Clean energy for EU islands

Energy Academy

Building Renovation towards Decarbonisation: Opportunities and Challenges

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Drivers for Renovation

International Commitments

- The Paris Agreement to limit overall temperature rise to 1.5 and requiring at least 57% reduction in overall carbon emissions by 2030, compared to 2019.

Political will at EU level

- The EU Green Deal aiming to achieve net-zero emission of greenhouse gases by 2050 and based on circular economy (approved in 2020)
- “Fit for 55” in 2021 aiming at reduction of GHG emissions by 55% by 2030
- Renovation Wave for Europe Strategy

The Russian Invasion of Ukraine

- RePowerEU (May 2022) initiative for affordable, secure and sustainable energy for Europe

Renovation Wave for Europe

Focusing on existing building renovation

- Potential of EE is much higher in renovation than in new buildings

Fostering economic recovery and job creation given the labour-intensive nature of renovation works

- Open new markets for EE products
- Train for EE future

Priorities

- Reducing energy poverty and worst-performing buildings
- Improving public buildings and social infrastructure
- Decarbonising heating and cooling systems

Instruments

- Direct EU funding (Recovery and Resilience Funds, Social Climate Fund, ERDF)
- PPP
- Strengthening finance to research and innovation
- Address market barriers and provide technical assistance

Renovation Wave Priorities

Strengthening regulations and standards (AND COMPLIANCE)

- Mandatory minimum energy performance standards
- Update EPC software to include indoor comfort
- Setting targets for renovating the Public Sector buildings

Provision of well-targeted funding

- ‘Renovate’ and ‘Power Up’ Flagships in the Recovery and Resilience Facility under NextGenerationEU,
- Simplification of rules for combining different funding streams
- Diversification of incentives for private financing;

Technical capacity building

- Training of technical staff for renovation
- Training public sector officers on green financing
- Revamping the Educational System and University syllabi

Expanding the market for sustainable construction products and services

- Encouraging use of environmentally-bengin building materials
- Requirements for recovery and re-use of building materials

Creating a New European Bauhaus

Developing community renovation projects and empowering citizens to become prosumers

The Energy Performance of Buildings Directive (2018/844)

- Main legislative instrument for buildings
- Carry out cost optimal studies to determine the minimum energy performance requirements for new constructions and for buildings undergoing renovation.
- Energy performance certificates must be issued when a building is sold or rented and for all public authority buildings also to be displayed at entrance.
- All new buildings must be nearly zero-energy buildings (NZEB) from 31 December 2020. Since 31 December 2018, all new public buildings already need to be NZEB.
- Member States must establish strong long-term renovation strategies, aiming at decarbonising building stocks by 2050.
- Minimum number of electrical charging points in new and renovated car parks
- An optional European scheme for rating the ‘smart readiness’ of buildings is introduced
- Smart technologies are promoted, including through requirements on the installation of building automation and control systems, and on devices that regulate temperature at room level
- Health and well-being of building users is addressed, for instance through the consideration of air quality and ventilation

Malta's Key Strategies & Plans

- National Energy and Climate Plan (NECP 2019)
- Recovery and Resilience Plan (2021)
- Low Carbon Development Strategy (LCDS 2021)
- Long-term Renovation Strategy 2050 (LTRS 2021)
- Construction and Demolition Waste Strategy 2021-2030 (2021)
- National Policy for Electric Vehicle Public Charging Infrastructure (2022)
- Draft National Strategy for the Environment 2050 (NSE 2022)

Complementarity and Overlapping between Strategies

National Energy and Climate Plan

Reporting on feedback received from public consultation
EE in buildings
Incentives
Missing data e.g. total area of public buildings to be renovated until 2030

Recovery and Resilience Plan

Building renovation
LTRS
Renewables in public road
Electrifying public fleet

Low Carbon Development Strategy

Energy efficiency single measures
Deep renovation
Awareness and incentives

Long-term Renovation Strategy 2050

Worst performing dwellings
Deep renovation
Barriers to renovation
Awareness and incentives

Construction and Demolition Waste Strategy

SM 810:2022 on Deconstruction and Recycling
SM820:2022 Classification of recycled aggregates

National Policy for Electric Vehicle Public Charging Infrastructure

Public charging points
Harmonisation of plugs
Private charging point services & tariffs

Draft National Strategy for the Environment 2050

Deconstruction
EE in buildings
Offshore renewable energy projects
Green infrastructure for buildings
Deep renovation

The Enabling Legislations & Tools

- Cost Optimal Studies (2018)
- Planning Authority Development Control Design Policy (DC15)
- Minimum Technical Document F (2016)

Cost Optimal Studies: What are they?

- Based on typical building geometry and building energy services
- Uses approved EPC software to calculate reference energy rating
- Proposes combination of energy efficiency measures and determines their resulting EPC rating
- Determines the global (life cycle) cost for effecting such measures (capital, installation, maintenance, replacement for 20 years or 30 years) both for financial (includes VAT) and macroeconomic (no VAT but includes carbon costs) levels
- Choose the EPC rating that corresponds to the least painful (cost effective) scenario
- If this value is more than 15% away from established minimum requirements, then the minimum requirements will need to be revised
- To be revised once every 5 years

Malta Cost Optimal Studies (2018)

- Carried out for Schools, Hotels, Restaurants, Sports Complexes, Homes for the Elderly, Shops, Offices (New)
- Cost optimality for Offices (Renovated) and Dwellings – completed but not published
- Tens to hundreds of combination of measures were simulated.
- Measures focused on building envelope, building energy systems and renewables (solar heating and solar photovoltaics)
- Results are on a macro (EPC cost optimal) levels and micro (component or elemental) levels

Malta's Cost Optimal Studies: Outcomes

	Cost Optimal Levels (NEW) kWh/m².yr	Proposed NZEB Levels (NEW) kWh/m².yr	Cost Optimal Levels (RENOVATED) kWh/m².yr	Proposed NZEB Levels (RENOVATED) kWh/m².yr
Offices	465	405	645	450
Homes for the Elderly	740	705	750	715
Hotels	790	757	905	890
Restaurants **	1535	1,535	1595	1,595
Schools	370	235	375	265
Shops	775	560	890	670
Sports Complexes	620	530	640	550

** In their majority, restaurants are assumed to have no access to roofs for installation of solar systems

Malta Cost Optimal Studies: Observations

- Although figures look high, one needs to note that the EPC software uses an old primary energy factor of 0.878, compared to the current ~ 0.5, which results in a reduction of 43%
- There is a limit to the extent of insulation that one can add to walls due to Malta's mild weather
- The main source of energy that needs to be avoided is the sun (shading, roof insulation)
- Specific measures are very much adapted to particular categories (e.g. heat pump water heaters for restaurants / solar heaters for Homes for the Elderly)
- The contribution of heat pumps to renewable energy is not considered in the EPC

Planning Authority DC15

- This is a binding design guidance policy
- Addresses a multitude of building aspects to form a holistic approach. This includes solar heating and solar photovoltaics on rooftops
- The last update was made in 2015
- Some of the requirements do not favour the full utilisation of the solar potential on rooftops
- Other legislation such as SUBSIDIARY LEGISLATION 552.22 Development Planning (Health and Sanitary) Regulations LN227/2016 and LN374/2020 may hamper the application of some EE measures such as external wall insulation due to the minimum set back of the building from neighbours

Minimum Energy Performance Requirements Technical Document F 2016

- This is a mandatory requirement for building compliance
- Two parts dealing separately with the building envelope and the building energy systems
- Two tier minimum requirements based on overall EPC rating limits and specific elemental minimum requirements
- EPC requirements limited to a select of dwelling categories and offices (290-350 kWh/m².yr) – clearly not matching cost optimal study
- Building energy systems minimum requirements are not fully in line with EN Norms, which have significantly changed over the past few years

Challenges to Renovation

- Overlapping strategies
- Discrepancies between existing legislation and new requirements
- New building boom not in line with all minimum requirements of Tech. Doc. F, thus adding to heavier future renovation needs.
- Renovation expertise is hard to find.
- High market prices for renovation products
- Insufficient financial support for best EE measures e.g. wall insulation for dwellings and heat pump water heaters for restaurants
- Weak market drive towards renovation
- Low energy tariffs

Lack of harmonization & action plans

Antiquated & conflicting legislation

Lack of legislative enforcement

Lack of appropriate technical skills

Small renovation market

Weak incentive schemes

Lack of awareness

Impacting cost effectiveness of EE measures

Recommendations

- Consolidate policies and strategies to avoid overlapping
- Priority to Energy Efficiency First principle and higher indoor comfort rather than economic feasibility only
- Support higher efficiency for heating and cooling systems, including water heating
- Alleviate energy poverty through strong financial EE measures ….. and quickly (before funds disappear)!!!
- Institute a One-Stop Shop for Energy Advice (both technical and economical) both for consumers and for professionals
- Update existing building legislation to support the energy transition process (DC15, Tech Doc F) and new laws to encourage prosumers
- Harmonise and implement the strategies (NECP, LTRS, etc) through structured approach
- Frontloading of Finances (RRF, RePowerEU, ERDF) – An effective strategy for accelerating benefits (Increase financial support for the first years rather than investing equal amounts every year)
- Invest more in EE and RE and Expand public investment for the green and digital transition and for energy security, including by making use of the RRF, RePowerEU and other EU funds as of 2023 –

References:

Policies to decarbonise residential buildings in Central, Eastern and Southern EU: impact on energy poverty and mitigation strategies, Institute for European Energy and Climate Studies 2022

Promotion of near zero CO2 emission buildings due to energy use (ZeroCO2)

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Thank you

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