



NESOI
EU ISLANDS FACILITY

Decarbonization of Generation and Resilience of Security of Power
Supply in an autonomous North-Aegean Archipelago

DGRES-AEGEAN



CHIOS, PSARA, OINOUSSES

“Another 28 isolated island electricity systems with similar characteristics exist in Greece, where PPC and DAFNI may replicate the project”



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The European Islands Facility NESOI aims to unlock the potential of EU islands to become the locomotives of European Energy Transition. To do so, NESOI aims to mobilize more than €100 Million of investment in sustainable energy projects to give EU islands the opportunity to implement energy technologies and innovative approaches, in a cost-competitive way. NESOI has selected 56 such projects across the European Union and provide them with financial resources and technical support.



 **Decarbonization of Generation and Resilience of Security of Power Supply in an autonomous North-Aegean Archipelago**

ABOUT THE PROJECT

Project Promoter
Network of Sustainable Greek Islands (DAFNI)
Public Power Corporation S.A.

Stakeholders
 Municipalities of Chios, Psara and Oinousses
 Ministry of Energy & Environment
 **HEDNO**
 The Regulatory Authority for Energy

 **Country** Greece  **Sector** Hybrid Systems  **PROJECT VALUE** 39,200,000 €

DESCRIPTION

CHIOS: Installation of a behind-the-meter battery energy storage system in the thermal power station, installation of two PV powered hybrid systems, replacement of conventional diesel with renewable diesel.
PSARA & OINOUSSES: Installation of PV-powered hybrid systems in each island. Provision of free electricity to poor households.

AIM OF THE PROJECT

The project takes decisive steps towards the decarbonization of the system's electricity generation and the improvement of the resilience of security of electricity supply to the Archipelago.

FUTURE STEPS

The next step is the implementation and how to proceed faster and in the best possible terms for both the Municipalities and PPC. The study is the intermediate stage of the possibilities offered by NESOI. The next stages, which have to do with the preparation of the tender documents as well as specific actions towards the financing lines are the points that would like the support of NESOI.

HOW THE EU ISLANDS FACILITY NESOI SUPPORTS THE PROJECT

- 1 Identification of suitable technological options given existing project sizing requirements
- 2 Definition of the required environmental permitting procedures
- 3 Cost-Benefit, socioeconomic and environmental analysis and Identification of the preferred option and corresponding definition of project inputs
- 4 Risk analysis and identification of available mitigation strategies and Assessment of existing procurement options.
- 5 Analysis of the permitting procedures and contractual framework
- 6 Financial modelling and identification of target scenario and Identification of financing/funding options
- 7 Action plan and identification of project monitoring procedures





INTERVIEW WITH

Konstantinos Kyparissis, Director of Storage & Islands Energy Transition Unit, PPC
Konstantinos Chasapis, DAFNI Network

Q: How was the project initially designed? Why choosing these specific technologies?

A: The objectives pursued by the project are to contribute to increasing the share of renewable energy in the islands' systems, improving the energy efficiency of the existing thermal plant and improving the quality of supply and resilience of the networks. To meet these objectives, mature and commercially available technologies were needed, that's why we chose photovoltaics and batteries. In addition, the creation of an energy community will contribute to the effort to address energy poverty by covering the electricity needs of 130 energy-poor households.

Q: What were the challenges? How did NESOI help overcome them?

A: A first challenge consists in clarifying the regulatory framework when it comes to combining storage and power generation, as there are not many similar projects in Greece. Regarding the set-up of the energy community, the identification and selection of suitable participating households is challenging as there are sensitive data issues. Another challenge concerns the financing of the project, where NESOI's help is appreciated.

Q: How does the project impact citizens locally? Are local professionals involved?

A: The project impacts citizens by reducing energy poverty. The local government will be involved with the installation of Municipal photovoltaics. It may be necessary to rent premises in order to set them up there – this is a point where the involvement of the local community counts. On Onousses and Psarras, the improvement of the quality and availability of electricity through the hybrid stations on these islands is expected to alleviate the power outages caused either by damage to the submarine cables connecting the islands to Chios or by failures in the power generation. During the construction phase of the project, it is expected that there will be employment opportunities for local professionals and craftsmen, as well as the supply of materials from local businesses. Finally, the implementation of the project will bring additional visibility to these islands in the business and academic sectors.

THE IMPACT

ON LOCAL COMMUNITY



- 1 Local Economy**
 Improvement of living conditions and quality, support to the high seasonal demand for electrical consumption, increase of competitiveness of companies as it sets the level of supplier's quality higher.
- 2 Social Acceptance**
 The real interest of the local authorities in active participation in such a project is expressed and it is declared through the supportive letters that are attached to the project proposal.

Decarbonization of Generation and Resilience of Security of Power Supply in an autonomous North-Aegean Archipelago – Technical Data

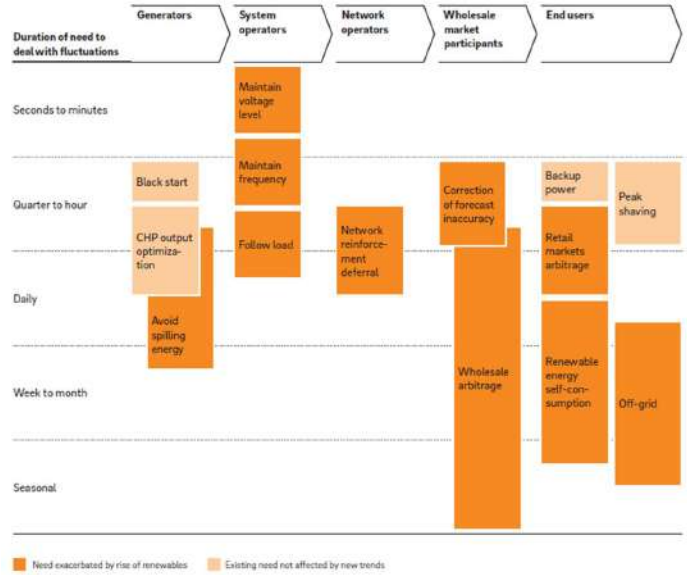
FOCUS ON THE MULTIPLE USE CASES OF ENERGY STORAGE

The integration of storage capacities in the energy system is needed to compensate for the growing intermittent renewable energy production levels, in particular in small islands' systems.

Actually, storage systems have a range of capabilities, which gives them the potential to provide numerous services at different levels of the energy system and within different timeframes, which in turn generates multiple value streams.

For instance, energy storage can be used by network operators in order to support the continuous operation of the network (frequency regulation, congestion management), and even to defer some investments into new network assets. It can also be used by renewable energy generators to smoothen their production and avoid curtailments. It can also support optimizing the operation of thermal power plants.

The batteries that are going to be installed in Chios, Oinousses and Psara in the framework of the DGRES-Aegean project illustrate very well this variety.

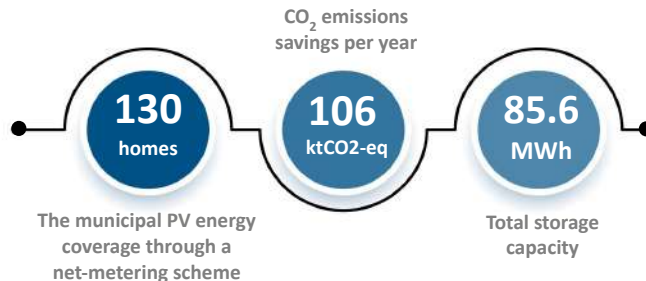


Storage needs across the value chain
 (Source: Roland Berger Focus “Business models in energy storage”)

EXPECTED ENERGY SAVINGS

The total expected primary energy savings from the whole project amount to 174,647 MWh/yr, while the total CO2 emission savings are 106 ktonCO2eq as the island complex is going to be fully decarbonized with the help of renewable diesel substitution. 10.6 MWp of PVs and 85.6MWh of storage.

KEY NUMBERS OF THE PROJECT



REPLICABILITY IN OTHER ISLANDS

Another 28 isolated island electricity systems with similar characteristics exist in Greece (involving another 44 islands), therefore replicates of the project are expected to have substantial benefits to the whole clean energy transition of the Greek islands. The role of this project's promoters is critical since PPC is the major (or sole) electricity producer in Greek islands and DAFNI represents a significant share of island municipalities.