

VPP4ISLANDS

Virtual Power Plant for
Interoperable and Smart isLANDS



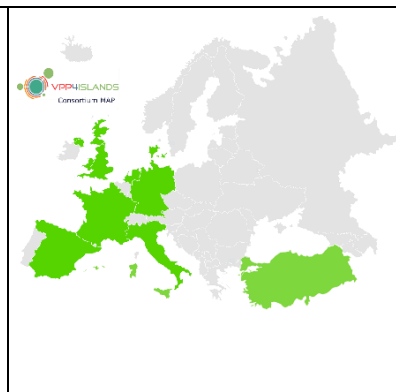
VPP4Islands aims to facilitate the integration of renewable systems, accelerate the transition towards smart and green energy and help Islands to exploit energy efficiency potential and innovative storage approaches, foster the active participation of citizens and become self-sufficient in energy, while reducing costs, GHG emissions and reliance on heavy fuel oil to generate power, and creating new intelligent business, growth and local skilled jobs. To reach these goals, VPP4Islands project proposes disruptive solutions based on digital twin concept, Virtual energy storage systems (V ESS) and Distributed Ledger technology (DLT) to revolutionize the existing VPP and build smart energy communities. Based on aggregation and smart management of distributed energy resources (DERs), VPP4Islands increases the flexibility and profitability of energy systems while providing novel services.

From 01/10/2020 To 31/03/2024	Project total cost 7 223 108.75 M€	EU contribution 6 119 378.75 M€	Website www.vpp4islands.eu
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Technologies and services deployed

Technologies for consumers	✓ Demand response ✓ smart metering ✓ Smart contract
Grid technologies	✓ Virtual power plant ✓ Digital Twin ✓ Forecasting tools
Large-scale storage technologies	
Distributed storage technologies	✓ batteries ✓ Virtual energy storage system ✓ Hydrogen ✓ Power to heat
Generation technologies	✓ Wind Turbine ✓ PV, ✓ Fuel cell generator
Market	✓ Electricity Market ✓ Ancillary Services ✓ P2P marketplace

Project partners' countries



Coordinator: AMU (France)

Other partners:

- algoWatt (Italy)
- Blockchain 2050 BV (The Netherlands)
- Regenera Levante SL (Spain)
- Civiesco SRL (Italy)
- Ingenieria Y Diseno Estructural Avanzado SL (Spain)
- FTK Forschungsinstitut Fur Telekommunikation Und Kooperation EV (Germany)
- TROYA Genc Cevre Dernegi (Turkey)
- Consell Insular De Formentera (Spain)
- Bozcaada Belediye Baskanligi (Turkey)
- Schneider Electric Espana SA (Spain)
- Brunel University London (UK)
- Cardiff University (UK)
- Inavitas Enerji Anonim Sirketi (Turkey)
- RDIUP (France)
- Agencia Estatal Consejo Superior De Investigaciones Cientificas (Spain)
- Uludag Elektrik Dagitim Anonim Sirketi (Turkey)
- Bornholms Varme AS (Denmark)
- Comune di Grado (Italy)



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Project Description

Context. As a result of the geographic insularity, the energy systems in Islands are characterized by high investment, installation and exploitation costs, low profitability, limited connection to the energy market, overdependence on fossil fuels, high greenhouse gas emissions level and poor electrical grid quality. Those barriers limit the improvement of the local energy infrastructure and slow down the economic development of the Islands.

Scope. VPP4Islands aims to develop a new concept for energy production, distribution and monitoring dedicated for islands. The new concept will promote RES use and revolutionize the existing small grids and Energy Communities (ECs) in Islands. The proposed flexible VPP will not be considered as a conventional power plant constituted of small distributed energy sources but as a flexible green power plant that can store surplus energy and modify their behaviour and architecture to support unpredictable growth and change of energy demand, climate and market, delivering stability to the grid. VPP4Islands will enhance the innovation capacity and competitiveness of the VPP in Europe based on demand-centred approaches to address the uncertainties and the weakness of the existing VPP.

Technical description and implementation. VPP4Islands is mainly based on three notions: Digital Twin, Distributed Ledger Technology (DLT) and Virtual Energy Storage System (VESS). The project aims to develop three tools: (1) VPP4I-Platform (2) VPP4I-Node (3) VPP4I-Box.

Impact. Replicability: During the project, the qualified VPP4Islands solutions will be replicated in 3 follower islands and a replication plan will be proposed.

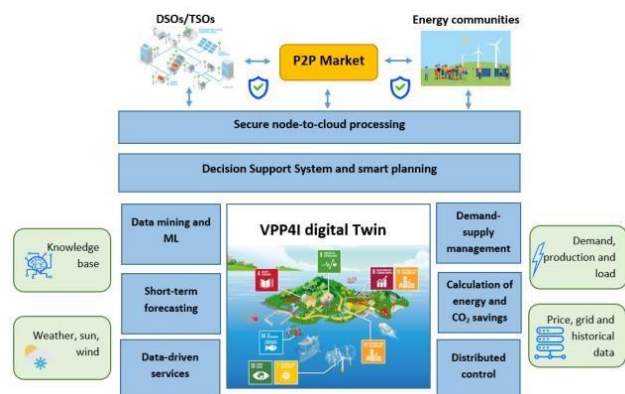
Socio-economics: VPP4Islands will put citizens in the center of the energy systems and promote the building of sustainable energy communities. The VPP4I tools will increase the awareness of the energy transition and consumers will become more engaged and active. Grid upgrade and manipulation will contribute to create new jobs. Moreover, the dynamic incentive prices solution will help to increase the income and reduce the investment cost compared to conventional energy storage.

Environment: VPP4Islands will contribute to the energy savings thanks to load scheduling via Digital twin optimization, Time of Use, eco-

collective action (VPP platform), consumer engagement behaviour through dynamic incentive prices (VESS) and Peak Shaving through the increasing of mix storage systems penetration and controllable loads. Also, VPP4Islands is devoted to 100% renewable energy systems integration and participates considerably in the reduction of CO2 emissions.

Market Transformation: The proposed open technologies (DLT/ Digital Twin/ KB) will unlock the constrained energy market, disrupt the positively current trading method and catalyze the proposed advanced forecasting will predict based on machine learning, transparency and KB precisely when the electricity produced can be traded on the spot markets.

Policy: The Collaborative Knowledge Management (CKM) platform will allow to share best practices and increase users' knowledge and experience for energy management and trading, to develop a vision for applying the VPP4ISLANDS technologies, addressing business and societal demands, and to provide recommendations to policy and decision makers. Moreover, VPP4Islands' exploitation & dissemination efforts collectively aim to support the development of a white paper and policy guidelines.



Architecture of the VPP4I Platform





Brochure developed by Technofi
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More information at <http://www.h2020-bridge.eu/>



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