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Azores data Overview





Power Supply General Requirements

Requirements

- Renewable energy production, so that the power supply is environmentally friendly;
- Grid infrastructure, reliable and with capacity for stable supply;
- Conversion system, to cope with different voltage and frequencies of energy supply;
- Charging system, designed to minimize voltage disturbances.





Source: https://escolaeuropea.eu/tag/onshore-power-supply/



Source: Utilization of Electric Vehicles for Vehicle-to-Grid Services: Progress and Perspectives, by Sai Sudharshan Ravi and Muhammad Aziz

EDA

Onshore Power Supply Load Requirements at Berth

Azores Islands

	Island	Peak Power Demand	Diesel Power Plant Power Instaled	Diesel PP Max Power Available
	São Miguel	78 850 kW	98 060 kW	90 800 kW
	Terceira	34 550 kW	68 000 kW	61 800 kW
	Faial	9 320 kW	19 110 kW	16 380 kW
	Pico	9 510 kW	16 760 kW	14 900 kW
	São Jorge	5 360 kW	8 230 kW	7 050 kW
	Santa Maria	3 960 kW	6 910 kW	6 150 kW
	Graciosa	2 680 kW	4 680 kW	4 250 kW
	Flores	2 050 kW	3 730 kW	3 450 kW
•	Corvo	370 kW	970 kW	850 kW







Ships



Inboard Load ("hotel" loads)

Ship Type	Peak Power Demand	Peak Power Demand for 95% of ships	Average Power Demand	Time per call*
Cruise ships (>200m) (<200m)	11 000 kW 7 300 kW	9 500 kW 6 700 kW	7 500 kW 4 100 kW	12 h 12 h
Oil and product tankers	2 700 kW	2 500 kW	1 400 kW	36 h
RoRo, RoPax and Vehicle carrier	2 000 kW	1 800 kW	1 500 kW	3 h 8 h
 Containership (> 140m) (< 140m)	8 000 kW 1 000 kW	5 000 kW 800 kW	1 200 kW 170 kW	36 h 16 h

Source: Shore side electricity, A feasibility study and a technical solution for an on-shore electrical infrastructure to supply vessels with electric power while in port, Chalmers University * estimation



Onshore Power Supply Fully Electric RoPax Ferry Boats

For quick charge, it may be required to supplement the onshore power supply with **battery storage systems**, to ensure adequate charging capacity and speed.





Onshore Power Supply

Charging facilities for electrical ferries in Faial and São Jorge Islands

Technical assistance from the **Clean energy for EU islands** secretariat under the program "30 for 2030" **Mitigating the impacts of ferry electrification on the distribution grids of Faial and São Jorge**



Challenges

Energy

The electrification of ferries require an **additional amount of electricity** to be generated on the islands.

Power

The charging of ferries at daytime, in between journeys, require a **high power demand for a short duration in time**.



Source: Clean energy for EU islands: Mitigating the impacts of ferry electrification on the distribution grids of Faial and São Jorge



Results (first year results)

Energy

The increase in electricity consumption related to the new electric ferries can be covered on a yearly basis from the newly expected RES generation capacity (RES generation representing ~35%).

Power

The introduction of a 2MW/2MWh BESS can decrease the required connection capacity at the port from 2.75 MW to 1.50 MW.



Onshore Power Supply Cold ironing for cargo ships in São Miguel, Terceira and Faial (LVSC)

Request for information on the technical conditions necessary to increase the electrical power supplied to the port infrastructure (2023) **Implementation of Shore Connection System to general cargo and container ships**





Onshore Power Supply

Shore Connection for cruise ships in São Miguel Island (HVSC)





Electric Vehicles Number of 100% Electric Vehicles



RAA 🛞 66 Charging Stations 47 🛞 Normal Charging Stations 19 🛞 Fast Charging Stations

Source: Portal da Energia – Direção Regional da Energia

Number of EV Charging Stations







Number of electric vehicles in the Azores





Number of electric vehicles in Portugal





Electric Vehicles Project V2G Açores

V2G Vehicle to Grid Açores

Portugal (São Miguel)

- reduce energy costs for the customer
- collaborate on system services
- contribute to the use of renewable energy



<figure>









Electric Vehicles Project EV4EU

EV4EU Electric Vehicle Management for Carbon Neutrality in Europe

- > develop and implement new management strategies
- > create conditions for the widespread use of electric vehicles

16 Participant Partners + 6 Associated Partners

Demonstrators in 4 countries:

Portugal, Slovenia, Greece and Denmark

Portugal (São Miguel)

- test V2X (Vehicle-to-Everything) strategies that facilitate electric vehicle charging in homes, buildings and companies:
 - propose new services to take advantage of V2X;
 - mitigate the impact of EVs on the electrical system;
 - contribute to the use of renewable production.







Sustainable Transport Electrical Energy Needs



Challenges

- ✓ Electric consumption increase
 - increase the production
 - strengthen the grid
- New load and production profiles
 - increase energy storage capacity
 - improve energy management systems
 - improve system flexibility
 - promote demand side management
- New power requirements (e.g. fast-charging)

Opportunities



- ✓ Increase renewable production
- ✓ Increase energy autonomy
- ✓ Diversify energy sources
- ✓ Improve energy efficiency
- \checkmark Use other energy vectors

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Thank You for your attention