SUSTAINABLE PLACES

Smart Islands Initiative

A collaboration of EU islands for their smart and sustainable transition

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DAFNI
Network of Sustainable Greek Islands

SMART ISLANDS INITIATIVE

Network of Sustainable Greek Islands DAFNI

DAFNI, a non-profit organization is a **network** of island local and regional authorities. It's comprised of **44 Municipal and 4 Regional members.**

DAFNI **promotes sustainable development** in Greek islands through integrated actions in the fields of energy, environment and culture

It is a founding member of the Pact of Islands initiative promoting sustainability in European islands through local energy planning

DAFNI is the coordinator of the Smart Islands Initiative promoting islands as ideas areas for innovative projects in the fields of energy, environment, transport and mobility

The Smart Islands Initiative

The Smart Islands Initiative is a bottom-up effort of European island authorities and communities which seeks to communicate the significant potential of islands to function as laboratories for technological, social, environmental, economic and political innovation.

Island Quadruple Helix Ecosystems

A collaborative process of setting the Smart Islands Initiative into motion

The Path towards the Smart Islands Initiative

2011
ISLEPACT
Pact of Islands

2013
SMILEGOV
Smart Islands Strategy

2016
Smart Islands Initiative

Pact of Islands | How it all started

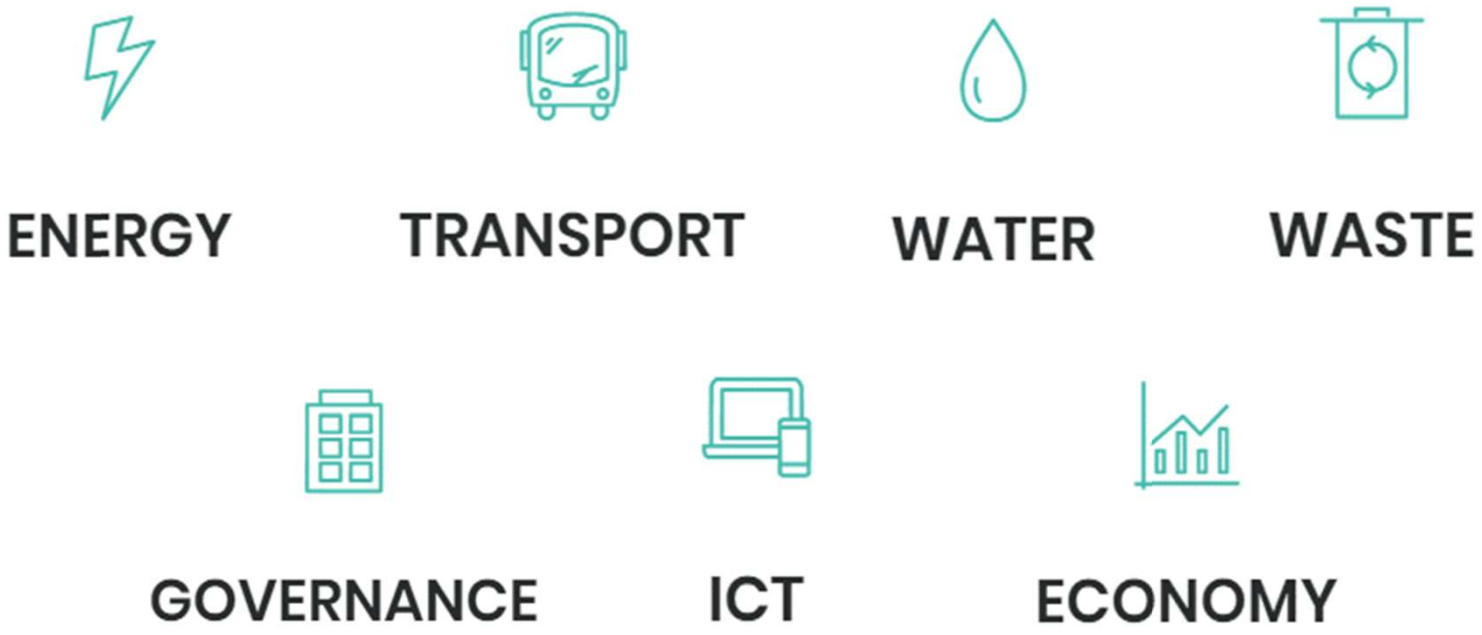
- ISLE-PACT project 2009 – 2012 funded by DG TREN to promote **local sustainable energy planning in EU islands**
- Initiative launched in 2011 under ISLEPACT project to promote **local sustainable energy planning** in islands
- An initiative **in liaison to the Covenant of Mayors** but focusing on the islands' special characteristics
- **Island Sustainable Energy Action Plans** (iSEAPs) produced by the signatories
- **iSEAPs conducted on island-scale** (except of Cyprus and Malta)
- **Methodologies and tools** for planning and monitoring the iSEAPs provided to the signatories
- **117 signatories** from all Member States with islands
- From 12/2016 Pact of Islands is **fully compatible to Covenant of Mayors** and iSEAPs are evaluated by JRC

The Smart Islands Strategy | How it matured

Smart Islands Initiative

An initiative bringing EU islands together to turn their islands into examples of change, technological disruption towards clean energy transition

The Smart Islands Initiative | Key areas of intervention



The Smart Islands Initiative | The commitments

We want to become smart, inclusive and thriving societies and to this end we will:

1. Take action to **mitigate and adapt to climate change** and **build resilience** at local level
2. Trigger the uptake of smart technologies to **ensure the optimal management** and use of our resources and infrastructures
3. **Move away from fossil fuels** by tapping our significant renewables and energy efficiency potential
4. Introduce sustainable island mobility including electric mobility
5. **Reduce water scarcity** by applying non-conventional and smart water resources management
6. Become **zero-waste territories** by moving to a **circular economy**
7. Preserve our distinctive **natural** and **cultural capital**
8. **Diversify our economies** by exploiting the intrinsic characteristics of our islands to create new and innovative jobs locally
9. Strengthen social inclusion, education and **citizens' empowerment**
10. Encourage the shift towards alternative, yearlong, **sustainable and responsible tourism**, inland, coastal and maritime

The Smart Islands Initiative | The 3 milestone events

Athens, June 2016

27 island representatives from **13 Member States** launch the Smart Islands Initiative and draft the Declaration

Brussels, March 2017

33 Local and Regional island authorities from **15 Member States** sign the Declaration on behalf of more than **200 EU islands** in a ceremony hosted by **12 MEPs**

Athens, September 2018

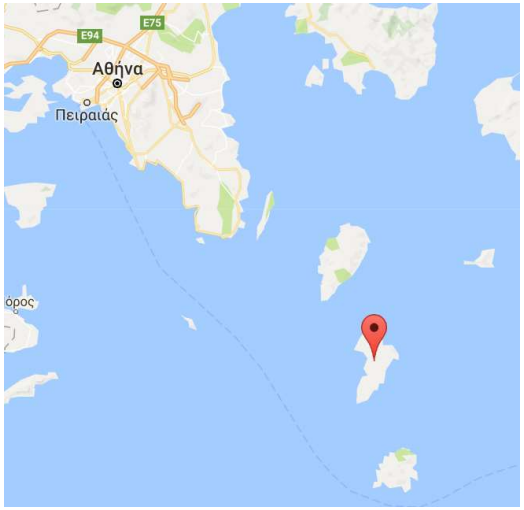
22 island representatives from **13 Member States** strengthen their cooperation and table proposals for the post 2020 era

Κύθνος «Έξυπνο Νησί»

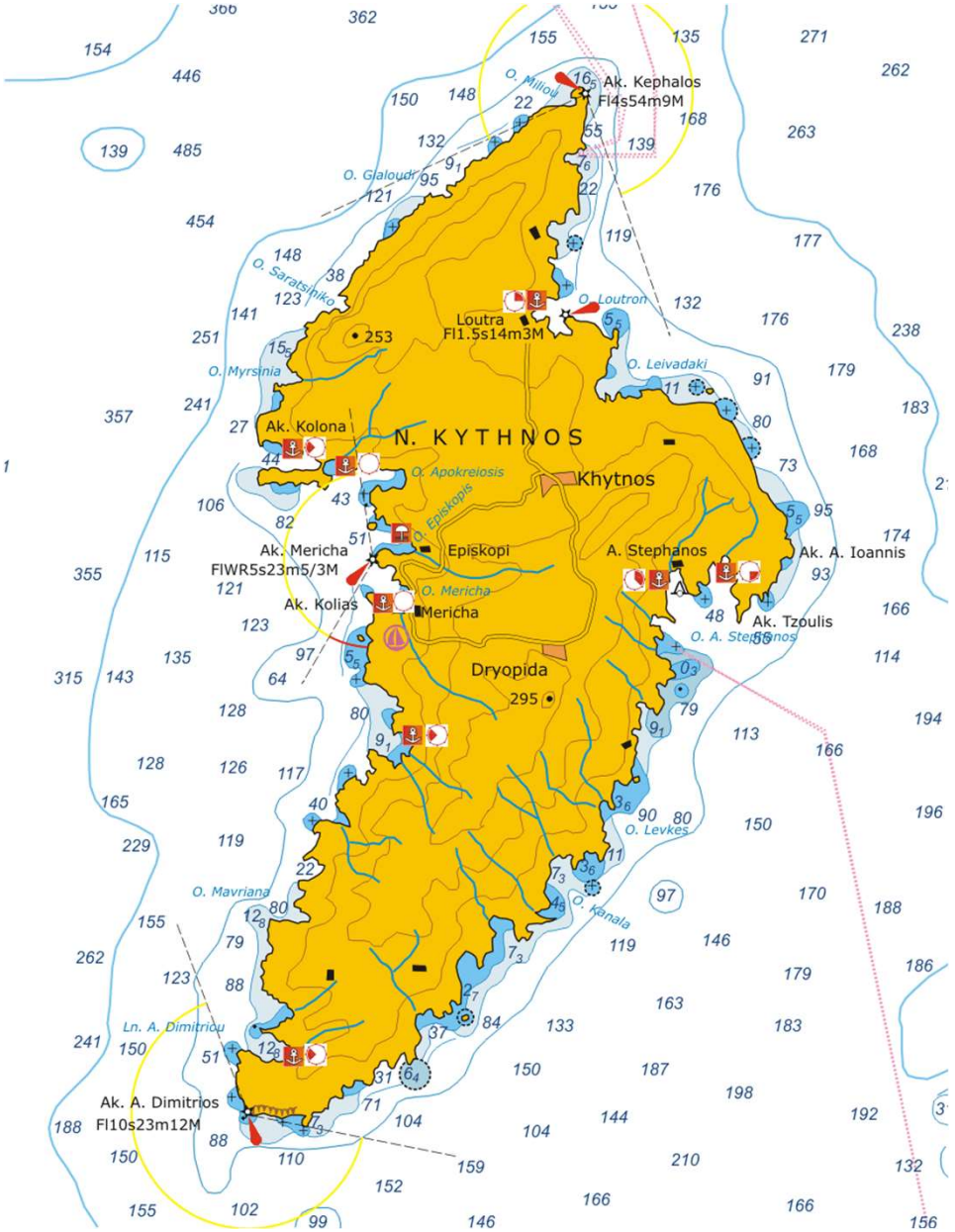
Kythnos “Smart Island”

A vision for sustainable local development

Kythnos



- 1608 inhabitants
- Easily accessible (1,5 hour from mainland)
- Non-interconnected
- Desalination for water production
- Not very touristic

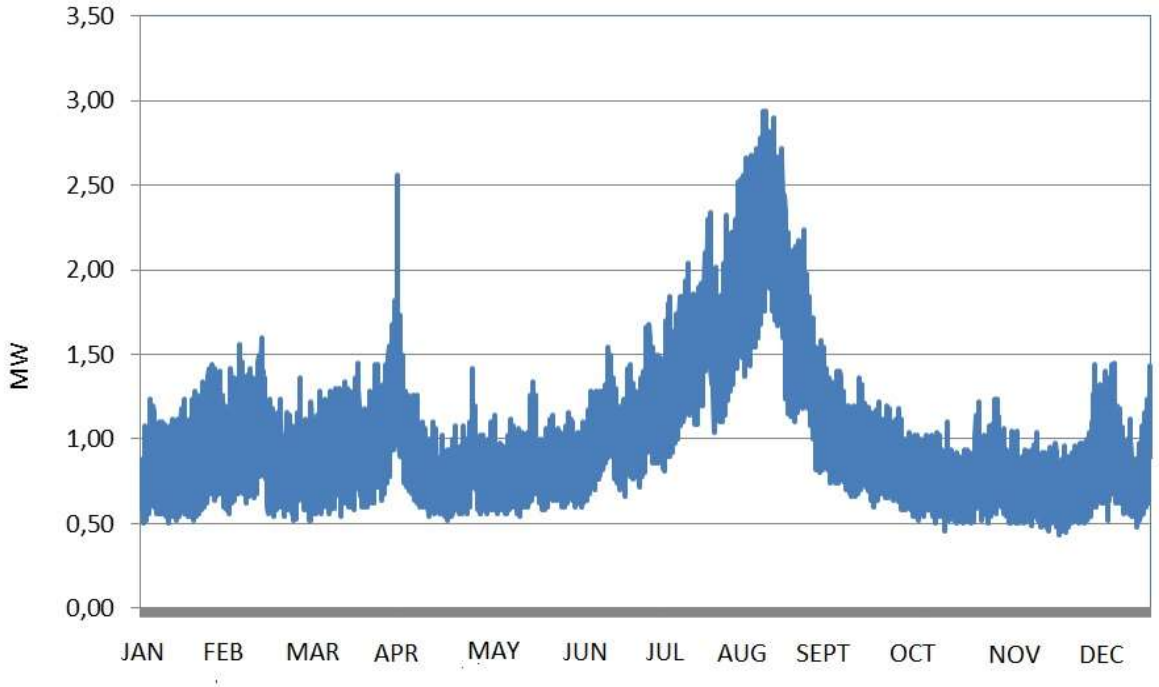


Kythnos – Electrical system

- The electricity mix of Kythnos Island is dominated by diesel and fuel oil
- Local power station established in 1964
- 4 MWM generating sets of 0.53 MW rated power each,
- 2 MITSUBISHI generating sets of 1.275 MW rated power each
- and 1 MITSUBISHI generating set of 1.250 MW
- 15kV Medium Voltage distribution grid – 3 lines – 87 km in total

Kythnos – Electrical system

- High seasonality



Kythnos – Electrical system

- RES in Kythnos – Wind park

Not in operation

Repowering in process by PPCR

5X33kW = 165kW

500kW

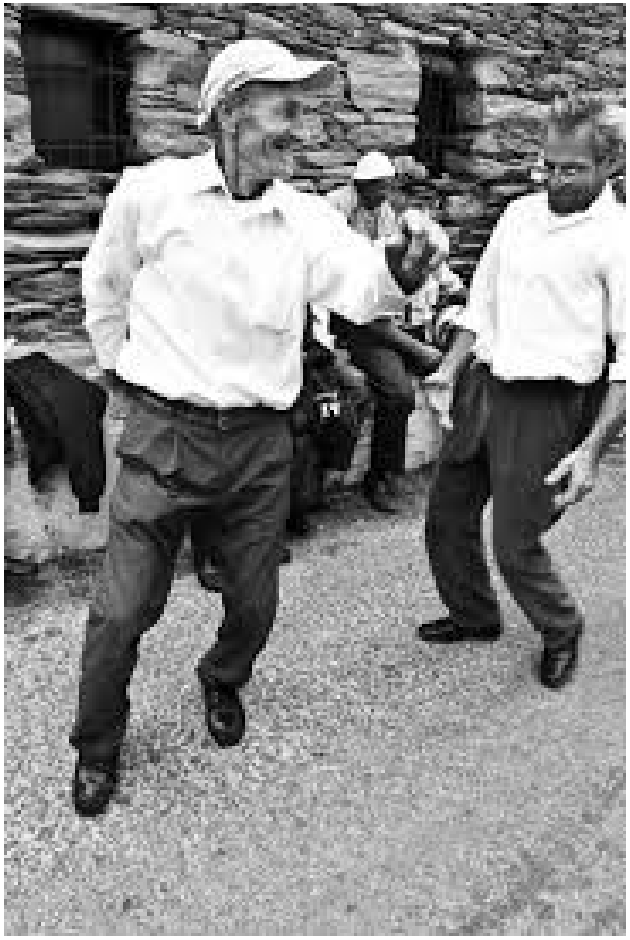
Kythnos – Electrical system

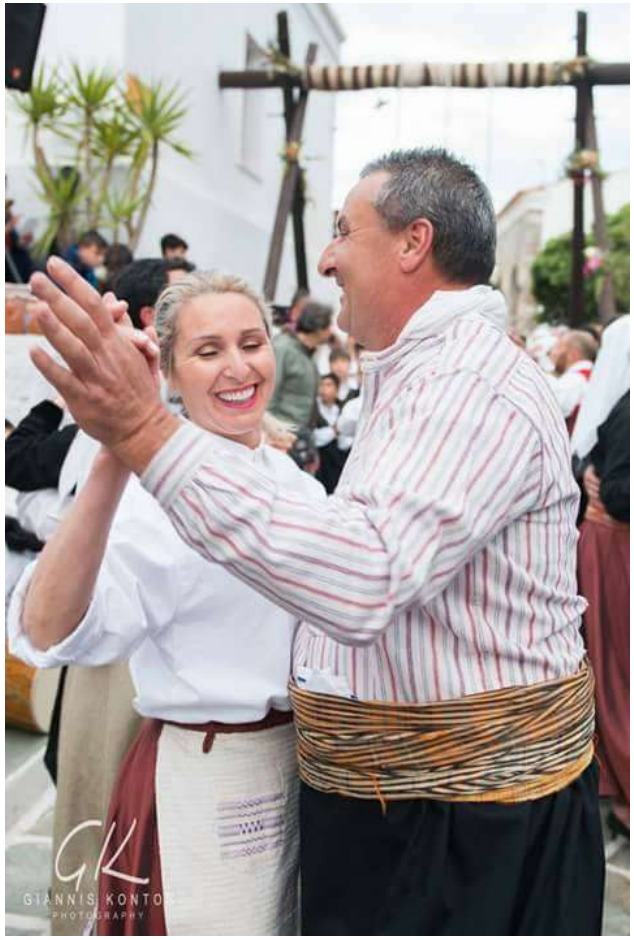
- RES in Kythnos - PVs

Beaches


Villages

Traditional dancing – Balos






Traditional music

Honey

Gastronomy

Archeology

Moreover…
Kythnos has been a Living Lab of technological innovation on clean energy transition

The history

1982

1st wind park in Europe

1983

Installation of 100kW PV system with battery storage (400kWh)

1989

Replacement of the WTs (5 x 33kW)

1992

New inverters in the PV system

1998

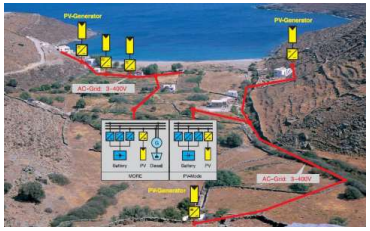
Installation of a new Vestas WT 500kW

2000

Operation of a fully automated Intelligent Power System

2001

Operation of the Gaoduromantra microgrid (PV & storage & diesel genset)



2016

WiseGRID H2020 project

2018

Vestas WT repowering

Building on the past
and
looking to the future

Vision for Local Economic Development

The island's transition in a smart and sustainable development model which will be based on the expansion of the tourism period while in parallel will retain the impact from the relevant activities

Towards this direction the Municipality aims

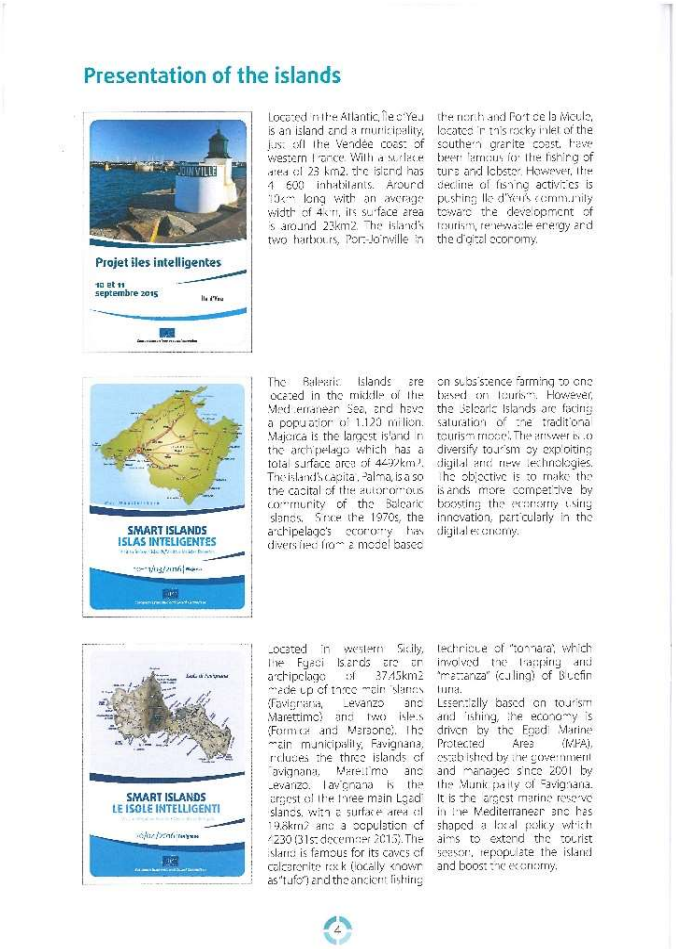
- on the one hand **in the holistic infrastructure planning** integrating smart and innovative solutions in the sectors of energy, water, waste, transport and mobility,
- on the other hand **in the exploitation of the island's natural and cultural resources** which will boost it development as a smart and sustainable destination

Visit of the EESC in Kythnos

May 2016

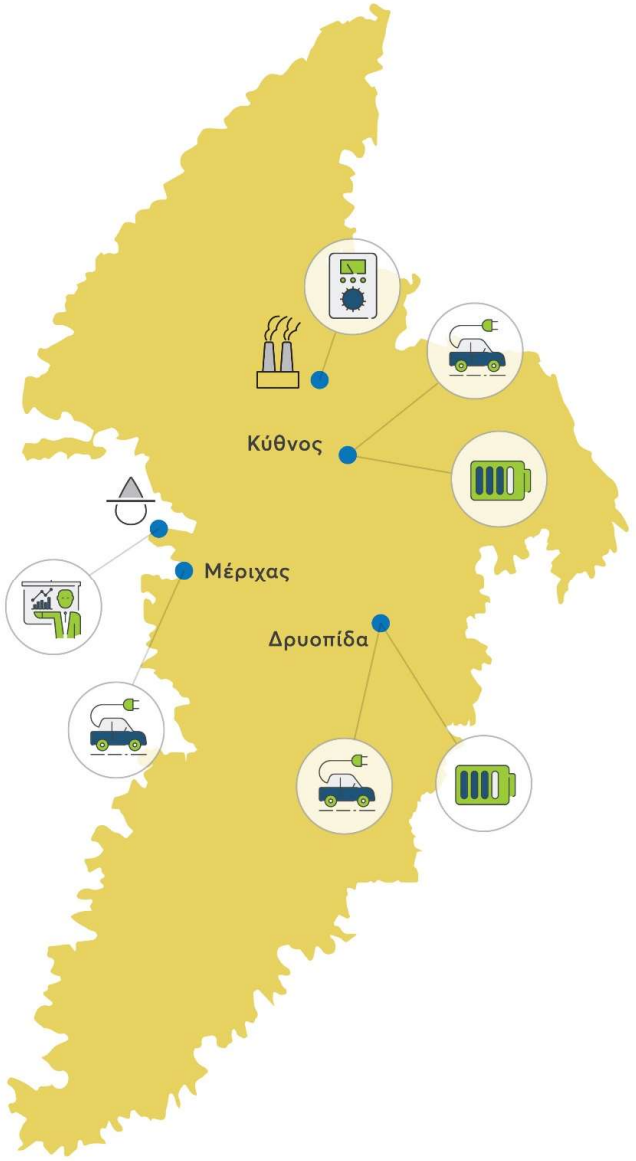
Inclusion in the EESC “Smart Islands” report

September 2016



WiseGRID H2020 project

November 2016



Local Meetings

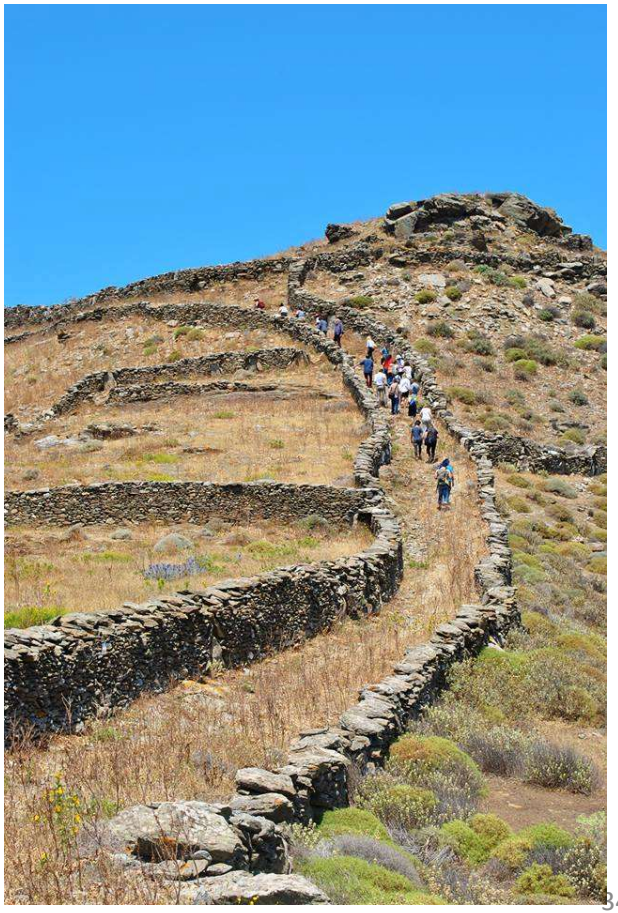
June 2017 – Wisegrid meeting



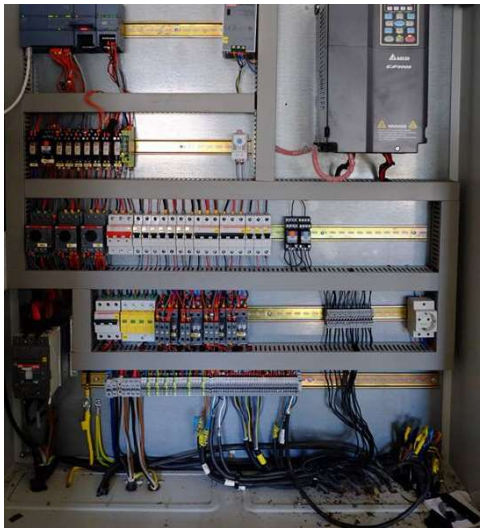



Local Meetings

June 2017 – Sustainable tourism workshop



Participatory planning

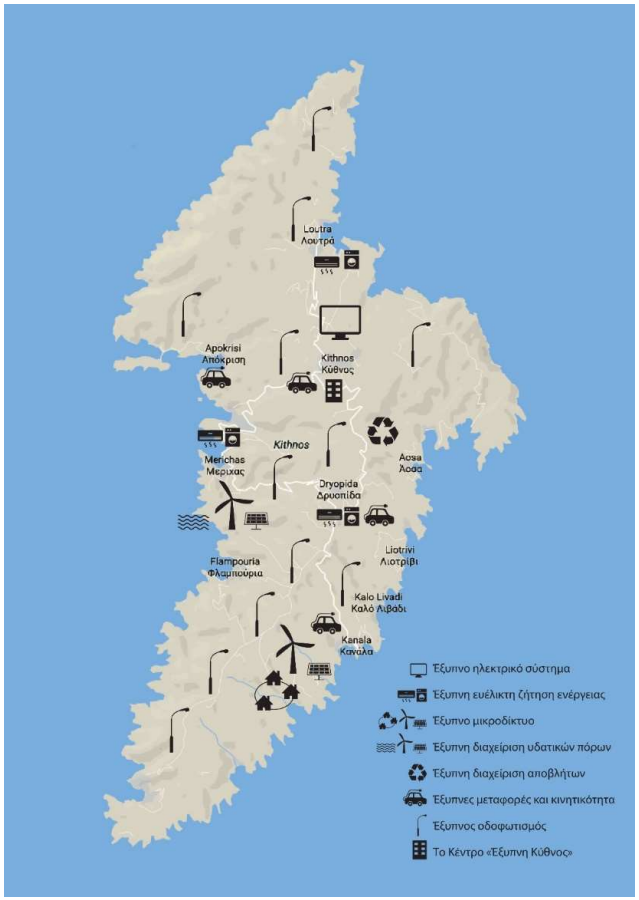


Kythnos Smart Island Master Plan

- The last years the tourism infrastructures of the island gradually increase attracting **more and more visitors** creating conditions for local economic growth.
- Of course this comes with a price which is, among others, the **pressure on local environment and infrastructure**
- For the Municipality and the citizens of Kythnos the vision is to move towards a **smart and sustainable development of the island** promoting the extension of the tourism period and minimising the impact of relevant activities.
- At the same time the integrated planning of the island's infrastructures will take stock of the past sustainable energy projects and **incorporate smart and innovative technologies** in the fields of
  - energy,
  - water,
  - waste and
  - mobility
- turning the island into a **laboratory of innovative smart technologies**.

Kythnos Smart Island Master Plan

- Smart electrical system management
- Smart microgrids
- Smart demand response
- Smart water management
- Smart waste management
- Smart transportation and mobility
- Smart street lighting
- Smart Kythnos Centre



Smart Electrical System

Objective

The automated and efficient operation of the Kythnos non-interconnected electrical system

- Development of an Energy Control Centre
- Ensure RES high penetration
- Investigate the integration of storage at grid level

Smart Demand Response

Objective

Demonstrate the potential to enhance the electrical consumption efficiency of the existing system through the integration of flexibility at the demand side

- installation of smart and energy efficient electrical appliances (air conditions and washing machines) in most of the island's households
- smart home control units will be installed in the respective households allow control and monitoring of the appliances' operation
- optimised management of the electrical system and the exploitation of locally produced energy from RES.

Smart Microgrids

Objective

To maximize self-consumption at microgrid scale while minimizing grid losses

- Modernization of the existing microgrid in Gaidouromandra
- Establishment of a new microgrid at a selected location
- Selection and installation of new equipment
- Demonstration of operation in island- and interconnected-mode
- Tests of the performance of the created hardware device in ICCS laboratory
- Introduction of small wind turbines connected to the microgrids for diversification of energy sources increase

Smart water resources management

Objective

Optimization of the water production and distribution system

- to install a PV station and a small wind turbine coupled with battery storage which will cover a significant part of the desalination plant's electricity demand;
- to optimize the sizing of the upper reservoir storing the desalinated water in order to provide additional energy storing capabilities to the batteries;
- to study the potential of seasonal storage of desalinated water in underground water aquifer making use of available RES and implement a demo phase of this activity;
- To install water kiosks in isolated areas where water transportation would be unprofitable, in order to increase fresh water use and consumption
- To design an integrated stand-alone water and waste water treatment solution for isolated areas, where the connection to the network would be unprofitable

Smart Waste Management

Objective

Optimization of waste management and collection system to transform the island to a zero-waste island

- Install micro-anaerobic digester to produce biogas from local agro-waste
- Maximise the locally reused waste by-products aiming to strengthen the local circular economy
- Take actions for the reduction of the produced waste
- Enable decentralized composting at the consumption side (rural)
- Optimize the waste collection plan

Smart transport and mobility

Objective

Promote the uptake of electric mobility on land and sea transportation. Aim to decarbonize the island's transport sector

- Installation of RES-coupled EV charging stations
- Procurement of Evs (municipal and shared-fleet)
- Establishment of an EV sharing system to be used by visitors
- Installation of a shore-side charging station for small boats at Merichas port
- Procurement of a small electrical boat to operate between the port and the nearby reputable Kolona beach
- Development of Fast EV Station
- Installation of a central fleet and charging management system
- Business model for the operation of the EV fleet

Smart street lighting

Objective

Energy upgrade and smartening of the island's street lighting network but also for the improvement of the visual comfort and minimizing the lighting pollution in Kythnos

- To replace existing luminaires with high efficiency LED technology ones along with the use of smart control systems;
- To incorporate adaptive lighting systems with the possibility to introduce predefined patterns (based on timing, pedestrian or vehicle presence, events, weather etc.);
- To install a SCADA infrastructure for the dynamic wireless control of the lighting systems;
- To test different scenarios of the abovementioned technologies under different conditions and in different locations taking into account the effect of seasonality;

Kythnos Smart Island Centre and Smart Training Lab

Convert two buildings of cultural heritage in NZEB to promote the Kythnos Smart Islands

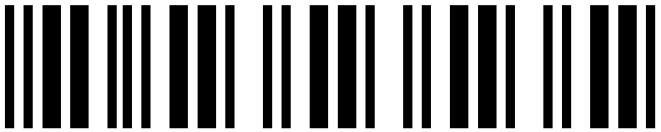
AND

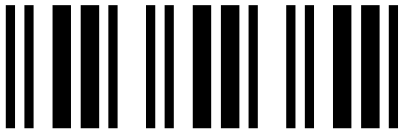
Kythos Energy Community

To enable local ownership and benefit of the project

Timeline – Budget

- **Start**: 1st April 2019
- **Duration**: 2 years
- **Budget**: ~8M€





ΔΑΦΝΗ

Δίκτυο Αειφόρων Νήσων