



ETIP SNET

EUROPEAN
TECHNOLOGY AND
INNOVATION
PLATFORM

SMART
NETWORKS FOR
ENERGY
TRANSITION



ENERGY STORY:

TILOS: Independent smart energy islands

Coupling energy storage and renewable energies for enhanced grid
resilience against blackouts on Islands

PLAN. INNOVATE. ENGAGE.



Even though human beings have overcome many of the impacts of geographical distance thanks to ever more advanced and efficient information and communication technologies, transport systems and energy supply infrastructures, we have not yet found a seamless, low-cost way to connect the electricity systems of islands which are separated by water. Connecting islands by putting cables on the seabed is possible but very expensive, especially at long distances. There is no wireless solution in sight “beaming” electricity from one island to the next. For these reasons enabling islands to balance at every moment their total electricity generation and total electricity demand, at an affordable cost for the electricity users of the island and by using volatile, renewable energy sources is a big operational challenge. However, the rapidly decreasing costs of renewable energies can now allow islands to use sustainable energy generation even in remote island areas, without the need of being connected by expensive high voltage cables. The namesake of the TILOS project, and the island Tilos, have vowed to make this dream of energy independence initially for parts of the islands and eventually for the whole island a reality.

How to connect to the future without depending on others?

The Greek island Tilos is located to the North West of Rhodes Island, with high mountains, steep coasts, beaches with clear waters and caves. Up till now, the local population of Tilos of about 500 islanders has covered its electricity needs through an undersea cable interconnection to the island of Kos, where a diesel-oil power station is operated. Extreme weather events and damages or faults of the undersea cable mean that Tilos suffers from quite frequent and in many cases long-lasting electricity blackouts.

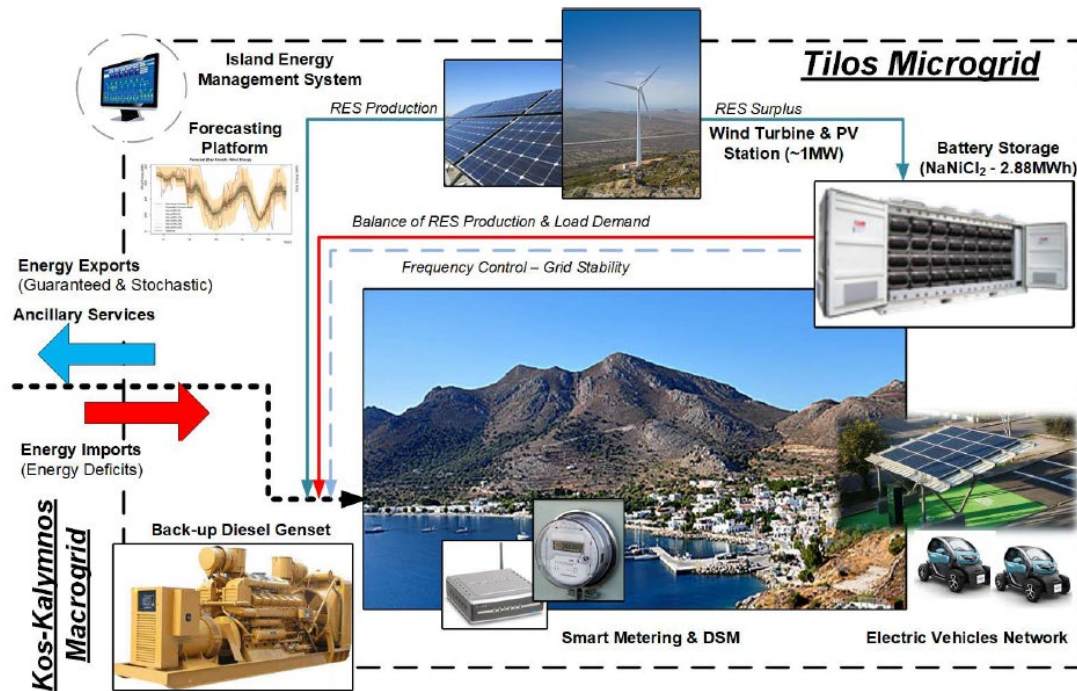
The TILOS project aspired to make this small and remote island of Tilos the first global role model for a smart microgrid facilitating increased participation of renewable energy sources under the optimum exploitation of energy storage assets. Besides Tilos, the islands Pellworm in Germany, La Graciosa in Spain, and Corsica in France also took part in the project. The project's main goal was to demonstrate the potential of local / small-scale battery storage to serve a multi-purpose role within an island microgrid that – in a first step - also interacts with the main electricity network which connects some nearby islands. Among others, the project aims to achieve growth of renewable energy sources and asset value maximization through the optimum integration of a combined wind and solar renewable energy source power station. The project also covers advanced battery storage and demand side management approaches to find the most suitable time during each day when to increase consumption during low energy pricing and when to reduce consumption in peak energy intervals with usually high energy pricing. Technologies such as residential heat storage in the form of domestic hot water and smart metering enable end users to be self-sufficient and maximising the efficiency of their own energy resources. The active participation of citizens and the public engagement in the project also foster novel business models and schemes between the private and the public sector and improve the social welfare produced by the operation



ETIP SNET

EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM
SMART NETWORKS FOR ENERGY TRANSITION

of novel micro grid schemes. TILOS project aims to encourage increased levels of public engagement that will facilitate the implementation of the proposed energy solution.



Impact

TILOS Project is providing innovative ways for a resilient provision of local, renewable electricity without interruptions for consumers. As a consequence, investments in the main grid infrastructure can be deferred and postponed, lowering consumer costs, and facilitating the maintenance of expensive sea cables. The TILOS Project combined renewables, battery storage and a smart distribution grid for secure energy provision while avoiding blackouts. It has demonstrated a solution that is scalable and diminishes high oil import costs for the electricity generation by the non-sustainable diesel-oil generators which affect island inhabitants and tourists negatively. The project has shown that communal programs can make battery storage integrated with local, renewable energies a workable reality and a way forward to address sustainable energy security for islands.

Keywords: Energy Island; Smart Energy Microgrid; Flexibility; Energy Storage.

More info at: <https://www.tiloshorizon.eu/>

Note: Project benefits based on specific criteria outlined in [ETIP SNET Monitoring Report](#)

Project Benefits

- decreased carbon emissions
- improved network management
- Efficient business models



ETIP SNET

EUROPEAN
TECHNOLOGY AND
INNOVATION
PLATFORM

SMART
NETWORKS FOR
ENERGY
TRANSITION



This publication has been developed in the frame of the INTENSYS4EU project, funded by the European Union's Horizon 2020 Research and Innovation Programme under grant agreement N° 731220.

www.etip-snet.eu

PLAN. INNOVATE. ENGAGE.