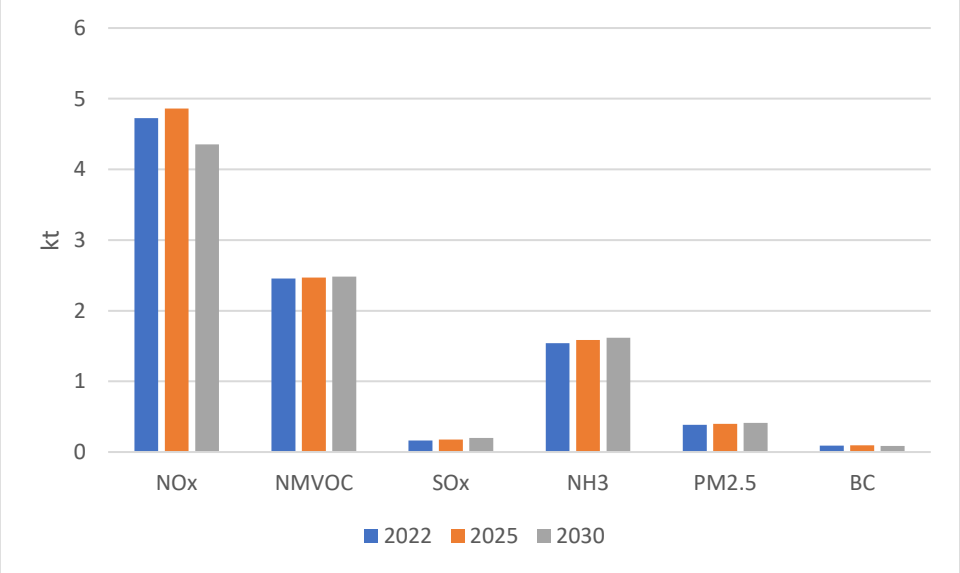
qualified individuals, ensuring that fluorinated greenhouse gases that would otherwise be emitted are instead adequately recycled, reclaimed, or destroyed. Through these comprehensive measures and initiatives, the Government of Malta is making significant strides in reducing emissions in the IPPU sector.

In relation to the National Air Pollution Control Programme, Malta is still working out its projections and hence any values expressed below are still subject to further changes based on further sectoral information that may reach the local Environment and Resources Authority (ERA) post the NECP submission. As a result of this, figures portrayed below should be viewed as preliminary indications.

The NEC Directive (2016/2284/EU) requires Member States to draw up a National Air Pollution Control Programme (NAPCP), which should contribute to reduce air pollutant emissions for the purpose of reaching compliance with the national emission reduction commitments under the same Directive and to improve air quality in line with the limit values set out in the Ambient Air Quality Directive (2008/50/EC). Additionally, NAPCPs should be consistent with other relevant plans and programmes, including climate policies. For this reason, alignment between Malta's Draft NECP and NAPCP processes was ensured, whereby the assumptions and outputs of one exercise fed into the other and vice-versa. The Environment and Resources Authority (ERA) is the government body responsible for the development of the NAPCP.

Figure 99 shows the national total emissions of air pollutants on the Maltese territory split by the five main pollutants, including black carbon. The projected trends show a small decrease in emissions for NO_x and NMVOC, and a stable trend for the remaining pollutants.

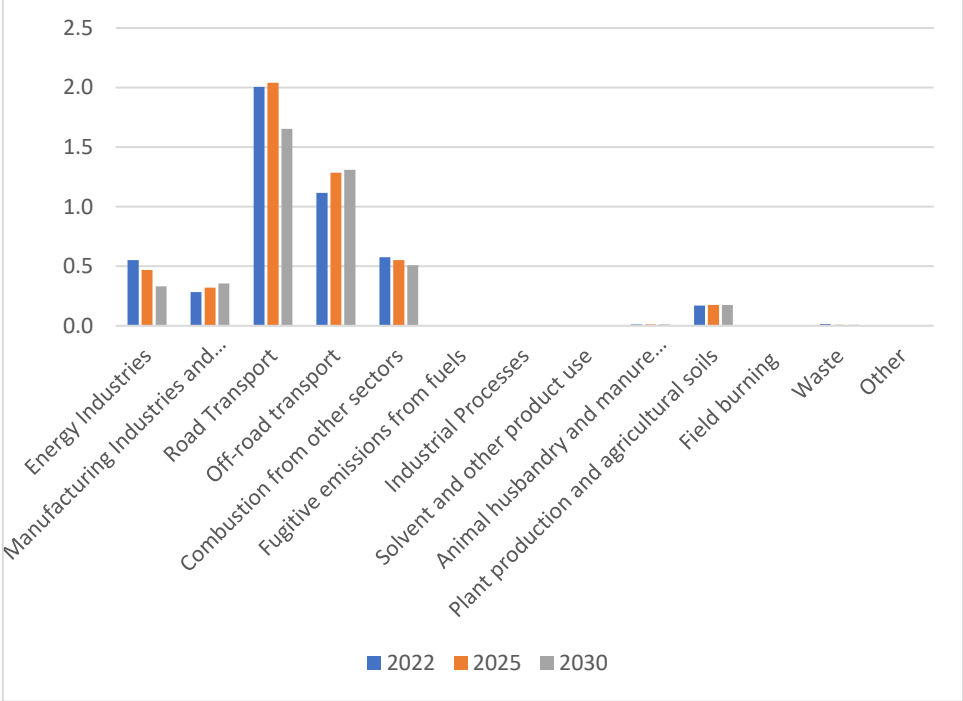
Figure 99 - National total air polluant emission projections, kt



Nitrogen Oxides (NO_x) emissions are expected to decrease by 8% in 2030 for the projected period, when compared to 2022. Nevertheless, it is worth noting that emissions need to decrease by 57% from 2022 to achieve the emission reduction commitment in 2030. Nitrogen oxide emissions are most prevalent in the 'Road transport' sector – it is expected however, that NO_x emissions in 'road transport' should decrease by 18% by 2030, because of newer vehicle technologies, and increased electrification. To calculate NO_x emissions in the road transport sector, the outputs of the vehicle profile model and vehicle kilometre projections were used as input to COPERT. The largest NO_x level increases, compared

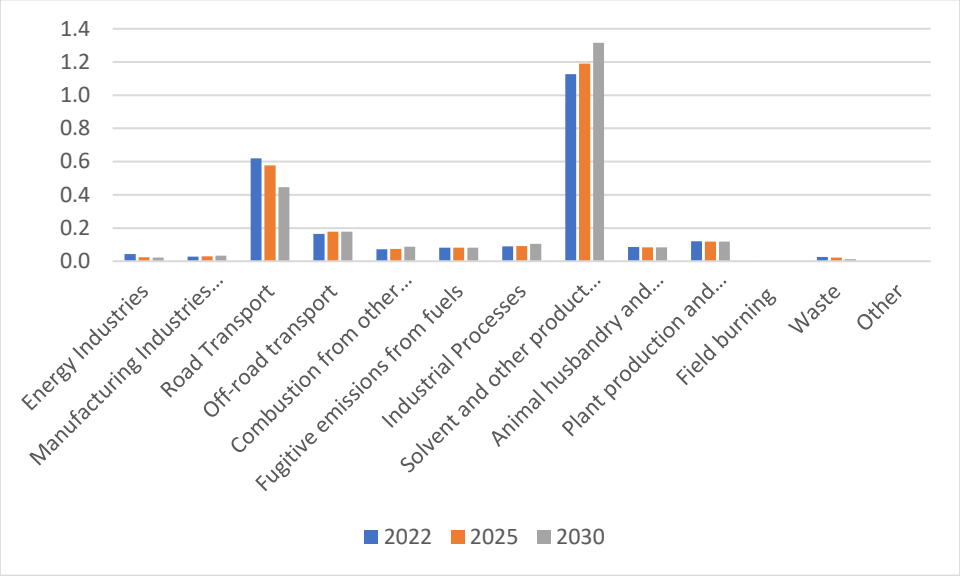
to 2022 emissions, are expected in the 'Energy Industries' sector, as a result of the commissioning of the new Waste-to-Energy facility in 2028. The increase in emissions from this sector was partly mitigated through the introduction of a second interconnector, which will reduce the quantity of fuel combusted. NO_x emissions are also expected to increase in the 'Off-road transport' sector, which considers emissions from national shipping and aviation, as well as 'Manufacturing Industries and sectors', following a projected increase in fuel use consumption. Figure 100 shows the projected NO_x emissions by sector.

Figure 100 – NO_x emission projections by sector, kt



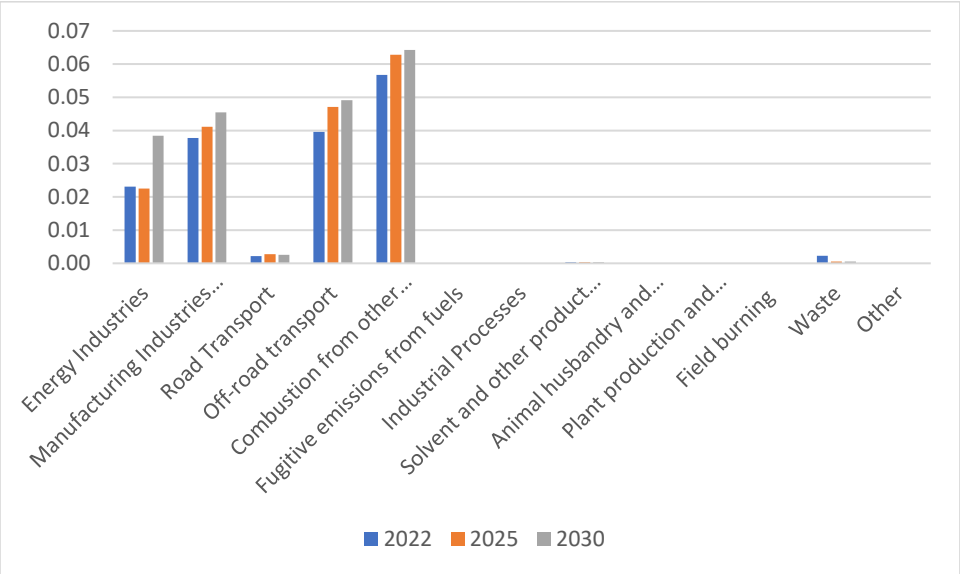
Non-methane volatile organic compounds (NMVOCs) are expected to increase by 1% in 2030 for the projected period, when compared to 2022, mainly as a result of an increase in emissions the 'Solvents and other product use', and a decrease in the 'Road transport' sector. Concerning the 'Road transport' sector, it is expected that NMVOC emissions will decrease by 28% by 2030, due to fleet renewal and an increase in the rate of vehicle electrification. On the other hand, NMVOC levels are expected to rise by 14% in the 'Solvents and other product use' sector. This increase can be attributed to an increase in product consumption, as both the population and the GDP of the Maltese Islands are expected to increase in 2030. Additionally, NMVOC emissions will be reduced from the 'Waste' sector following the partial closure of the landfill in 2026, the complete closure of landfills in 2029, and the commissioning of the landfill gas extraction system in 2027. However, as seen in the figure below, the total emission reduction contribution from the 'Waste' sector is minor. Projected NMVOC levels are shown in Figure 101.

Figure 101 - NMVOC emission projections by sector, kt



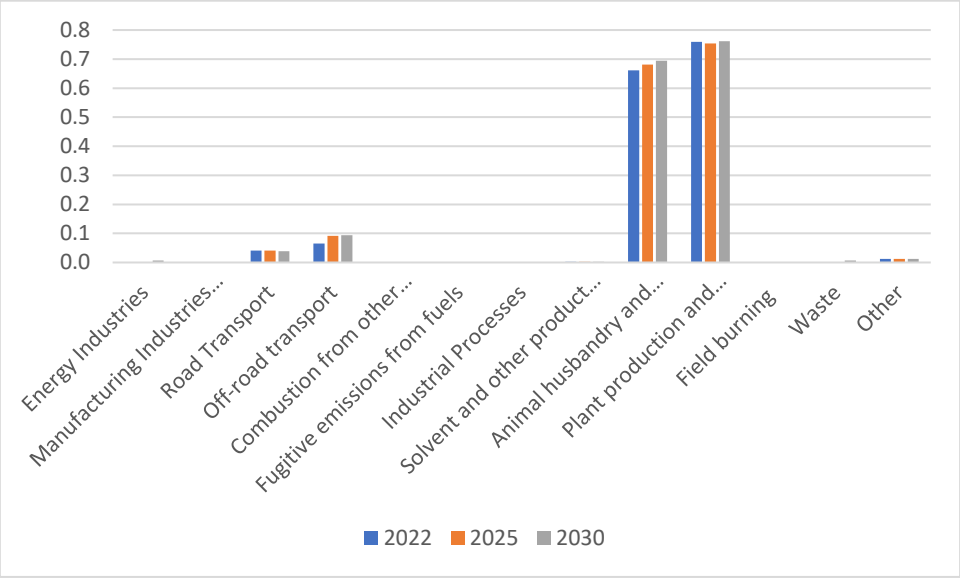
Sulphur dioxide (SO_2) emissions are projected to increase by 24% in 2030 for the projected period, when compared to 2022. However, it is worth noting that the emissions of SO_2 have decreased by almost 99% in 2022 compared to 2005, following a reform in the 'Energy industries' sector. The projected increase in SO_2 emissions can be observed within multiple sectors, such as: 'Energy industries', 'Manufacturing Industries and Construction', 'Off-road transport', and 'Combustion from other sectors'. In all cases, this increase in emissions is derived from an increase in projected fuel consumption. Projected SO_2 levels are shown in Figure 102.

Figure 102 - SO2 emission projections by sector, kt



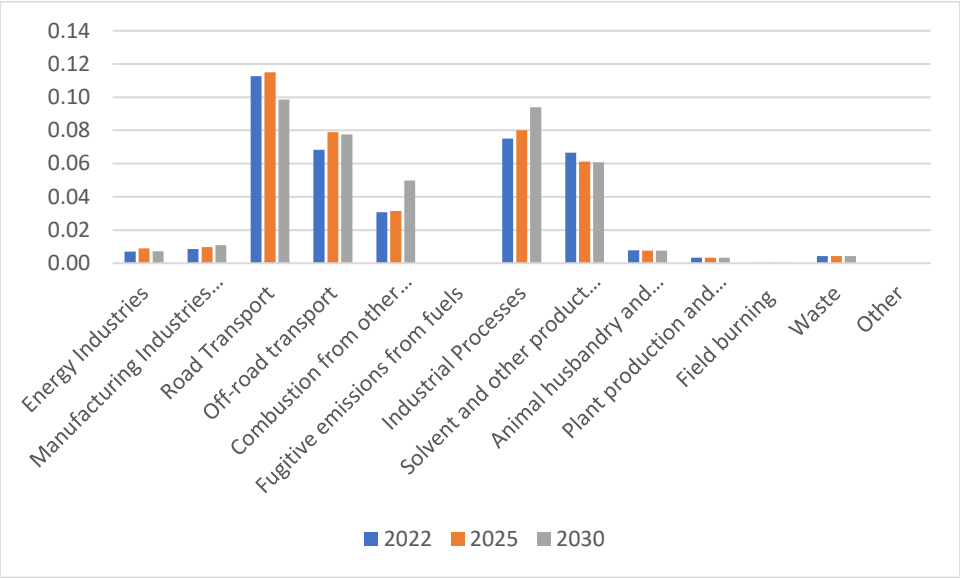
Ammonia (NH_3) emissions are projected to increase by 5% in 2030 for the projected period, when compared to 2022. Nevertheless, it is worth noting that emissions need to decrease by 11% from 2022 to achieve the emission reduction commitment in 2030**.** More than 90% of NH_3 emissions are derived from 'Animal husbandry and manure management' and 'Plant production and agricultural soils'. These sectors mainly refer to the emissions of NH_3 from manure storage, and the application of manure and synthetic fertilisers. The increase in emissions can be attributed to small increases in the quantity of animal heads. NH_3 emission projections are provided in Figure 103.

Figure 103 - NH3 emission projections by sector, kt



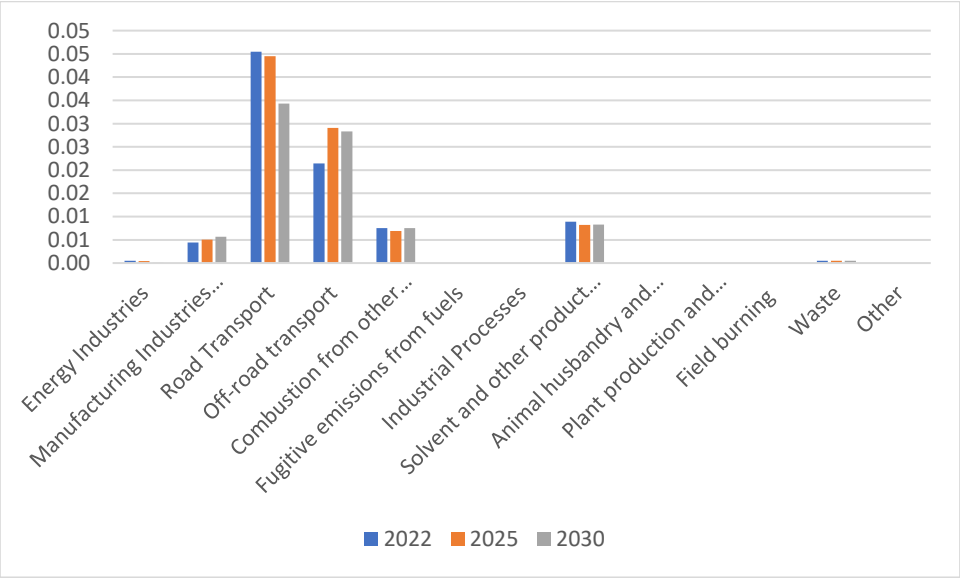
Fine particulate matter ($PM_{2.5}$) emissions are projected to increase by 8% in 2030 for the projected period, when compared to 2022. Nevertheless, it is worth noting that emissions need to decrease by 2% from 2022 to achieve the emission reduction commitment in 2030. Exhaust emissions are expected to decrease in the 'Road transport' sector, due to the increased electrification of vehicles, as well as fleet renewal. Nevertheless, it is worth noting that work is being carried out on improving the estimate for non-exhaust emissions from electric vehicles and hence are not being included within these calculations. Additionally, a small decrease in emissions is observed for 'Solvent and other product use', due to a small decrease in the projected quantity of asphalt laid on roads. Notable increases in emissions came from the combustion based sectors, such as 'Off-road transport' and 'Combustion from other sectors'. These increases are a result of the projected increase in fuel consumption for the residential sector and the increased number of landing and take-off cycles for international aviation. $PM_{2.5}$ emission projections are provided in Figure 104.

Figure 104 - PM2.5 emission projections by sector, kt



Black carbon (BC) emissions are projected to decrease by 5% in 2030 for the projected period, when compared to 2022. There are no emission reduction commitments for BC. The most significant emissions reductions were in the 'Road transport' sector due to the increased electrification of vehicles, as well as fleet renewal. In contrast, emission increases were noted in 'Off-road transport', due to increases in projected fuel consumption under recreational crafts. BC emission projections are provided in Figure 105.

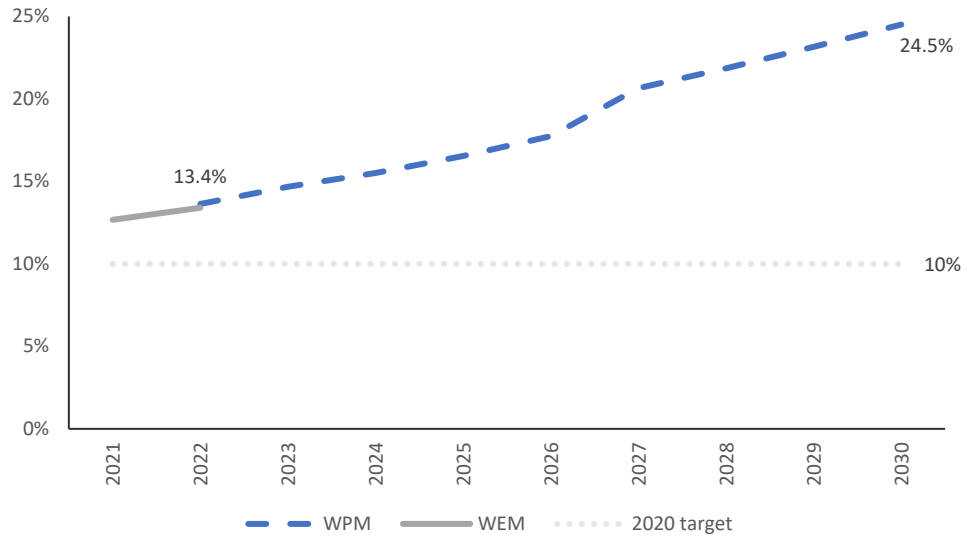
Figure 105 - Black carbon emission projections by sector, kt



In line with Annex I of the Governance Regulation (EU) 2018/1999, Malta's overall RES contribution in 2030 represented as a RES share in total gross final consumption of energy is presented in Section 2.1.2 of this plan. Likewise, estimated trajectories for the sectoral share of RES in final energy consumption and by technology are also provided within Section 2.1.2. In order to avoid repetition, this section is intended to provide a general overview of Malta's WPM scenario projections in the area of renewable energy.

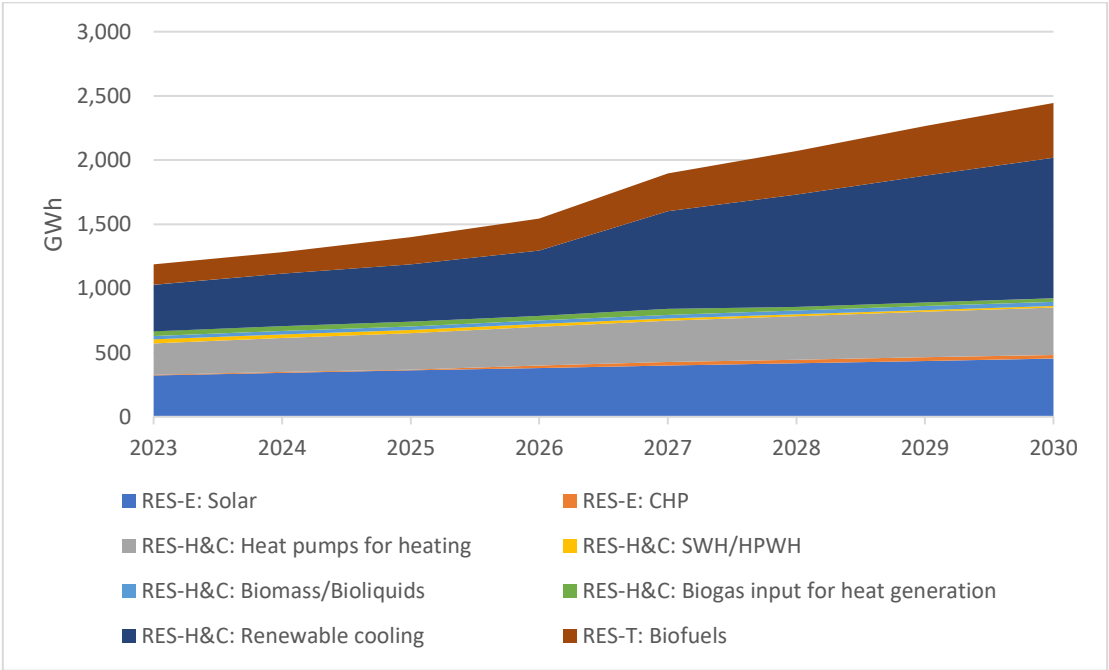
Figure 106 provides an overview of Malta's RES share trajectory from 2010 to 2030, whilst comparing the WEM and WPM scenarios. Based on these estimated projections and historical figures, Malta has reached its 10% RES target in 2020. Malta is expected to continue increasing its RES share gradually annually, reaching a 24.5% RES share by 2030.

Figure 106 - RES Share in Final Energy Consumption



The projected evolution of RES share by technology under the WPM scenario from 2023 to 2030 is provided in Figure 107. Policies and measures for the period post-2030, namely related to offshore renewable energy development, have been detailed in Section 3.1.2.

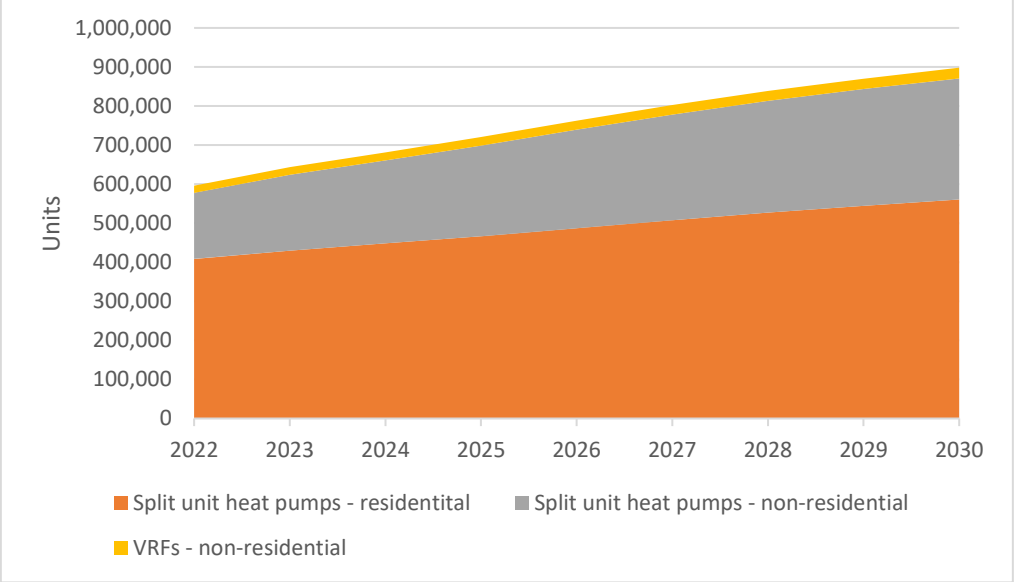
Figure 107 - RES technology consumption under WPM



RES Heating and Cooling

Ambient cooling from heat pumps is projected to have the most significant contribution to the heating and cooling sector. The affordability of this technology combined with the continual rise in expectations of thermal comfort ensures sustained growth, also reflecting demographic changes. In 2021, the estimated number of split-unit heat pumps installed in Malta stood at 519,000. The share of households with at least one heat pump (air conditioner unit) stood at 78% in 2021 (Source: NSO-EWA 'Household Energy' survey). This uptake is expected to continue with the share of households with heat pumps reaching 93% in 2030. Furthermore, the number of heat pumps per representative 'household with heat pump' is also projected to increase to 2.3 in 2030 and their use in SMEs and large enterprises for both heating and cooling has also been on the rise. Under the WPM scenario, the stock of split-unit heat pumps in the residential sector is projected to grow from 408,768 units in 2022 to 560,725 units in 2030. In the non-residential sector, the number of split-unit heat pumps is expected to increase from 168,879 units in 2022 to 309,865 units in 2030. Additionally, the number of VRFs (Variable Refrigerant Flow systems) in the non-residential sector is projected to grow from 18,251 units in 2022 to 27,655 units in 2030.

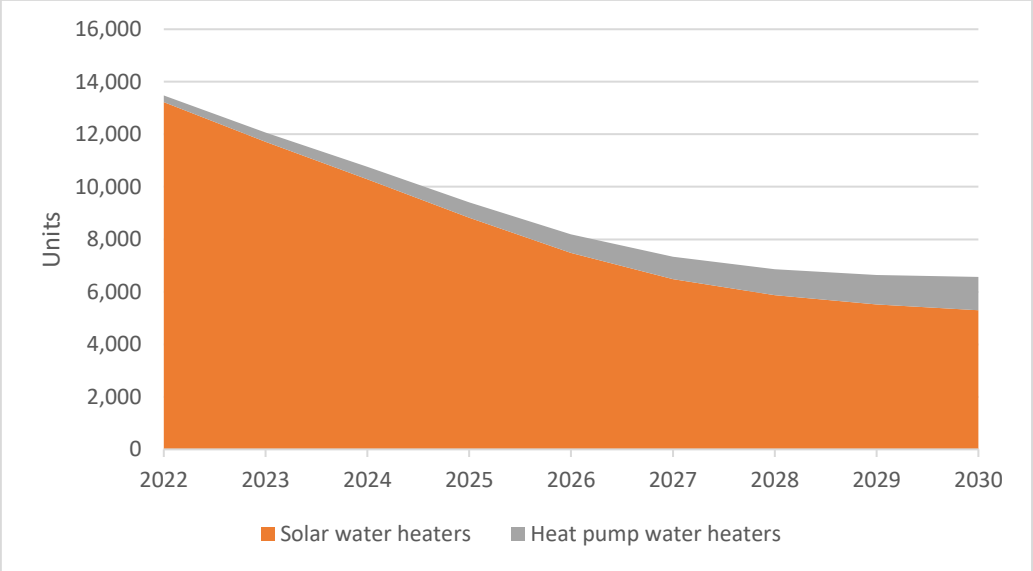
Figure 108 - Stock of space heating and space cooling



In contrast to air-to-air heat-pumps, solar water heaters (SWH) and heat pump water heaters (HPWH) are unlikely to be installed if grant schemes to promote uptake are not maintained. Due to their high capital cost (compared to alternatives such as electric water heaters) and long payback period, it is assumed that no new or replacement units will be installed without Government intervention. Indeed, in recent years, Malta has observed a downward trend in the sales new SWH installations despite the availability and promotion of grants. This downward trend can be attributed mainly to consumer shift towards PV systems, developments in the construction and renovation of buildings linked with limited roof accessibility and reliability concerns accentuated by the prevalence of hard water in Malta.

Under the WPM scenario, the stock of solar water heaters is projected to decrease from 13,225 units in 2022 to 5,297 units in 2030. Conversely, the number of heat pump water heaters is expected to increase from 253 units in 2022 to 1,275 units in 2030.

Figure 109 - Stock of solar water heat pumps and heat water heat pumps

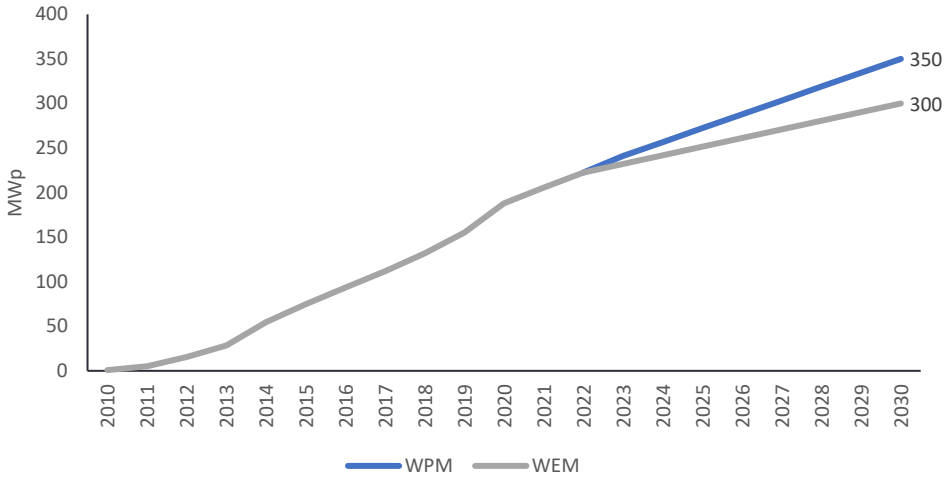


Biomass imports, used for space heating by a small number of households, is not projected to increase as heating by heat pumps, followed by LPG heaters is likely to remain the preferred mode of space heating.

RES-Electricity

The Organic Processing Plant (OPP), will transform organic waste into compost and biogas, , while the gas extraction project will enhance biogas generation and incorporate a new Combined Heat and Power (CHP) system contributing to Malta's RES-E targets., however, this will continue to constitute only a small percentage of RES-E in Malta, as most of RES-E will result from solar PV. The projected capacity of solar PV up till 2030 is expected to reach 350MWp, based on the Government's commitment to maintain increased penetration of solar PV through financial support schemes and other measures to facilitate uptake was already presented under Section 2.1.2.

Figure 110 - PV capacity for WEM vs WPM scenarios



RES-Transport

The transport sector in Malta is set to increase its renewable energy share, primarily through an extended substitution obligation on fuel importers that now includes maritime and aviation sectors, alongside road transport, in line with the revised Renewable Energy Directive (EU) 2023/2413. This obligation is expected to boost biofuel consumption, also in line with ReFuelEU Aviation Regulation targets.

The electric vehicle (EV) fleet is also projected to grow significantly, as outlined in section 2.1.2, encouraged by stricter EU CO2 emissions standards and government incentives. Malta's lack of a rail system emphasizes its reliance on road transport.

As illustrated in Figure 111 the projected surge in electricity's contribution to Malta's transport sector is primarily due to the expected increase in electric vehicles within the road transport fleet. This trend is a direct consequence of the post-2020 CO2 emission regulations targeting vehicle manufacturers for various vehicle categories, including passenger cars, light commercial vehicles, and heavy-duty vehicles. These regulations are set to shape the new vehicle import profile in Malta. The anticipated peak in energy consumption in road transport by 2030, followed by a reduction, hinges on key developments: the fleet's gradual shift towards electrification, aiming for an equivalent of 65,000 electric and plug-in hybrid passenger cars by 2030; and the impending ban on sales of internal combustion engine vehicles, including passenger cars, light commercial vehicles, and motorcycles, from 2035, which will accelerate the adoption of electric mobility.

Figure 111 - RES share in road transport in WPM (without multiplying factors)

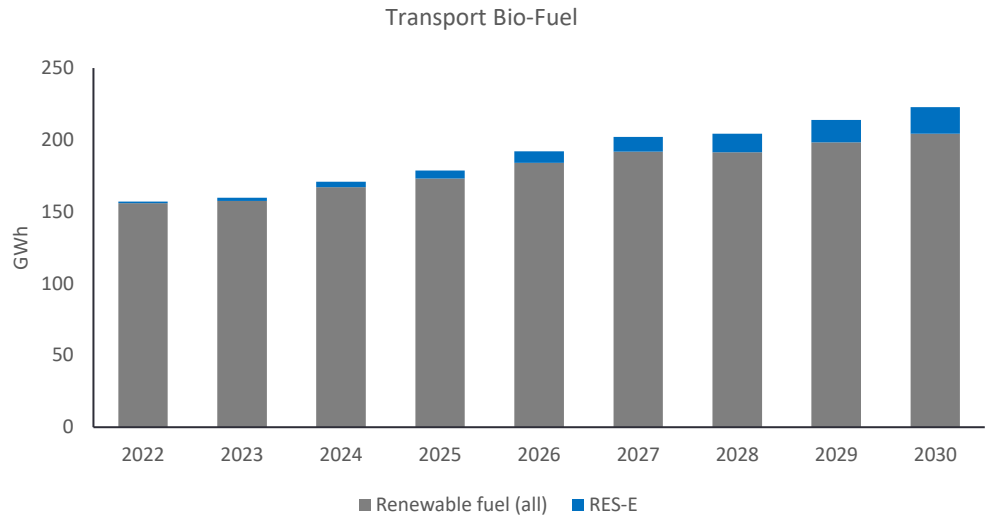


Figure 112 - Projections for final energy consumption for road transport, under the WEM scenario, split by fuel, GWh

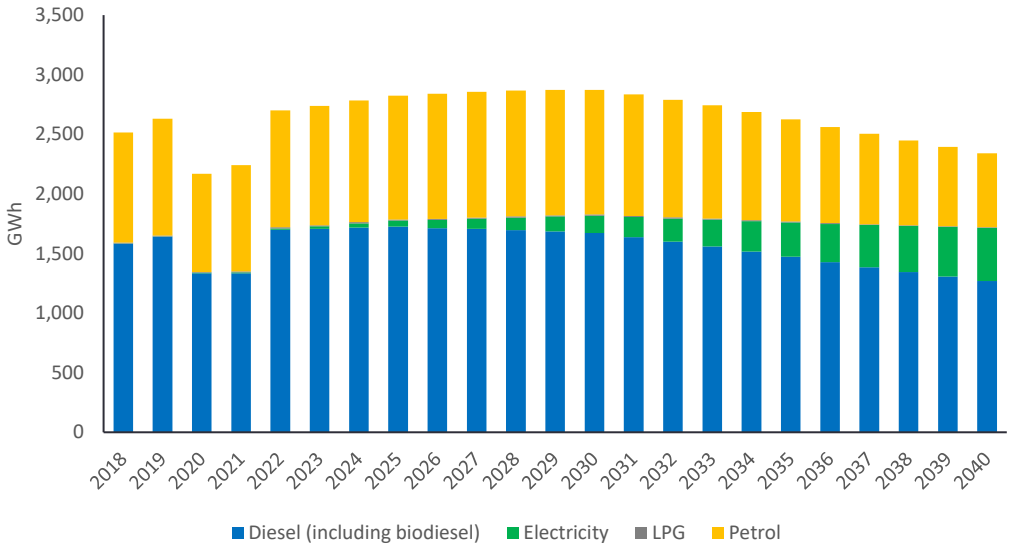


Figure 113 illustrates the projected final energy consumption for aviation. The projected increase in final energy consumption is consistent with the expected rise in aircraft movements and scheduled flight arrivals. In 2023, scheduled flight arrivals rebounded to the levels seen in 2019, yet Jet A1 fuel consumption remained approximately 9% lower. This discrepancy could be attributed to a combination of factors, including a gradual transition to more fuel-efficient aircraft product lines/series operating in Malta and a shift in aircraft movements towards shorter routes. Notably, the proportion of aircraft

movements between Malta and the UK decreased from 23% in 2019[224] to 18% in 2023[225], while movements between Malta and Italy rose from 20% in 2019 to 24% in 2023, reflecting changes in travel patterns and potentially contributing to the reduced fuel consumption despite the recovery in flight arrivals.

Figure 113 - Final energy consumption in aviation sector under WEM scenario.

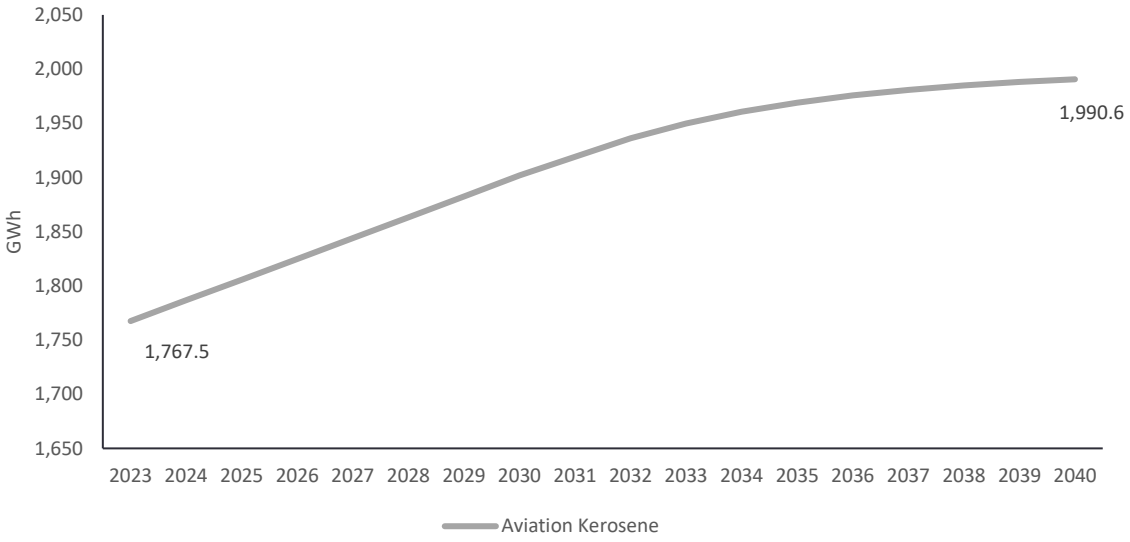
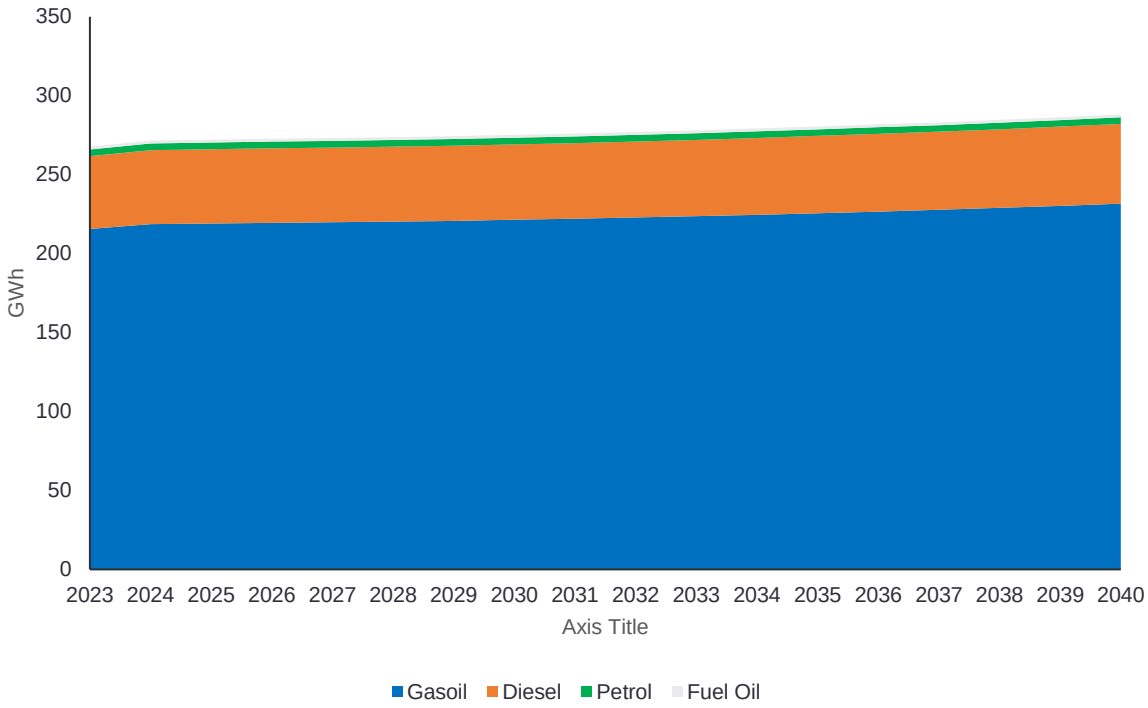


Figure 114 provides projections for final energy consumption for navigation by fuel type. In this sector the Ċirkewwa – Mġarr ferry service and the Valletta – Mġarr fast-ferry service are significant contributors, accounting for over half of the sector's energy consumption. Both services are assumed to continue operating until 2040, resulting in a steady and continued reliance on gasoil as the primary fuel source for these services.

[224] Malta International Airport p.l.c. (2019), Malta International Airport p.l.c. Report 2019. Available at: https://www.maltairport.com/wp-content/uploads/2020/10/Business-Report-2019-1.pdf
[225] Malta International Airport p.l.c. (2023), Malta International Airport p.l.c. Annual Report 2023. Available at: https://www.maltairport.com/wp-content/uploads/2024/04/Business-Report-2023.pdf

Figure 114 - Final energy consumption in inland navigation sector, under WEM Scenario, split by fuel



Economic Sectors

Figure 115 shows total final energy consumption by sector from 2023 to 2040 across various sectors. The agriculture sector experiences a steady decline in energy use, while the industrial, residential, and services sectors see a consistent increase. The transport sector, which consumes the most energy, shows a significant increase throughout the period. Overall, while some sectors are reducing their energy consumption, others are on an upward trajectory, reflecting varying energy demands and efficiencies across different areas of the economy.

Figure 115 - Total Final Energy Consumption by Sector

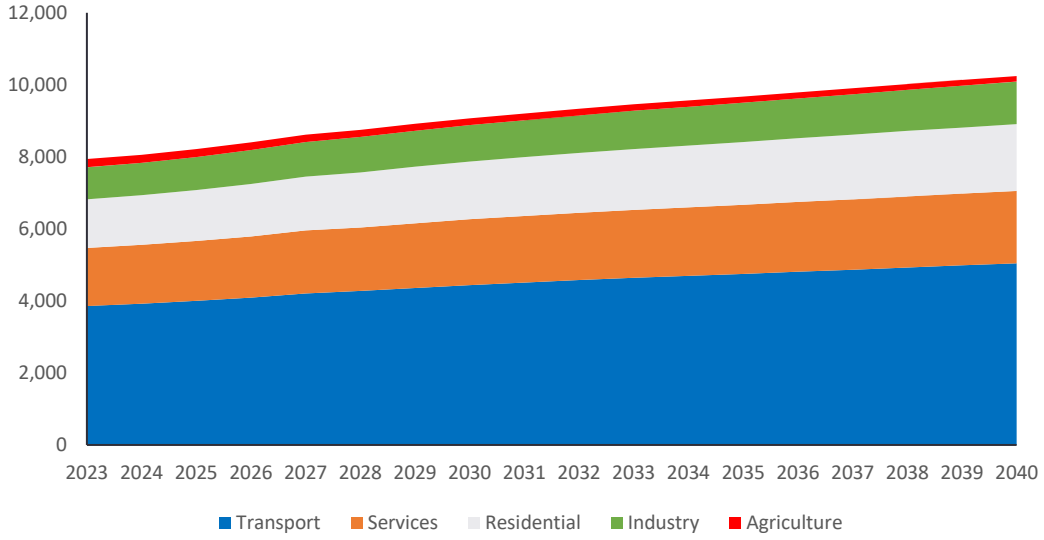


Figure 116 includes projections for final energy consumption by industry. Whilst most fuels are projected to remain largely constant, electricity and diesel consumption is projected to continue increasing.

Figure 116 - Final energy consumption under WEM, split by fuel for Industry sector

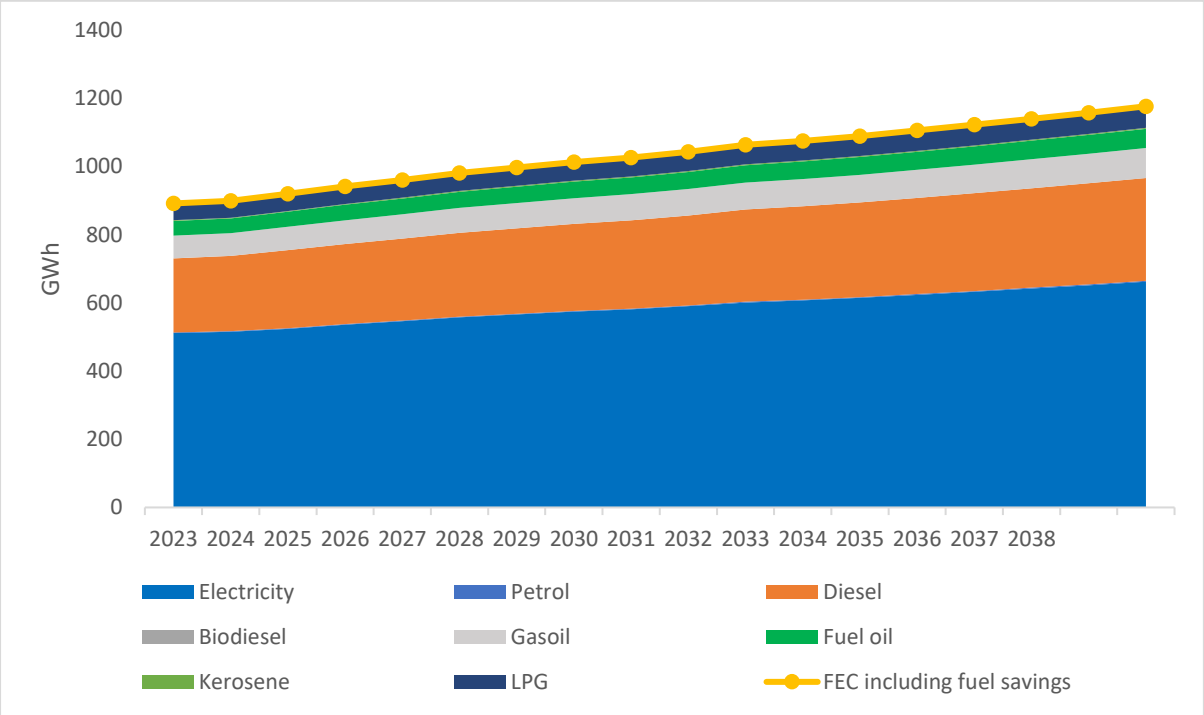


Figure 117 illustrates projections for final energy consumption for the services sector. Electricity consumption in this sector is projected to increase until 2040, along with certain key fuels such as LPG and ambient heat; the consumption of other conventional fuels is set to remain largely constant.

Figure 117 - Final energy consumption, split by fuel for services, WEM scenario

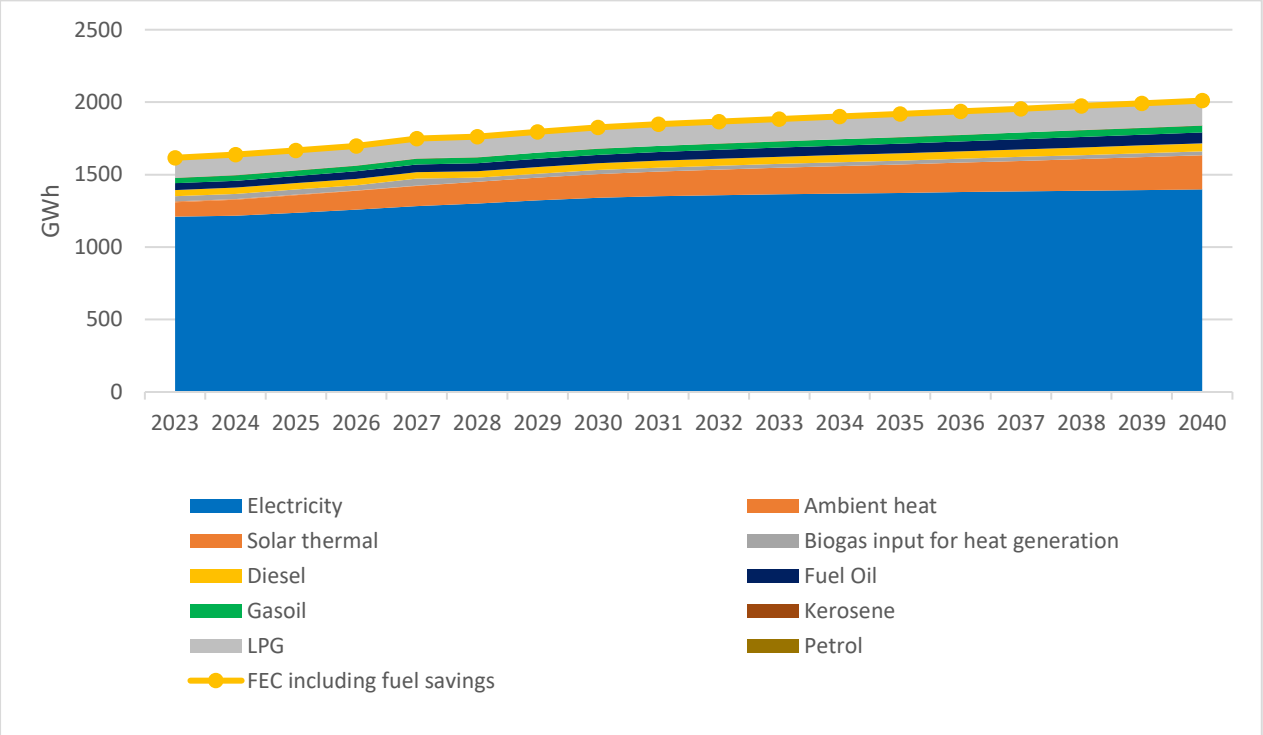


Figure 118 - Final energy consumption split by fuel for agriculture sector under WEM

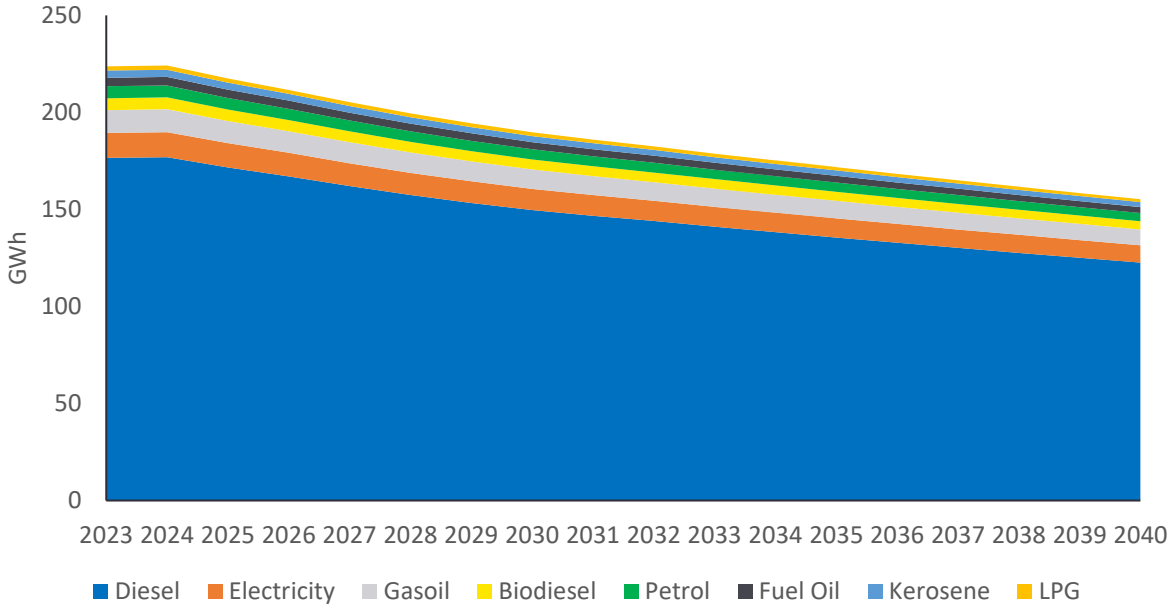
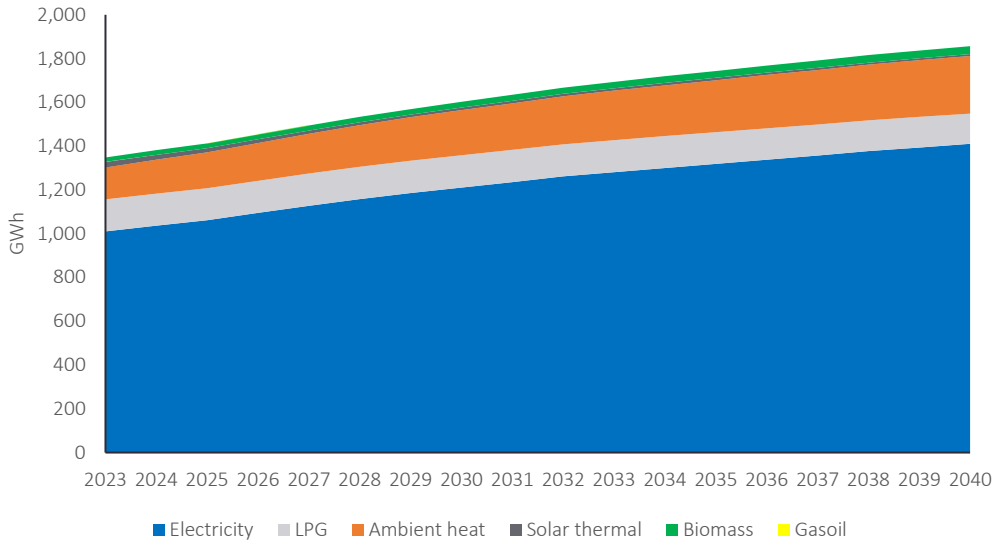


Figure 119 - Final energy consumption in the residential/households sector, under WEM scenario, split by fuel



The projected growing energy demand implies the need for more energy in the coming decade and beyond, which in turn will require more generation capacity and/or imports over the interconnector, as well as a more flexible electricity system. These developments will have a direct impact on how Malta shall continue to ensure the desired level of security of supply and resource adequacy. It is also expected that early in the next decade Malta will find it increasingly challenging to meet its electricity demand with the current and projected (under WPM) power generation infrastructure. The projected electricity generation by source, split into conventional gas-fired power plants, net imports over the electricity interconnectors, renewables and the projected waste-to-energy facility in 2030 is shown in Figure 120.

Figure 120 - Electricity generation by source in GWh under WPM

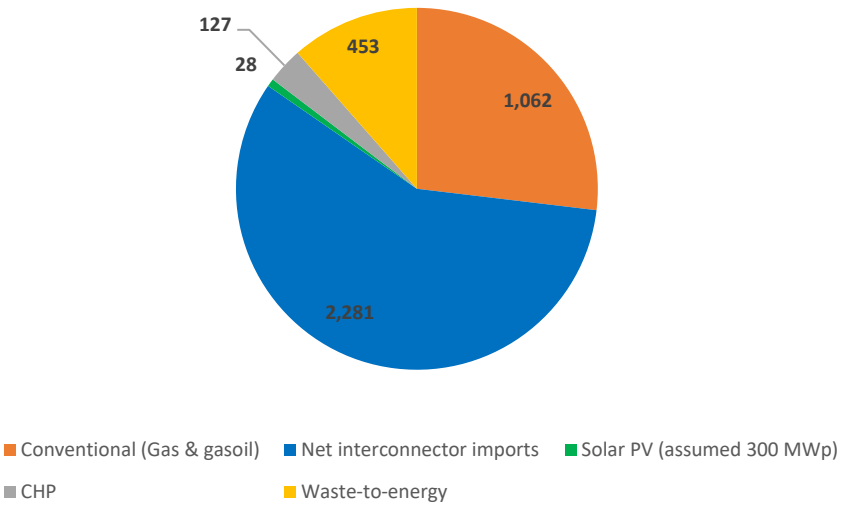


Figure 121 - Net import dependency

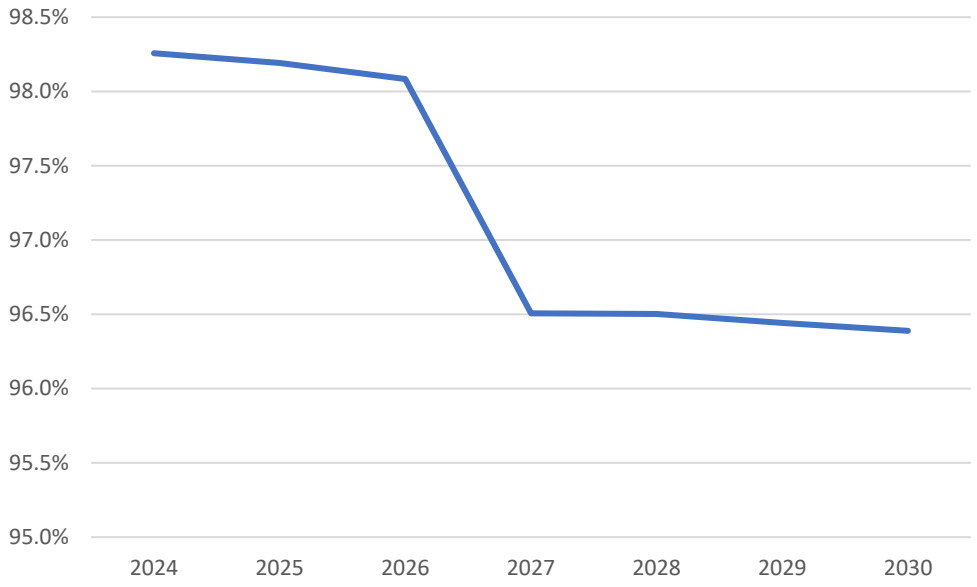
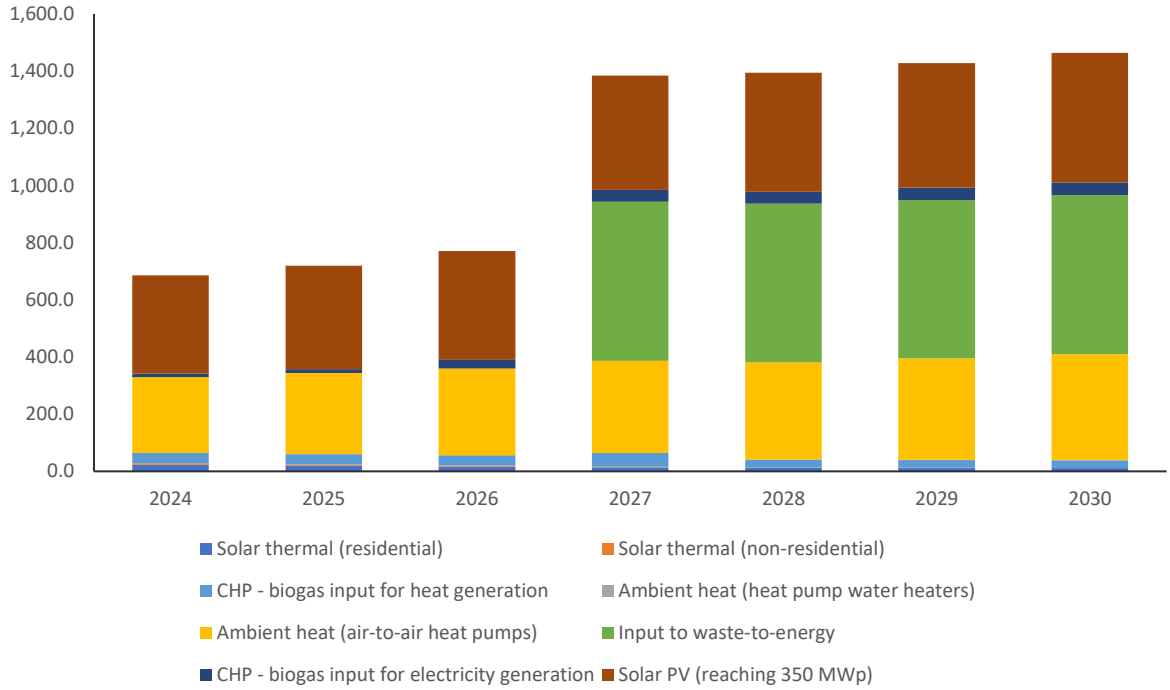


Figure 122 - Projected consumption of domestic energy sources



Dimension Internal Energy Market

As referred under the relevant sections of the Internal Energy Market dimension, there are no liquid wholesale electricity or gas markets in Malta. Enemalta performs the functions of a DSO and constitutes the sole electricity supplier to final consumers. There is no electricity transmission system in Malta and hence no transmission system operator (TSO). Malta was also granted derogations from

the application of provisions on unbundling of DSO, third party access and free choice of supplier under the Electricity Market Directive.

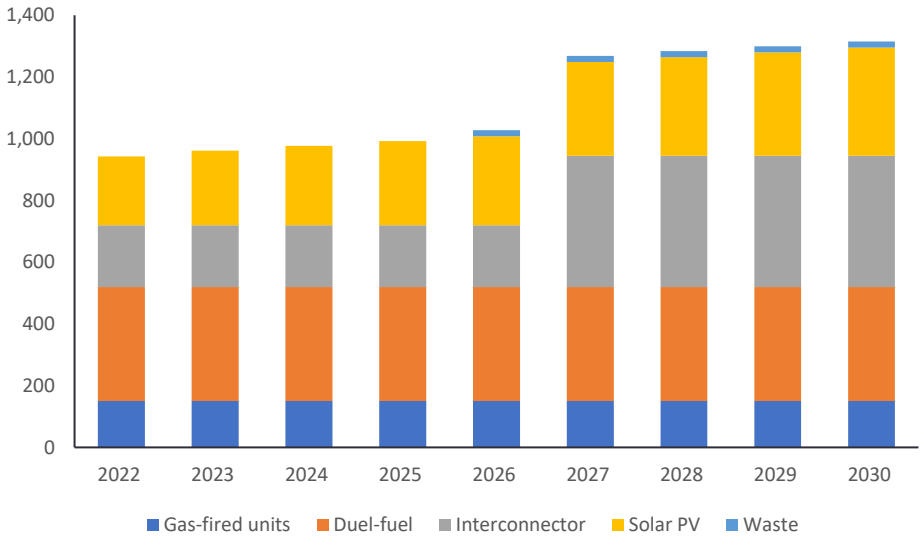
Under the energy system modelling framework used for the development of the NECP, these factors are taken into consideration and assumed to continue to apply throughout the projected period. Projections of electricity interconnectivity, including the indicators of urgency of action are already outlined in Section 2.4.1. of the NECP, while the key relevant indicators for natural gas, such as gas demand and supply and the electricity generation mix are included under the Energy Security dimension of the Plan. The sole use of natural gas in Malta is in the power generation sector.

The projected installed power generation capacity by source under the WPM Scenario is shown in

Figure *123*. This amounts to the current and expected operational capacity in Malta, excluding gas-oil fired stand-by capacity. The currently existing power generation capacities running on natural gas at the Delimara Power Station, as well as the stand-by generation capacity running on gas-oil is expected to remain largely the same. Solar PV capacity will increase throughout the projected period until 2030, reaching 350 MW. It is also expected that the waste incinerator plant comes into operation before 2030.

The central scenario referenced in Figure 125 represents the baseline scenario used in the NECP modelling framework. The high scenario, on the other hand, was developed to assess the impact of higher projected population growth and inbound tourism, as well as variations in electrification rates and technological efficiency, on electricity demand. As a sensitivity scenario, the high scenario serves as a tool for informing investment decisions when considering power system adequacy.

Figure 123 - Installed Capacity by fuel, WPM



*126*Figure 124 - Peak demand (MW) and electricity demand (GWh) under WEM scenario, 2023-2040.

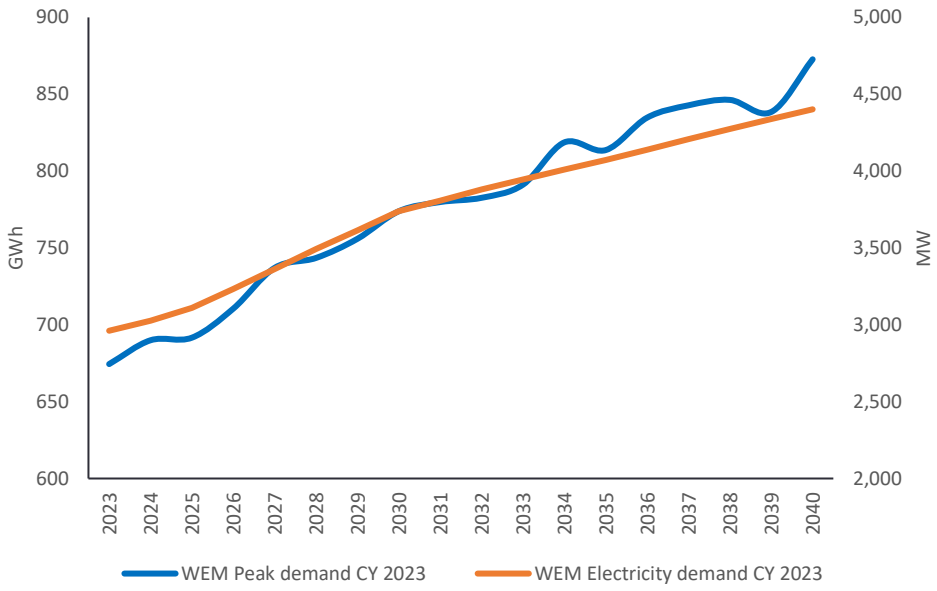


Figure 125 - WEM Peak Demand (MW) under the central and high scenario

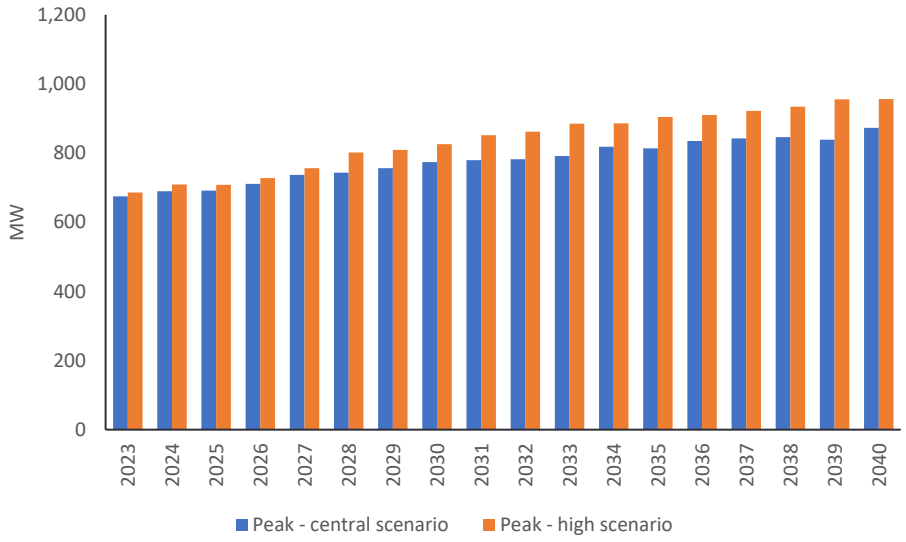


Figure 126 - Electricity Imports and Exports over the interconnector, 2024-2030

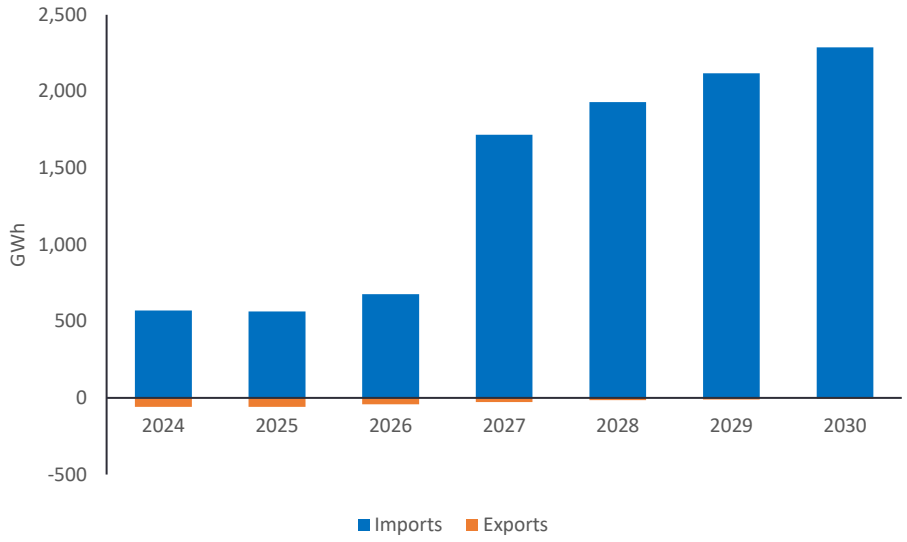
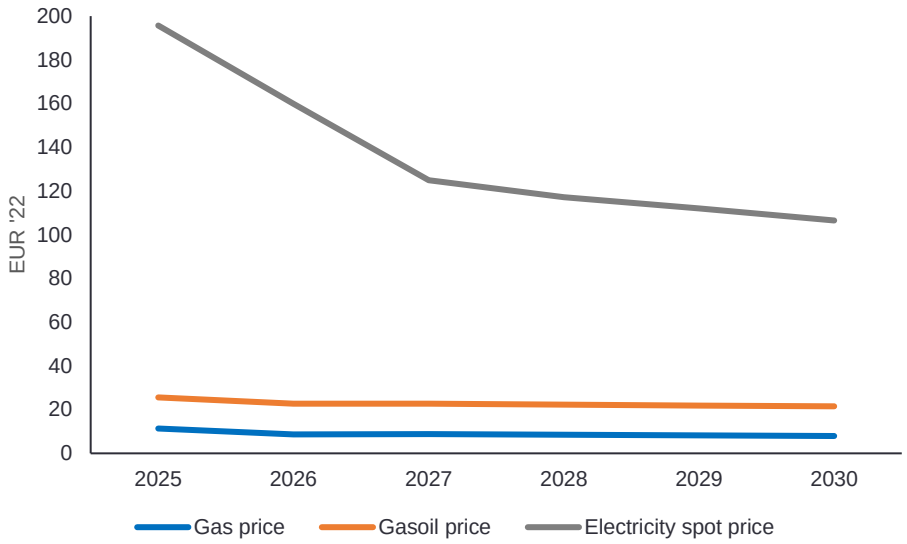


Figure 127 - Projected trends in electricity spot prices, gas and gasoil prices



Air-to-air heat pumps are considered by many households to be essential for thermal comfort. In fact, the share of households with at least one heat pump (air conditioner unit) stood at 78% in 2021. This uptake is expected to continue growing given the increase in population. The share of households with heat pumps is expected to reach 93% and 98% in 2030 and 2040 respectively (Figure 128). Furthermore, the number of heat pumps per 'household with heat pump' is also projected to increase to 2.3 in 2030 (Figure 129), reaching a saturation point where no further installation of heat pumps will be required in households.

Figure 128 - Number of households with/without heat pumps

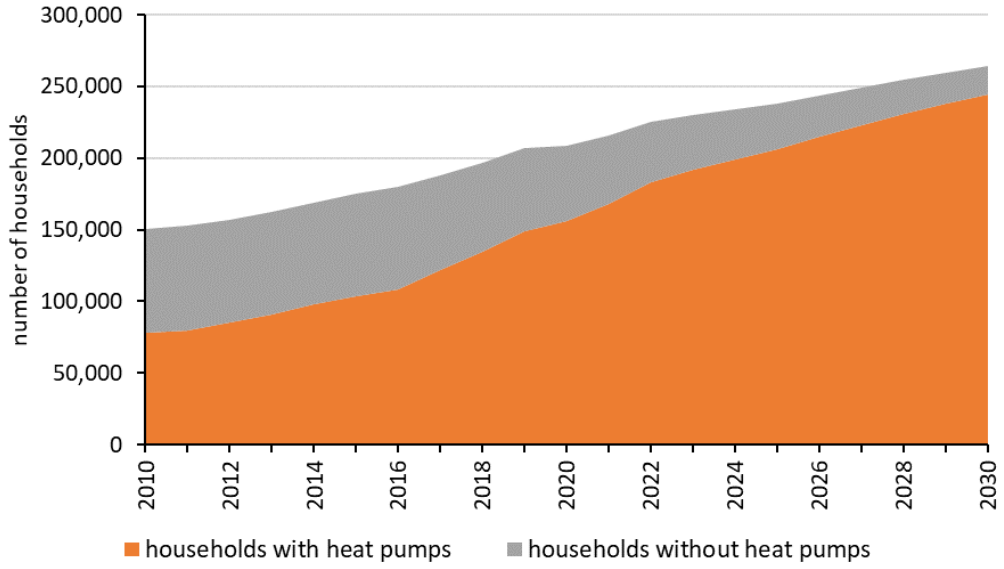
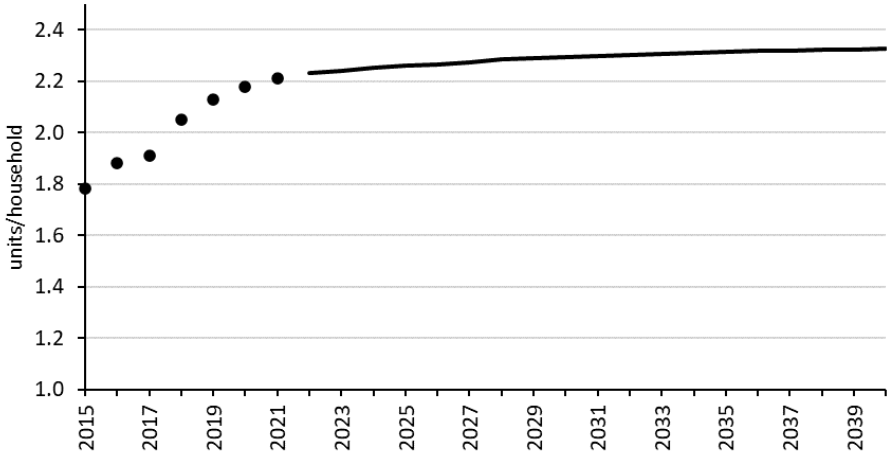


Figure 129 - Number of heat pumps per 'household with heat pump'.



ii. *Assessment of policy interactions (between existing policies and measures and planned policies and measures within a policy dimension and between existing policies and measures and planned policies and measures of different dimensions) at least until the last year of the period covered by the plan, in particular to establish a robust understanding of the impact of energy efficiency / energy savings policies on the sizing of the energy system and to reduce the risk of stranded investment in energy supply.*

Projections indicate that, notwithstanding the planned implementation of a number of energy efficiency measures, energy demand shall continue to rise. The plan envisages investments in a second interconnector before the 2030 time window. Investments in renewables also need to take into account the capacity of Malta's small grid to further integrate intermittent sources, keeping in

mind the similarity between the local demand profile and that of Sicily, towards which excess electricity could potentially be exported.

iii. Assessment of interactions between existing policies and measures and planned policies and measures, and between those policies and measures and Union climate and energy policy measures

Malta's policies and measures included under the WEM and WPM scenarios are aligned to the Union energy and climate acquis. Existing and planned policies are expected to be implemented to contribute and fulfil objectives and targets at the national, EU and international level. PAMs under the decarbonisation dimension are set out to contribute to the Paris Agreement and the Effort Sharing Regulation, while policies to promote the deployment of renewables align with the requirements of the Renewable Energy Directive. This can also be said for energy efficiency policies and the Energy Efficiency Directive, including policy measures in the remaining dimensions, such as obligations stemming out of the Gas Security of Supply Regulation. Table 51 illustrates the impact of various policies and measures within the WPM scenario across different Energy Union dimensions.

Table 51 - Policy interactions under WPM scenario between Energy Union dimensions

PAM number	Name of Policy or Measure	GHG Emissions reduction	Renewable energy	EE	Energy Security	IEM	R&I and competitiveness
7	Regulatory measures to increase energy-efficiency in buildings	✓		✓			
12	Development of an offshore wind/solar farm	✓	✓		✓		✓
18	Melita Transgas hydrogen ready Pipeline				✓		
47	Modal shift to Active Mobility	✓		✓			
	Modal shift to Alternative Transport	✓		✓			
	Green Mobility Scheme	✓	✓	✓			

73	Gas Extraction from Landfill	✓					
16	Regulatory policies to increase PV installation	✓	✓		✓		
	Increase in PV capacity to 350MW	✓	✓		✓		

Table 52 - Policy interactions under WEM scenario between Energy Union dimensions

PAM Number	Name of Policy or Measure	GHG Emissions reduction	Renewable energy	EE	Energy Security	IEM	R&I and competitiveness
2	Manure and slurry management	✓					
	Renovation of public buildings	✓	✓	✓			
	Incentives for increasing energy efficiency in buildings			✓			
11	Commissioning of second interconnector	✓	✓	✓	✓	✓	
15	Financial incentives to increase renewable energy installations	✓	✓			✓	
17	Medium to Large scale Solar PV Installations	✓	✓		✓		
20	Utility-scale battery storage solutions	✓		✓	✓		
23	Shore-to-ship projects						
	EE schemes for industries and services			✓			
	Public sector leading by example	✓		✓			
	Replacement of appliances in vulnerable households' scheme			✓			

	Energy efficient street lighting			✓			
	Projects in primary water network and wastewater treatment plants					✓	
	Implementation of the f-gases regulation	✓					
	Electrification of vehicles		✓	✓			
	Incentivise active transportation modalities						
50	National free transport service			✓			
	Biofuels substitution obligation (2021-2030)	✓					
	Road and infrastructure projects			✓			
67	Free public transport for school children			✓			
70	High bio-waste capture	✓					
72	Waste-to-Energy facility	✓					
	Eco-reduction in electricity tariffs			✓			
	Incineration pre-sorting	✓					
81	Investments in Agrovoltaics	✓					

5.2. MACROECONOMIC AND, TO THE EXTENT FEASIBLE, THE HEALTH, ENVIRONMENTAL, EMPLOYMENT AND EDUCATION, SKILLS AND SOCIAL IMPACTS, INCLUDING JUST TRANSITION ASPECTS (IN TERMS OF COSTS AND BENEFITS AS WELL AS COST-EFFECTIVENESS) OF THE PLANNED POLICIES AND MEASURES DESCRIBED IN SECTION 3 AT LEAST UNTIL THE LAST YEAR OF THE PERIOD COVERED BY THE PLAN, INCLUDING COMPARISON TO PROJECTIONS WITH EXISTING POLICIES AND MEASURES

The NECP update needs to be seen in the context of Malta's socio-economic background, including a mature economy and dynamic society, both recently affected by the COVID-19 pandemic and the energy crisis. The NECP's objectives include a reduction in greenhouse gas (GHG) emissions and the implementation of adaptation strategies that aim to benefit society as a whole. Nonetheless, the impact of these initiatives will vary among different stakeholders and will unfold over diverse timelines. This section will delve into the potential macro-economic effects of the various planned strategies and policies outlined in the plan.

Financial considerations will shape the NECP, influencing markets, labour dynamics, and the operations of both the private and public sectors. While some measures may impose additional financial and administrative burdens, they may also affect international trade, albeit to a lesser extent due to the scale of the local economy.

The government is committed to ensuring that the transition to a carbon-neutral future is equitable, offering support to communities, groups, and individuals who may encounter socio-economic difficulties in contributing to the implementation of the plan. This commitment is rooted in the principle that no one should be left behind as we collectively strive for a sustainable environment.

As mentioned in earlier sections, the government has devised pathways towards achieving climate neutrality based on a cost-effectiveness approach. It is being reiterated that Malta already is one of the lowest emitters of GHGs per capita; therefore, the easy and readily available options, which are accessible to larger and more carbon-intensive countries, are not present in Malta. This means that the benefits and carbon savings from the proposed measures may take longer to realise compared to other measures implemented in larger countries or may involve marginally higher costs.

Furthermore, Malta's small size limits its capacity to be a technology enabler, and in fact is essentially an adopter of existing technologies. As a result, the adoption of carbon-saving technologies might take more time locally compared to larger countries with greater resources and capacities.

Despite this, Malta is determined to create opportunities from the challenges and believes that its small size makes Malta a potential test bed for cleaner technologies.

Malta is aware that its individual efforts will contribute only a very small portion in absolute terms to the global effort required to combat climate change. It acknowledges that all countries need to undertake reductions according to their *common but differentiated responsibilities and respective capabilities*. This approach is recognized by the European Commission in its impact assessment for the Effort Sharing Regulation[226] which states the following:

[226] SWD (2021) 611 final

"*This Member State has a gap of around 69 pp between its GDP based emission reduction target and its cost-efficient emission reductions in modelling based on the most recent Reference scenario. This is because of particular developments related for instance to population development, build-up of housing stock and F-gas emissions from air conditioning systems. The projections are also in-line with Malta's own 'with additional measures scenario' that still sees emissions increase by 41% compared to 2005 emissions by 2030."*

Overall, the social and economic outcomes of the NECP's measures are expected to be beneficial, enhancing public health and living conditions. However, the initial costs of some initiatives may pose challenges.

While the NECP holds significant promise for reducing emissions and helping achieve GHG reduction targets, the government recognises the dual nature of the plan's effects. It is crucial to take measures that amplify the positive outcomes while mitigating any adverse consequences.

This section will explore the socio-economic impacts of the NECP which includes both social and economic impact categories.

Subsequent subsections will provide a synopsis of the principal health, environment, employment and education, economic impacts as well as skills and social impact and the just transition related to the identified planned policies and measures. This impact assessment examines a set of measures outlined in Section 3 under the WPM scenario, targeting sectors such as energy, buildings, transport, and waste management. The analysis spans regulatory measures aimed at enhancing building efficiency, the integration and impact of PV installations, the implications of offshore renewable energy, and the strategic role of the Melita TransGas Hydrogen ready Pipeline Melita TransGas Hydrogen Ready Pipeline ('MTGP') Melita TransGas hydrogen-ready pipeline in energy diversification and security. Furthermore, the assessment explores the Green Mobility Scheme's potential to drive a transition to electric vehicles and initiatives promoting active transport modes, such as walking and cycling, alongside alternative transportation methods like public transit and car-sharing. Additionally, the environmental and health impacts of extracting gas from landfills is considered, assessing its viability as an energy source and its contribution to effective waste management.

Buildings

Measures	Positive Impacts	Negative Impacts
Regulatory Measures to improve efficiency in buildings	Health • Better ventilation and air filtration systems, which can reduce the presence of indoor pollutants and allergens. This can lead to fewer respiratory problems, allergies, and other health issues for occupants.	Health • Temporary health issues during retrofitting works and construction phases.

Measures	Positive Impacts	Negative Impacts
	• Positive impact on mental and overall well-being.	
	Environment • Reduced greenhouse gas emissions due to less energy used for heating, cooling, and lighting. • Efficient buildings use fewer resources, leading to a reduction in the exploitation of natural resources and environmental degradation.	Environment • Process of retrofitting may consume significant number of materials and resources, leading to increased waste and environmental impact. • Removal of old materials and systems may result in increased waste if not managed properly.
	Employment & Education • Implementation of energy efficiency measures requires skilled labour, leading to creation of new jobs in construction, retrofitting and maintenance sectors.	Employment & Education • If retraining opportunities are not offered there might be job displacement for workers skilled in traditional building practices. • As workers adapt to new technologies there may be a temporary decrease in productivity.
	Skills • An increased demand for a workforce with specialised skills in areas such as green construction, retrofitting, energy auditing and sustainable design.	Skills • Shortage of workers with necessary skills to implement energy efficiency measures. • The need for specialised skills may create barriers to entry for individuals or small businesses that lack resources to obtain necessary training and certifications.
	Social Impact & Just Transition • Energy efficiency may lead to lower utility bills over time.	Social Impact & Just Transition • Exclusion of vulnerable individuals/households who cannot afford higher spend on retrofitting.

Measures	Positive Impacts	Negative Impacts
	• Contribution to SDG 11 – sustainable cities and communities.	• Disruption of family life/ business operations during installations. •
	Economic • Improved efficiency in buildings will help both businesses and households reduce energy consumption, essentially driving competitiveness for businesses and household purchasing power. • Increased sales for energy efficient equipment/services. • Lower maintenance and replacement costs. • Economic diversification due to growth of green industries/services.	Economic • Economic disruption in industries related to traditional building practices.

Energy

Measures	Positive Impacts	Negative Impacts
PAM 17 - Medium to Large scale Solar PV Installations	Health • Lower incidence of respiratory conditions due to reduction in air pollutants. • Lower reliance on fossil fuel generators improves air quality and health outcomes.	Health • Potential health risks during installation/maintenance such as falls and electrical hazards.
	Environment • Direct reduction in carbon emissions contributing to climate change mitigation efforts.	Environment • Negative visual impacts on cultural sites. • At the end of their lifecycle, disposing of or recycling PV panels may

Measures	Positive Impacts	Negative Impacts
	• Decreased acid rain and water pollution from fossil fuel power plants enhance local ecosystems.	present environmental challenges
	Employment & Education • Job creation in the green economy, including research, sales, installation and maintenance. • The growing renewable energy sector can stimulate educational programs and vocational training in related fields.	Employment & Education • Potential job losses in traditional energy sectors, requiring transition support for affected workers.
	Skills • Increased demand for electricians, engineers and other professional with expertise in solar technology. • Upskilling and reskilling opportunities for the workforce to meet the needs of the renewable energy sector as new technologies and systems are developed.	Skills • There may be initial shortage of qualified workers, slowing down the implementation process of PV projects.
	Social Impact & Just Transition • Renewable energy sources can enhance energy security and reduce dependence on energy imports. • Social inclusion initiatives (e.g. community solar projects or green bonds) can ensure that benefits of PV installations are shared widely.	Social Impact & Just Transition • Potential for energy poverty if costs of transitioning to solar energy are not additionally subsidised or offset for low-income households.

Measures	Positive Impacts	Negative Impacts
	• Energy independence for households, can lead to increased resilience and self-sufficiency.	
	Economic • Long-term cost savings for businesses and consumers due to lower operational costs of solar energy • Renewable sources decrease dependability on foreign energy sources	Economic • Upfront costs for PVs can be a barrier for widespread adoption particularly when factoring in the resulting operational savings which will take a number of years to pay back the investment. • Possible disruptions to dispatch of electricity, requiring careful management to ensure stability of supply.

Measures	Positive Impacts	Negative Impacts
PAM 12 – Development of Offshore Renewable Energy Generation	Health • Lower incidence of respiratory conditions due to reduction in air pollutants. • Lower reliance on fossil fuel generators improves air quality and health outcomes.	Health • Construction and maintenance of offshore wind and solar farms may pose additional risks to workers, such as the risk of falls, drowning, electrical accidents and exposure to harsh weather conditions.
	Environment • Direct reduction in carbon emissions contributing to climate change mitigation efforts. • Decreased acid rain and water pollution from fossil fuel power plants enhance local ecosystems.	Environment • Offshore farms may alter coastal views, creating visual pollution. • The installation and operation of offshore farms can disturb marine life through noise, electromagnetic fields, and physical presence.

Measures	Positive Impacts	Negative Impacts
	• Offshore location does not compete with land-based needs such as agriculture.	• Potential disruption of bird migration routes, elevated risk of bird-turbine collisions—especially during nocturnal migrations—can lead to bird fatalities.
	Employment & Education • Job creation in the green economy, including research, sales, installation and maintenance. • The growing renewable energy sector can stimulate educational programs and vocational training in related fields.	Employment & Education • Potential job losses in traditional energy sectors, requiring transition support for affected workers.
	Skills • Offshore solar/wind industry requires a range of specialized skills, promoting the development of technical expertise in areas such as marine engineering, electrical systems, and environmental management.	Skills • Shortage of qualified trainers and educators to deliver the necessary training programs. • Shortage of skilled workers in the country to develop and maintain the sector.
	Social Impact & Just Transition • Renewable energy sources can enhance energy security and reduce dependence on energy imports.	Social Impact & Just Transition • If not managed properly, the benefits of offshore solar farms may not be equitably distributed, potentially exacerbating social inequalities.
	Economic • Attracts investment in renewable energy infrastructure, which can stimulate financial markets and provide	Economic • Requires significant upfront investment and additional costs associated with managing the intermittent nature

Measures	Positive Impacts	Negative Impacts
	opportunities for public-private partnerships. • Foreign investment potential for Malta to become a hub for renewable energy innovation and expertise. • Renewable sources decrease dependability on foreign energy sources	of solar/wind power and integrating it into the existing grid infrastructure.

Measures	Positive Impacts	Negative Impacts
PAM 18 – Melita Transgas hydrogen ready Pipeline	Health • Lower incidence of respiratory conditions due to reduction in air pollutants. Pipeline could open up possibility of Malta having another power plant running on hydrogen, and additionally could also open up hydrogen use by other sectors including transport. • Lower reliance on fossil fuel generators improves air quality and health outcomes. Gas has lower emitting factors, hydrogen has no CO2 generation.	Health • The construction and maintenance of undersea pipelines can pose occupational health risks, including exposure to hazardous materials, operating in high-pressure environments, and the physical dangers of working at sea.
	Environment • Being a hydrogen-ready pipeline, it has the potential to lower the carbon footprint of the energy generation sector in Malta.	Environment • The construction of the pipeline could disrupt local habitats and biodiversity, especially if it passes through sensitive areas. • Any accidental releases could have detrimental

Measures	Positive Impacts	Negative Impacts
		effects on soil and water quality.
	Employment & Education • The need for skilled workers in the pipeline industry could lead to new educational programs and training.	Employment & Education • Workers in industries that may be displaced by the shift to natural gas may require retraining or face unemployment.
	Skills • The pipeline project would require specialized skills in construction, operation, and maintenance, leading to the development of a skilled workforce. • The introduction of new technologies and best practices in pipeline construction and operation could enhance the local skill base.	Skills • There may initially be a lack of local workers with the necessary skills to construct and operate the pipeline, necessitating reliance on foreign expertise.
	Social Impact & Just Transition • The pipeline could lead to potentially more affordable energy for households, improving overall quality of life.	Social Impact & Just Transition • The construction phase may lead to temporary social disruption, including increased traffic, and noise, affecting some communities.
	Economic • The pipeline could enhance Malta's energy security by providing a steady and reliable source of natural gas and hydrogen. • Increase the potential for use of hydrogen in other sectors, apart from energy, including transport.	Economic • The initial investment for the pipeline construction could be substantial, potentially diverting funds from other areas. • Malta's economy could become more dependent on natural gas and hydrogen markets, which can be volatile.

Measures	Positive Impacts	Negative Impacts
		• Malta would need to develop a dedicated infrastructure for the proliferation of hydrogen use beyond energy generation. This will require significant investment and may lack the required economies of scale to reap the full potential of the investment.

Transport

Measures	Positive Impacts	Negative Impacts
Modal shift to alternative transport *(use alternative means instead of private vehicle)* **PAM 48 – Investment in Active Mobility** *(use active modes of transport instead of private vehicle)*	Health • Better air quality, due to reduction in emissions from traditional vehicles benefitting respiratory health. • Encouraging active modes of transport can lead to increased physical activity, improving overall health and reducing obesity rates. • Reduced congestion can potentially lower the rate of traffic accidents.	Health • In the short-term, there may be increased risks for pedestrians and cyclists if infrastructure is not yet adequately developed to ensure their safety. • During the transition to alternative transport, there may be a period of adjustment where individuals might experience inconvenience or stress
	Environment • Private vehicle use reduction would lower carbon dioxide emissions, contributing to climate change mitigation efforts. • Less reliance on private vehicles can lead to a reduction in the need for parking spaces, allowing	Environment • Temporary negative environmental impacts during construction phase of new transport infrastructure.

Measures	Positive Impacts	Negative Impacts
	for more pedestrian and green spaces.	
	Employment & Education • Travel time reductions for individuals and businesses due to lower traffic congestion. • The shift can stimulate the need for education and training programs related to sustainable transport, urban design, and environmental management.	Employment & Education • Job displacement of workers in industries related to traditional automotive manufacturing and maintenance.
	Skills • The shift to alternative transport systems will require new skills related to sustainable urban planning, urban design , and infrastructure management.	
	Social Impact & Just Transition • Improved public and active transport can increase mobility for all societal groups, including the elderly, children, and low-income households • Increased potential for public spaces free from cars.	Social Impact & Just Transition • Resistance of difficulty in change of travel habits, especially among private vehicle users. • There may be challenges ensuring that alternative transport options are accessible to all, particularly in rural or less developed areas.
	Economic • Individuals can save money on fuel, maintenance, and parking by using alternative transport modes.	Economic • Changes in consumer behaviour may impact industries related to car ownership and usage. • The shift requires upfront investment in infrastructure, which can

Measures	Positive Impacts	Negative Impacts
	• Reduced congestion can lead to more efficient movement of goods and people, boosting productivity. • Attractive and sustainable transport options can enhance the tourism appeal of a destination.	be a financial burden in the short term.

Measures	Positive Impacts	Negative Impacts
Green mobility scheme	Health • Better air quality, due to reduction in emissions from traditional vehicles benefitting respiratory health. • EVs are generally quieter than internal combustion engine vehicles, leading to lower noise pollution levels, which can have positive effects on mental health and well-being.	Health • Electric vehicles are quieter than conventional vehicles, which can be a hazard for pedestrians and cyclists who rely on auditory cues to gauge the proximity and speed of oncoming traffic. This could potentially lead to an increase in traffic accidents unless additional safety measures are implemented.
	Environment • Quieter modes of transport, such as electric vehicles, can reduce noise pollution. • By targeting the business sector, the green mobility scheme will significantly help in reducing emissions from commercial transportation.	Environment • Temporary negative environmental impacts during construction phase of new transport infrastructure.
	Employment & Education • Travel time reductions for individuals and businesses. • The expansion of the EV market and the development of charging infrastructure can create new jobs in manufacturing, installation, maintenance, and services.	Employment & Education • Job displacement of workers in industries related to traditional automotive manufacturing and maintenance.
	Skills	Skills

Measures	Positive Impacts	Negative Impacts
	• The shift towards green mobility can stimulate professional development in areas such as renewable energy integration, smart grid technology, and sustainable transportation planning. • Workers will need to acquire new skills related to EV technology, such as battery maintenance, charging station installation, and electric powertrain repair.	• Need for upskilling and training workers in EV technology, charging infrastructure installation, and maintenance, as well as in the management of green fleets.
	Social Impact & Just Transition • The scheme can improve access to clean transportation options for businesses and individuals, contributing to social inclusion	Social Impact & Just Transition • Ensuring that the benefits of the Green Mobility Scheme are accessible to all businesses, including small and medium-sized enterprises, is crucial to avoid creating disparities.
	Economic • The development of recharging infrastructure can stimulate economic growth through investment and job creation in construction, engineering, and technology sectors. • Cost savings due to lower fuel and maintenance costs associated with electric vehicles compared to traditional vehicles.	Economic • Business costs in connection with EV transition adjustments. • Potentially lower market competition in EV market and competitive distortions from public transport subsidisation. • The electricity grid may experience increased demand due to the charging of electric vehicles, necessitating upgrades or management strategies to ensure stability and reliability.

Waste

Measures	Positive Impacts	Negative Impacts
• **Gas extraction from landfill**	Health • Reduction in the release of harmful gases such as methane and volatile organic compounds into the atmosphere, reducing respiratory issues. • Proper gas extraction and management can mitigate health hazards associated with landfill sites, such as exposure to toxic substances.	Health • If not managed properly, the process of gas extraction could lead to accidents, which may result in health risks for workers and nearby residents.
	Environment • Capturing methane from landfills for energy use can significantly reduce greenhouse gas emissions, contributing to climate change mitigation	Environment • The installation and operation of gas extraction infrastructure may disturb local ecosystems, particularly if landfills are located near sensitive areas.
	Employment & Education • The development and maintenance of gas extraction facilities can create new jobs in engineering, construction, and facility operation.	Employment & Education • There may be a temporary skill gap in the local workforce, requiring investment in training or the hiring of foreign experts
	Skills • The need for specialised skills can stimulate innovation and research in local educational institutions.	Skills • Traditional waste management skills may become less relevant, requiring workers to retrain or adapt to new roles.
	Economic • Gas extraction can provide a source of renewable energy,	Economic • If there is insufficient demand for the heat generated from landfill gas extraction, it can lead

Measures	Positive Impacts	Negative Impacts
	potentially reducing energy costs	to economic inefficiencies. The cost of capturing, processing, and transporting the gas may not be justified by the cost savings/revenue, leading to a poor return on investment.

5.3. OVERVIEW OF INVESTMENT NEEDS

i. Existing investment flows and forward investment assumptions with regard to the planned policies and measures

The government of Malta has already demonstrated significant commitment to reducing greenhouse gas emissions, as evidenced by the initiatives launched in the course of implementing the 2019 NECP, further strengthened in the LCDS as adopted in 2021 and through other significant measures and initiatives introduced as from 2021. These actions have laid the groundwork for a robust framework of decarbonization, with the government actively pursuing a range of measures aimed at transitioning to a sustainable, low-carbon future. The updated NECP builds upon these existing efforts, reflecting a continued and strengthened resolve to meet Malta's climate targets. The progress made thus far includes substantial policies and measures, regulatory reforms, and the facilitation of green investments as part of the With Existing Measures ('WEM') scenario. This ongoing commitment is crucial as the country moves forward with the implementation of the measures under the With Planned Measures (WPM) scenario, which necessitates a concerted effort from both public and private sectors to mobilize the necessary funding.

It is pertinent to note that the majority of the substantial total investment is ongoing with the implementation of the With Existing Measures scenario. As also manifested in the successive budget plans rolled out in the last years, significant ongoing investments are taking place in both the power generation sector through the incentives for the installation of renewable energy systems, installation of domestic and utility scale battery energy storage solutions, incentives for the uptake of electric vehicles, free use of public transport including crossing by ferries, upgrading of the transport road network and incentives towards shared and active mobility.

Under the Recovery and Resilience Plan submitted to the EU, Malta made it a priority to allocate the largest share of its funds, i.e. 69% of the total amount, to reaping green objectives which will contribute to further future-proofing the economy to lower its risks towards adverse climatic occurrences and realities. The investment dedicated towards the green pillar is proof that the government is committed to further decarbonising the economy as projections for economic growth continue to be solid.

Further to this, there are additional investment needs for the implementation of the measures falling within the "with planned measures" scenario. Total additional investment costs estimated for this scenario up to 2030 is over €100million mainly in the PV capacity and measures in relation to active mobility.

The initiative to boost solar photovoltaic (PV) capacity is estimated to require a total investment of around €88 million from national funds for the period until 2030. This strategic effort aims to elevate PV capacity on land to 350MW, thereby promoting the transition to sustainable energy sources.

The transition towards sustainable transportation is estimated to require an additional investment of €30.9 million from both EU and national funds, for the enhancement of active mobility infrastructure. This strategic investment aims to encourage a shift to low-carbon transport alternatives. The Green Mobility Scheme, with a total estimated cost of €7.5 million, is an initiative aimed at promoting sustainable transportation. It primarily supports the development of recharging infrastructure for

electric vehicles that are integral to business operations, and the leasing of clean or zero-emission vehicles.

Regulatory measures to increase energy-efficiency in buildings, ensure that the latest buildings meet the necessary legal standard. This regulatory measure is designed to guarantee that new buildings are constructed in accordance with the law and the latest environmental prerequisites.

Additionally, the gas extraction from landfill project, is estimated to cost €2.5 million.

ii. *Sector or market risk factors or barriers in the national or regional context*

As described earlier, planned policies and measures need to take into account the unique geophysical and economic context of the Maltese islands and cannot be implemented independently. This distinguishes it from other plans as certain characteristics of the islands impose limitations on the recommended measures to reduce carbon emissions. Malta's physical separation from mainland Europe means that it can only be connected to Europe through air or sea connections. Malta's small size and limited natural resources leads to dependence on imports. This poses challenges due to economies of scale and cost considerations, as certain technologies require a larger scale of operation that Malta may not achieve. Despite this, Malta can serve as a testing ground for new technologies in collaboration with larger countries or private partners, and emerging carbon technologies offer opportunities in this regard.

Land limitation also restricts Malta’s potential for large-scale deployment of large scale onshore solar or wind farms, and whilst floating offshore technology is expected to provide new opportunities, this technology has yet to reach full commercialization. As already stated in previous sections, in an attempt to overcome this challenge, the Maltese government launched a specific policy to promote investment towards offshore renewable generation.

It is also important to mention that Malta's climate is characterised by extremely hot summers and mild winters, which result in relatively short periods of heating, and cooling in buildings. This typically increases the demand for efficient air-to-air heat-pump technology. It also leads to lower potential emission reductions compared to colder countries. The key economic sectors in Malta are primarily service-oriented or involve low carbon-intensive manufacturing, further limiting the potential for carbon reductions in those areas. Whilst Malta’s energy consumption per household is already one of the lowest in the EU, higher expectations with regards to thermal comfort and more people living in multi-dwelling buildings, means that an increasing number of households are resorting to heat pumps to achieve the desired thermal comfort level rather than relying on natural ventilation, thus any improvements in efficiency are expected to require pronounced measures and efforts.

Due to these constraints, the proposed measures may result in delayed benefits and carbon savings compared to similar measures implemented in other countries. Additionally, Malta is more of a technology importer rather than a produce, due to its small size, which means that the adoption of carbon-saving technologies may take longer to occur locally, particularly if they require changes to work properly in the local environment.

A short description of main sectoral barriers already outlined within the NECP are further provided in the table below.

Table 53 - Main Sectoral Barriers

Sector	Market Barriers
Power Generation	Limited indigenous renewable energy sources
	Limited capacity for onshore PVs
	Little or no potential for onshore wind RES
	High relative cost to ensure power system adequacy.
Transport	Cleaner fuels for all transport modes are still not adequately accessible resulting in higher prices than conventional fuels
	Issues with the global supply of electric vehicles, primarily right-hand drive vehicles supply
	Lack of rapid mass transport system
Buildings	High upfront capital cost and long payback periods
	Limited climate neutral alternatives for air conditioning units

iii. Analysis of additional public finance support or resources to fill identified gaps identified under point ii

As previously mentioned, the implementation of climate and environmental measures is expected to require front loading of investment (capital intensity), particularly on low-to-middle-income families. In response, the Government is actively considering several mitigation approaches to alleviate this burden.

Incessantly in the last couple of years, the government has been supporting the transition towards cleaner technologies for both industries and businesses as well as households. This support is provided through incentives aimed at encouraging the adoption of cleaner and more sustainable technologies. These incentives are designed to mitigate barriers at local level and make cleaner options more accessible and affordable for various sectors of society.

The government's commitment to supporting this transition is evident through the various projects and initiatives that are committed to be implemented including programmes and measures co-financed through different EU programs. As a Member State of the EU, Malta is committed to maximise these funds to facilitate increased investment in green jobs and sustainable economic growth. This involves directing financial resources towards clean technologies and renewable energy, enhancing energy efficiency, and promoting the adoption of sustainable green transportation and infrastructure.

By offering incentives and facilitating financial support, the government aims to promote the uptake of cleaner technologies, mitigate the financial burden on citizens and businesses, and facilitate the transition towards a more sustainable and eco-friendly future for Malta.

In view of inherent barriers explained, the Maltese Government will likely need to continue to shoulder the costs of mitigating the financial burdens resulting from the implementation of climate measures. Hence, National public funding and EU Funding will continue to play a crucial role to support projects and initiatives aimed at reducing carbon emissions and promoting sustainable practices.

To support this investment in the green transition, the government is implementing various regulations, policies, and incentives designed to encourage sustainable practices and reduce carbon emissions. These measures create an enabling environment for businesses and industries to adopt cleaner technologies and practices, further driving the transition towards a more sustainable and climate-resilient economy.

These endeavours manifest the direct investments of the government in decarbonization infrastructure to facilitate the transition towards a low-carbon economy. In turn, these investments serve as a guiding force for private sector investment to follow suite in line with the overall objective of achieving climate-neutrality.

In 2021, Malta Stock Exchange (MSE) launched a Green Market and is increasing efforts to promote sustainable investments that meet ESG standards, through the listing of Green Bonds within the Exchange, which would also support economic development. Qualifications for listing will entail issuers to invest in projects contributing to environmental objectives such as Climate Change Mitigation, Climate Change Adaptation, Pollution Prevention, and Sustainable Use of Water and Marine Resources amongst others.

Malta's first green bonds program issued by the Water Services Corporation (WSC) in 2023 demonstrates the Corporation’s commitment to environmental sustainability and responsible finance. Valued at €25 million and spanning ten years with a 4.25% interest rate, these bonds align with the UN's Sustainable Development Goals and the EU's Green Deal. Proceeds will fund eco-friendly projects, including a cutting-edge reverse osmosis plant in Gozo, solar farms for renewable energy, wastewater treatment plants, and network enhancements. This initiative tackles water challenges, promotes job creation, and economic growth. The certified Climate Bonds Initiative ensures that funds benefit environmentally impactful projects.

The commitment to decarbonization infrastructure, alongside strategic policies and incentives, fosters a conducive environment for private investment in green initiatives, accelerating progress towards climate-neutrality and creating a more sustainable and prosperous future for all.

As part of Malta’s commitments towards the country’s transition towards environmental and socio-economic sustainability, the government launched an ESG Platform in December 2021 as a voluntary initiative, designed to instil education and awareness on enterprises’ environmental, social and governance credentials. The initiative was very well received, with several of Malta’s listed companies participating in this voluntary initiative together with other medium-sized enterprises. Since 2021, this

initiative has yielded successful results with more companies, including a large number of entities that fall out of scope of the CSRD due to their size, opting to report on their ESG criteria. In fact, the number of enterprises reporting their credentials increased from 16 to 33 since the launch of the ESG Platform. Moreover, it was found that a number of companies that reported on their criteria through the government platform registered a decrease in the total net kgCO2 emissions, whilst several more registered a decrease in the total amount of waste generated. Furthermore, many companies have also registered an increase in the amount of females in management as well as an increase in the amount of hours for training undertaken by their employees.

Furthermore, an ESG grant scheme, a pilot initiative administered by Malta Enterprise, was launched in September 2023 to assist businesses in reporting and assessing their ESG impact. 13 businesses benefitted from this grant scheme.

During 2024, the government commenced the process of digitising the ESG reporting exercise with the aim of making the ESG Platform more user-friendly and easier for enterprises to register their ESG credentials.

Besides this, the Malta ESG Alliance (MESGA) was set up in July 2022 independently by the private sector and sets out to act as a platform for Maltese businesses to collaborate and work together in order to lead and drive national ESG goal. This initiative is wholly welcomed and supported by the Maltese government through regular collaborations and stakeholder meetings in order to enable and accelerate the transition.

By utilizing a combination of public and private funding, the government can secure the resources needed to implement the proposed measures effectively and advance the transition towards a more sustainable and climate-friendly economy.

5.4. IMPACTS OF PLANNED POLICIES AND MEASURES DESCRIBED IN SECTION 3 ON OTHER MEMBER STATES AND REGIONAL COOPERATION AT LEAST UNTIL THE LAST YEAR OF THE PERIOD COVERED BY THE PLAN, INCLUDING COMPARISON TO PROJECTIONS WITH EXISTING POLICIES AND MEASURES

Malta's small economy, energy system, and geographical isolation on the periphery of the EU, means that the impact of its national planned policies and measures, as described in Section 3, on other EU Member States is minimal.

However, certain measures included in the update hold regional significance. These measures include the second interconnector with Italy, a potential hydrogen-ready pipeline, and other potential connections with neighbouring third countries to access renewable and clean energy sources. The impacts of these measures are discussed in greater detail under the Energy Security and Internal Energy Market dimensions of the Plan.

Of particular relevance to Malta are price developments in the Italian (Sicily) wholesale electricity market. Malta's single electricity supplier procures a share of its power requirements from the Italian spot market. Therefore, price convergence within Italy and at the EU level would have a direct impact on Malta's cost of electricity Malta is also following closely the proposed changes to the Electricity Market Directive as it is important that the cost of electricity acquired from the European grid fully reflects the increasing share of renewable energy sources and slowly decouples from the price of natural gas.

Apart from price considerations, interconnection with mainland Europe is also essential to increase the grid's stability in view of a higher share of intermittent renewables in Malta's energy mix.

Having said this, Malta deems it crucial to diversify sources of electricity supply, including onshore backup facilities, to mitigate risks associated with potential failure to its electricity interconnection with Sicily, also in view that damages to subsea cables often require several months to be repaired.

These considerations highlight the need for interconnections between Malta and neighbouring regions in the context of energy supply. As Malta seeks to expand its renewable energy capacity and improve its energy security, cooperation with neighbouring countries becomes increasingly important in the pursuit of common climate and energy goals.

Annex I – Public Consultation Feedback

Stakeholder Category	Summary of Feedback Received
Business Association	A key business representative body proposed several measures to address Malta's energy, transport, and environmental challenges. They highlight the importance of reducing traffic through initiatives like usage-based car license fees and parking charges in city centres, with the money raised going towards sustainable transport options. They also call for investments in Malta's electricity, water, and sewage systems to keep up with the demand. Keeping public areas well-maintained, along with strict law enforcement, is also a priority. The body suggests targeted help for low-income earners and subsidies for businesses that invest in energy-efficient solutions. They believe it is time to move away from energy subsidies and instead boost incentives for renewable energy and better public transport, including EVs. They also emphasise the need for all stakeholders to work together, make the permitting process simpler, and raise public awareness to support the green transition. Additionally, they propose financial incentives for sustainable building practices, better waste management, and educational programs to develop green skills and promote sustainable development. The body emphasises the need for comprehensive infrastructure upgrades, energy diversification, and improved maintenance to ensure a stable energy supply for significant investments in renewable energy, traffic congestion reduction, and sustainable tourism to enhance Malta's competitiveness. They call for the development of a 5-10 year Energy Investment Plan with clear milestones, emphasising the importance of transitioning away from energy subsidies and implementing a well-designed feed-in tariff for businesses. They also highlight the need for better waste management, rain harvesting, and energy performance criteria for new buildings. Additionally, they stress the importance of public awareness campaigns, streamlined grant processes, and financial incentives to support the green transition. They recommend measures to support vulnerable groups, such as targeted energy subsidies and retraining programs for workers transitioning to green jobs. Finally, they underscore the importance of collaboration among stakeholders, reducing bureaucratic obstacles, and adopting practical approaches to sustainability reporting.
Business Association	A business association has provided feedback on how Malta can update its NECP, particularly focusing on making real estate more energy-efficient and sustainable. They point out that property is a major asset class backed by banks and suggest that we can improve energy performance and environmental impact of buildings through various EU and local initiatives. The group believes new regulations can help elevate building standards, but this will require everyone to work together. They propose attractive investment incentives and fiscal benefits for energy-efficient properties, and they emphasize the importance of retrofitting existing

Stakeholder Category	Summary of Feedback Received
	buildings. They also highlight the need for integrating sustainability into public procurement and updating planning requirements to support energy-efficient projects. They stress the importance of aligning ESG criteria+ with financial institutions and ensuring that banks and capital markets support sustainable development. Research, innovation, and education are crucial for the green transition, and the group of companies call for better monitoring and data management to track progress. Lastly, they recommend phasing out energy subsidies to encourage the use of cleaner energy and more efficient technologies.
NGOs	A group of NGOs emphasised the need for actual implementation of existing policies to promote decarbonisation, energy efficiency, and sustainable mobility. They advocate for restricting private car use, investing in a Bus Rapid Transit system, and creating safe cycling and walking networks. They stress the importance of protecting solar rights by limiting building heighs and mandating PV installations for large-scale industries. The groups call for a shift to a circular economy, better education on the green transition, and stricter enforcement of energy efficiency standards in new buildings. They also highlight the need for transparency, political will, and a holistic vision for Malta's socio-economic model. Additionally, they recommend phasing out fossil fuel subsidies, promoting renewable energy, and ensuring public participation in climate policy discussions. The feedback underscores the urgency of addressing Malta's high energy dependency and the importance of community-driven initiatives and innovative mobility solutions.
Airline	An airline highlighed critical points regarding the decarbonisation of aviation in Malta. They emphasise that there are currently no effective policies or support mechanisims for international aviation to contribute to Malta's energy and climate goals. Given Malta's heavy reliance on international aviation for connectivity and economic diversity, they stress the urgent need for a national plan to ensure the availability of Sustainable Aviation Fuels (SAF) at competitive prices. They suggest that Malta should aim for higher SAF blend percentages than the EU mandate to attract environmentally conscious travelers and SAF producers. The airline also points out the importance of learning from policies that successfully supported wind and solar energy markets to develop effective strategies for SAF. They call for timely implementation of EU legislation and consultation with the airline industry to understand SAF requirements and ensure a secure supply. The airline stresses that without the right incentives, decarbonising aviation will be challenging, potentially impacting Malta's connectivity and economy. They advocate for research into the feasibility of SAF production in Malta and emphasise that clean air transport should be accessible to all, given Malta's reliance on air travel.
Government entity	A government entity emphasizes the importance of ensuring the Malta's transition to a low-carbon economy is just and inclusive, particularly for those living in or at risk of poverty. They highlight that while there are various initiatives to encourage investment in renewable energy, these often remain out of reach for vulnerable groups due to their limited financial resources and the long time required to see returns on such investments. To address this, the Ministry suggests divising ways to make renewable energy

Stakeholder Category	Summary of Feedback Received
	initiatives accessible to all segments of society. Additionally, they stress the need to ensure that business investments in alternative energy do not lead to higher living costs, advocating for a transition that is both sustainable and profitable for everyone in the long run.
Private company	A private company highlighted the importance of increasing PV and wind installations to meet renewable energy targets and suggests that Malta's plans for offshore wind and PV facilities will be crucial. They commend the shift from heavy fuel oil to natural gas for power generation and the introduction of free public transport but stress the need for better service to reduce road emissions. The company also underscores the need for incentives to support the electrification of vehicles, paired with a switch to renewable energy sources. They advoacte for prioritising green and active mobility solutions, such as cycling and walking infrastructure, to ease congestion and improve the quality of life. Additionally, they call for regulatory changes to discourage private car ownership, stronger EPC requirements for buildings, and exploring innovative solutions like floating solar panels. The company also stresses the importance of private investment and public-private partnerships to fund large-scale renewable projects, improving public engagemnet and education, and estalishing clear regulation and robust monitoring mechanisms to track progress.
Business Association	A business association has raised several important points regarding the proper disposal and recycling of refrigerants in Malta. They emphasised the need for engineers to ensure that decommissioned systems pass through appropriate waste channels and that all refrigerants are recovered, with penalties for companies that fail to comply. They highlight the issue of refrigerants not being recycled properly due to unofficial scrap yards offering cash for units, leading to environmental harm. The association calls for better alternatives for refrigerant disposal, as the current costs are prohibitive. They also stress the need for stricter enforcement and regulation, including requiring proof of proper disposal and valid licenses for purchasing refrigerants. Additionally, they suggest providing grants or tax credits to replace old, inefficient units with newer, more environmentally friendly models, contingent on proper disposal through approved channels.
Private citizen	A private individual emphasised the need for energy efficiency and the repurposing of waste energy generation. He advocates for maximising domestic solar power and agrivoltaics, improving mass transportation, and decentralising the energy sector to enhance resilience. He suggests promoting hybrid vehicles over fully electric ones due to the current strain on Malta's electricity grind and highlights the potential of biofuels from waste. He also calls for better energy storage solutions, renewable water desalination, and even considering nuclear power with small modular reactors. The individual stresses the improtance of strict regulatory frameworks for energy efficiency in buildings, public consulattaions on energy policies, and incentivising dmaller personal cars and public transport use. He underscores the need for public-private partnerships and university research funding to drive innovation

Stakeholder Category	Summary of Feedback Received
	in renewable energy and storage. Finally, he emphasises leveraging Malta's abundant sun, sea, and waste resources to make the energy transition accessible to all, regardless of income.
NGO	A non-profit making organisation recommends incorporating a comprehensive Social Impact Assessment (SIA) in the update to Mlata's National Energy and Climate Plan 2021-2030. They stress that this assessment should go beyond simple metrics like 'social acceptability' and 'quality of life' and instead follow the International Principles for Social Impact Assessment. This would involve an interdisciplinary approach using both quantitative and qualitative methods to analyse, monitor, and manage the social consequences of planned interventions. The organisation also raises concerns about the proper recovery and disposal of refrigerants from air conditioning units, suggesting regulation of scrap yards to prevent improper disposal. Additionally, they advocate for disincentivising private vehicle ownership and investing in public transport and green mobility solutions to address the high number of vehicles on the road.
Business Association	An NGO emphasises the need for a forward-looking, holistic vision in Malta's National Energy and Climate Plan to support the shipping industry's transition to alternative sustainable fuels and innovative emission reduction measures. They call for clear government commitments, an appropriate legislative framework, and financial support schemes to facilitate this transition. The NGO highlights the importance of developing port infrastructure to support the supply and affordability of clean maritime fuels, such as hydrogen and biofuels, and stresses the need for on-board carbon capture technology and infrastructure to handle captured CO2. They advocate for closer collaboration between the government, renewable fuel suppliers, and shipowners to reduce barriers and enhance Malta's competitiveness as a maritime nation. The NGO also underscores the importance of ship financing, recommending that Malta works with the local and European financial institutions to support the industry's decarbonisation projects and suggest learning from best practices in other EU countries. Additionally, the NGO stresses the need for a national skills strategy to upskill and reskill the maritime workforce, ensuring Malta remains competitive in the green and digital transition. They recommend involving all key stakeholders in developing a comprehensive strategy for sustainable maritime jobs, growth, and competitiveness.

Stakeholder Category	Summary of Feedback Received
Government entity	A government entity emphasizes the importance of integrating environmental considerations into Malta's NECP. They recommended that the NECP align with the Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) recommendations to mitigate potential impacts on Natura 2000 sites. The agency stresses the need for ongoing environmental assessments for future projects to ensure effective planning and design. They highlight the interconnectedness of climate change and air quality, suggesting that the NECP explicitly reference the National Air Pollution Control Programme (NAPCP) to create a cohesive strategy. The agency also calls for careful siting of infrastructure projects to avoid major environmental impacts, particularly in waste management and agriculture. They raise concerns about the end-of-life disposal of batteries, solar panels, and wind turbines, recommending that such facilities be located in urban or industrial areas. Additionally, the agency underscores the importance of considering biodiversity in climate change mitigation and adaptation efforts, advocating for nature-based solutions and referencing the EU Nature Restoration Regulation.