



The Evolution of the Power Grid Overview

Traditional Grids

Modern Smart Grids + increase in VER production



Source: World Economic Forum - Getting to Net Zero: Increasing Clean Electrification by Empowering Demand (2021)

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The Evolution of the Power Grid Electrification + Decentralization



Source: World Economic Forum - The Future of Electricity: New Technologies Transforming the Grid Edge (2017)

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Projects in Azores

Energy Management System Battery Energy Storage System

Energy Management System

- > Manage the various resources in an integrated manner
- > Monitor and control the various systems
- Make decisions based on forecasts

Battery Energy Storage System

- > Introduce flexibility into the power generation system
- > Collaborate in frequency regulation
- Reduce the need for spinning reserve







Projects in Azores Distributed Generation for self-consumption

Self-consumption production units

- ✓ Collaboration in defining dimensioning rules for local production to minimize the injection of excess power to the grid
 - > ensure that self-consumption does not cause grid constraints
 - > ensure that every user can install local production
 - > promote local energy management
 - promote local storage
- ✓ Definition of technical requirements for the connection of production facilities for self-consumption.
 - > ensure network security and stability







Projects in Azores Smart Metering

EDA Smart Metering Project

> transition from conventional meters to smart meters

in addition to automatically measuring and communicating electricity consumption, it allows data to be processed and made available and supports the provision of services through remote communication

Period : 2025-2028

+1.500 distribution stations; +130.000 clients

Phase 1 (2025-2026), the Advanced Metering Infrastructure and the Meter Data Management will be installed, and 10.000 smart meters will be connected (from all islands)

Phase2 (2026-2028), rollout of the remaining meters

What changes will this bring?

- remote operations
- continuous monitoring
- load control
- more rigorous studies
- dynamic tariffs

- correction of time lags
- tariff changes
- cuts/reconnections
- readings





Projects in Azores

N()S

SUSTAINABLE SOLUTIONS

for islands' decarbonisation

IANOS - IntegrAted SolutioNs for the DecarbOnization and Smartification of Islands

test, on islands, management solutions for small electrical systems with high penetration of renewable sources, efficiently, safely and with quality.

Partners: 32 from several European countries Period : 2020-2025 Demonstrators: Portugal (Terceira), Netherlands (Ameland) "Fellow Islands": Lampedusa (Italy), Bora Bora (French Polynesia) and Nisyros (Greece)

Portugal (Terceira)

- > installation of:
 - photovoltaic panels, energy storage solutions (thermal or electrochemical) and self-production optimization systems, in 40 homes;
 - two chargers with V2G technology;
 - a flywheel, in a dairy industrial unit;

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- a transformer with voltage regulation on the LV side
- > development of a Virtual Power Plant



Funded by the European Union



Projects in Azores SMHYLES

SMHYLES - Safe, Sustainable and Modular Hybrid Systems

➢ design, construction, deployment, and demonstration of supercapacitors coupled with an Aqueous-based Hybrid Energy System (HESS), a Salt-based HESS, and an aqueous energy storage expansion.

Partners: 17 from several European countries Period: 2024-2027 Demonstrators: Portugal (Maia and Graciosa), Germany (Pfinztal) Graciólica - Paticipant Partner; EDA - Associated Partner

Portugal (Graciosa)

- \succ installation of:
 - nickel-carbon water-based supercapacitor;

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salt battery (SHESS) supporting the island electric grid

Salt-based HESS will operate to provide an effective frequency and voltage regulation (primary and secondary control) of the grid and efficient transitions between gridforming and grid-following modes



the European Union





Projects in Azores EV4EU

CV4CU

EV4EU - Electric Vehicle Management for carbon neutrality in Europe

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

Partners: 16 Participant Partners + 6 Associated Partners

Period : 2022-2025

Demonstrators: Portugal (São Miguel), Slovenia (Krško), Greece (Mesogia) and Denmark (Bornholm)

Portugal (São Miguel)

- test V2X (Vehicle-to-Everything) strategies that improve and facilitate electric vehicle charging in homes, buildings and companies (4 use cases):
 - propose new services to take advantage of V2X;
 - mitigate the impact of EVs on the electrical system;
 - contribute to the use of renewable production.





V2G - Vehicle-to-Grid Açores

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

Period : 2020-2021



MAIN DRIVERS FOR THE ELECTRIC SYSTEM

- ✓ Promotion of INTELLIGENT SYSTEMS
- ✓ Roll out of SMART METERS

PLANO NACIONAL

ENERGIA E CLIMA

- ✓ Promotion of STORAGE systems
- ✓ Strong boost in LOCAL / DECENTRALIZED PRODUCTION POWER
- ✓ Encouraging consumer participation in the system
- ✓ Adoption of SUPPLY / DEMAND FLEXIBILITY systems
- ✓ Maintenance of adequate levels of QUALITY OF SERVICE AND SUPPLY SAFETY

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The Evolution of the Power Grid National Energy and Climate Plan 2030

A VIEW OF THE ELECTRICAL SYSTEM FOR NEXT DECADES

Source: PNEC 2030

Thank You for your attention