

FIAMM



XIV Giornata della Ricerca ANIE

FIAMM ESS per la *Smart Island* di TILOS

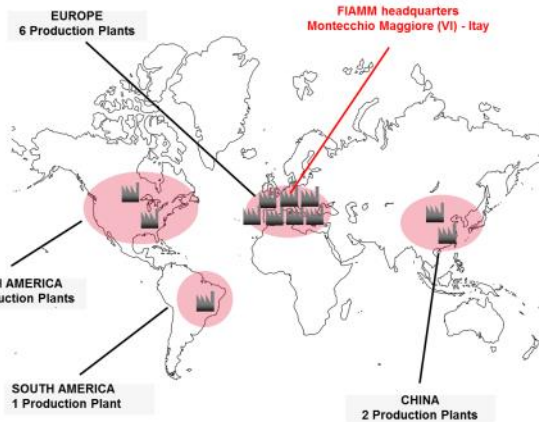
Stefano Nassuato
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FIAMM Energy Storage Solutions Spa

02/12/2015



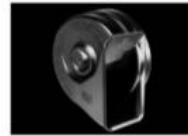
Who





Industrial Batteries

FIAMM Industrial Batteries offers a broad range of stationary batteries, designed to guarantee uninterrupted power supply in a myriad of applications.



Acoustic Devices

FIAMM Acoustic Devices is the global leader in the production and supply of horns for the safety of vehicle and people.



Oled

Astron FIAMM, a manufacturer of innovative lighting solutions with OLED technology, has placed its experience at the service of the automotive industry, offering light as a distinguishing element among the various brands and models.



Starter & Mobility Power Solutions

FIAMM Starter & Mobility Power Solutions was established with the aim of satisfying the mobility sector's current and future energy storage requirements.



Energy Storage

FIAMM Energy Storage is aimed to research and propose solutions for the grid optimization and for the planet's energy self-sufficiency thanks to innovative products and systems for energy storage.



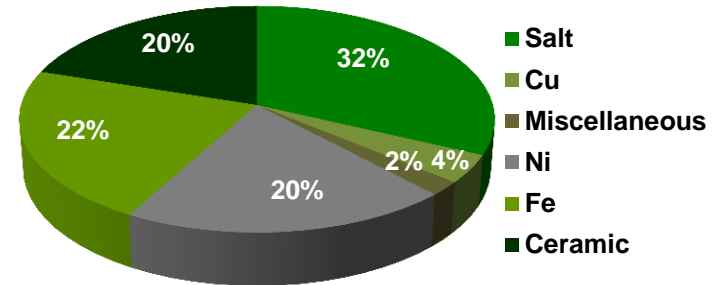
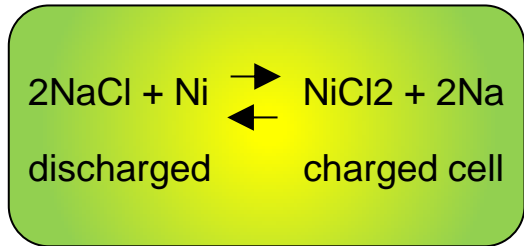
Antennas

FIAMM Antennas has been one of the main automotive antenna player in the European market for the last 25 years.

14
PRODUCTION
PLANTS

3.000
EMPLOYEES

2014 Turnover
570 M€



Performances

- ✓ Hot cell (~270°C inside)
- ✓ **Temperature Immunity** (-40 ÷ +60°C)
- ✓ **Cycling Capability** > 4.500 cycles (80% DOD)
- ✓ **Battery energy density** 100÷120Wh/kg 150-190Wh/lt
- ✓ **Shelf life** (> 20 years)
- ✓ **No memory effect**

Safety

- ✓ **Intrinsically safe**, electrochemical safety
- ✓ **No gas emissions**
- ✓ **No flammable materials**
- ✓ **No fire/water flood reaction**
- ✓ **Industrial Process Control**
- ✓ **Tested in the field** (EV, TLC, ESS,...)
- ✓ **BMS control**
- ✓ **Cell/Battery Mechanical case**

Zero Impact Battery

- ✓ **NO dangerous materials**
- ✓ **100% recyclable**
- ✓ **NO pollution materials**
- ✓ **NO gas emissions**

Suitable for any place of installation:

Marine transportation

Harsh environment

Extreme temperature

Safe from physical damage

No hazardous emissions



Energy Storage Market Value Chain

1 Generation



&

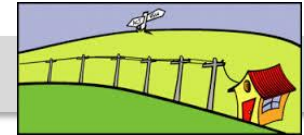


2 Grid Management

2

3 Transmission & Distribution

3



4 Retail ("behind the meter")

4

- Commercial
- Residential



5 Off- Microgrid
Micro-Grids

5



smart grid

6 Others (UPS, TLC,...)

6

Out of Scope

What

Project Title & ID

TILOS - 646529

Technology Innovation for the Local Scale, Optimum Integration of Battery Energy Storage

Research Call

Topic: Local / small-scale storage-LCE-08-2014

Total Score

14/15 (Excellence 4.5; Impact 5.0; Quality & Efficiency 4.5)

Project Budget

EU Funding: ~11M€ - Total Grant: ~15M€

Project Duration

Duration of 4 years - Start Date: 1/2/2015

Tilos is a **far distant**, “S” shaped Greek island lying midway between **Kos and Rhodes**.

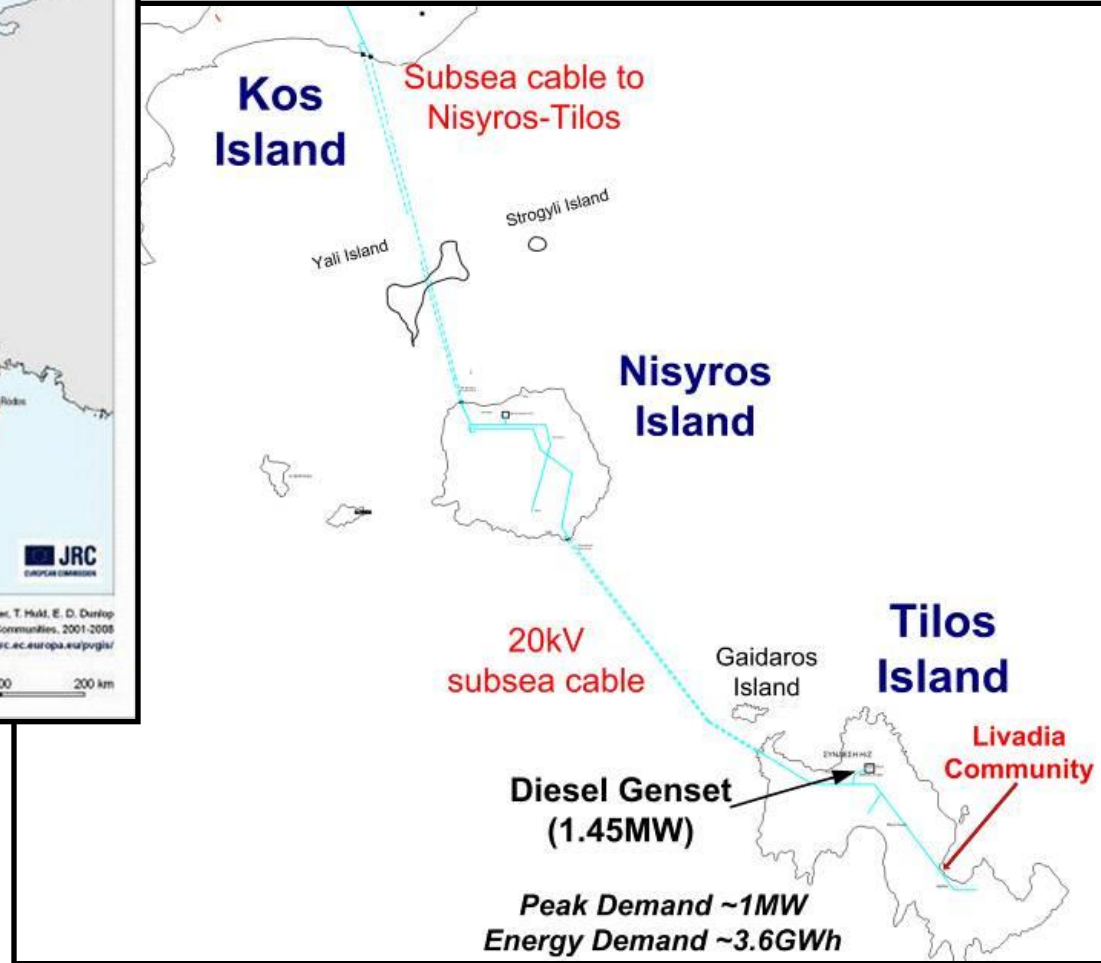
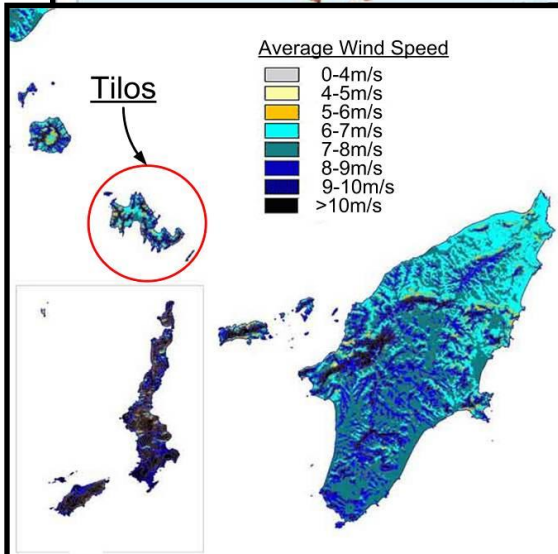
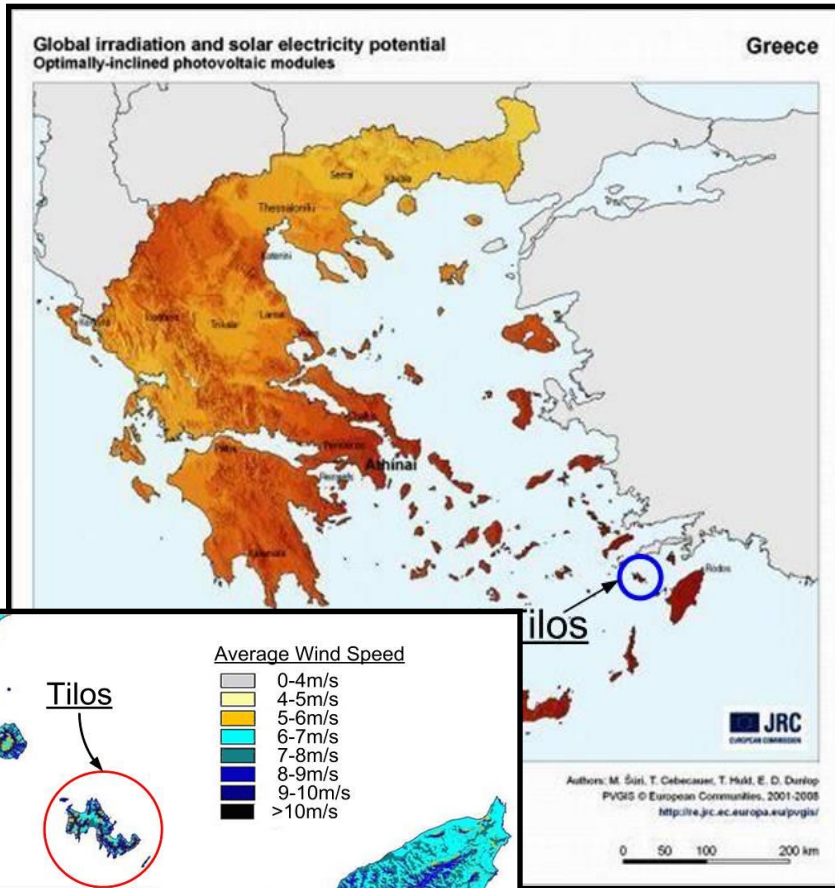
Recently known for its **kind people** and their **solidarity** towards **immigrants** crossing the Aegean in search of a better living.

The local population of Tilos, **~500 islanders**, covers its electricity needs through a **poor interconnection** to the host island of **Kos**, where a **diesel-oil power station** is operated.

Owed to **undersea cable faults**, Tilos suffers from **quite frequent** and in many cases **long-lasting black-outs**.



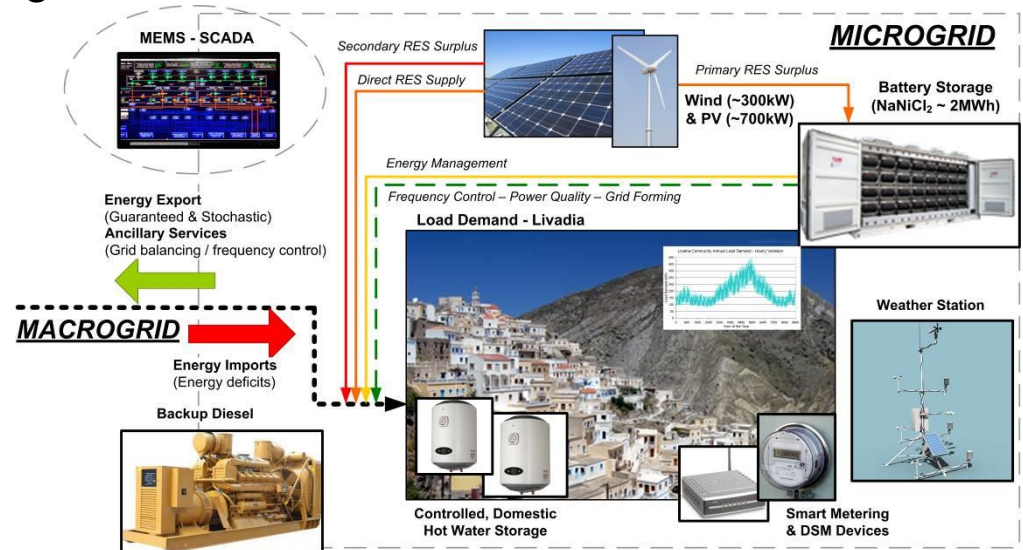
TILOS Island



Main goal of the project:

Design an energy storage system based on FIAMM SoNick NaNiCl₂ batteries (2x20ft containers, ~ 3MWh) that will support the operation of a smart microgrid on the basis of multiple tasks, including:

- > Synergy with wind (300 kW) and PV (700 kWp) power
- > Microgrid energy management
- > Maximization of RES penetration
- > Grid stability
- > Export of guaranteed energy
- > Ancillary services to the main grid
- > Synergy with DSM



The battery will support both **stand-alone and grid-connected** operation, while proving its **interoperability** with the rest of microgrid components, such as **smart meters, demand side management devices and distributed, residential heat storage**

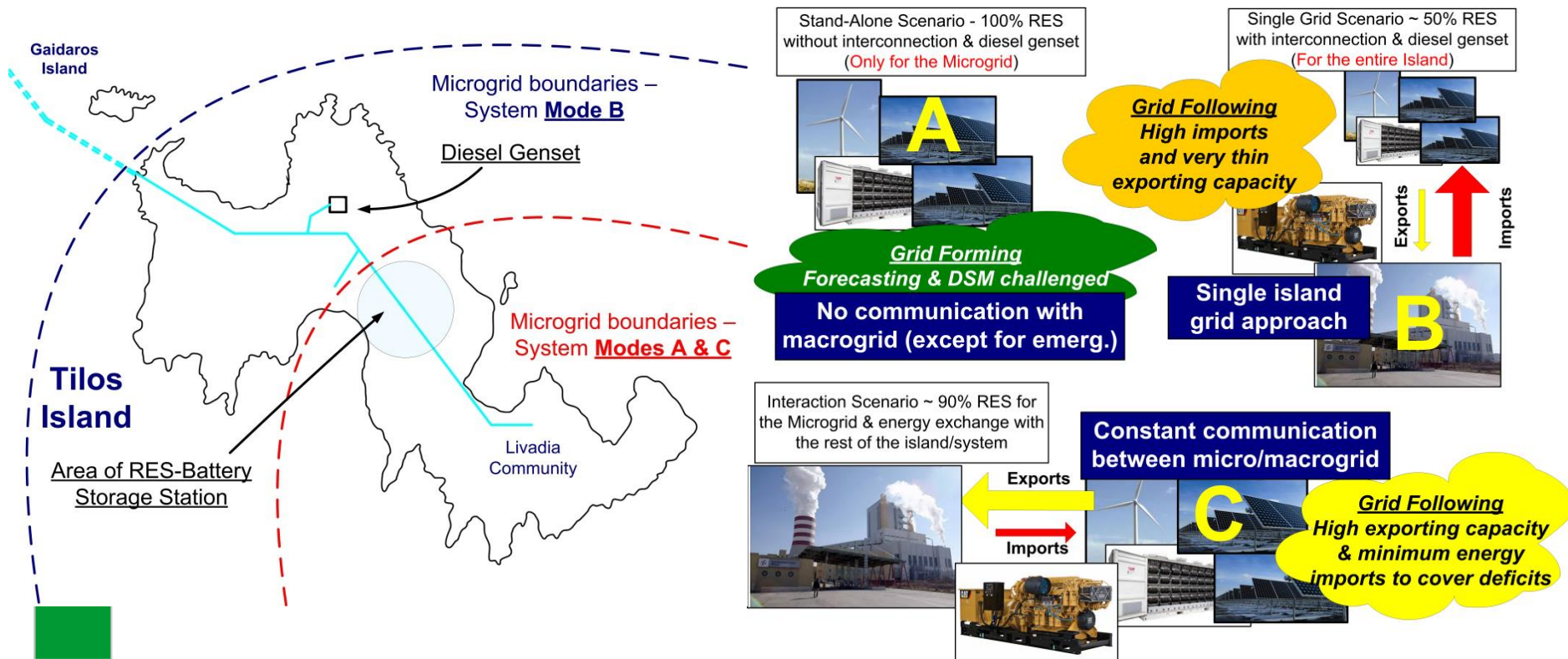
TILOS project goals

Following the development of the system, the demonstration phase will include **three different test modes** of operation;

A: Stand-alone microgrid ;

B: Increased RES penetration for entire island in parallel with the host grid (Kos);

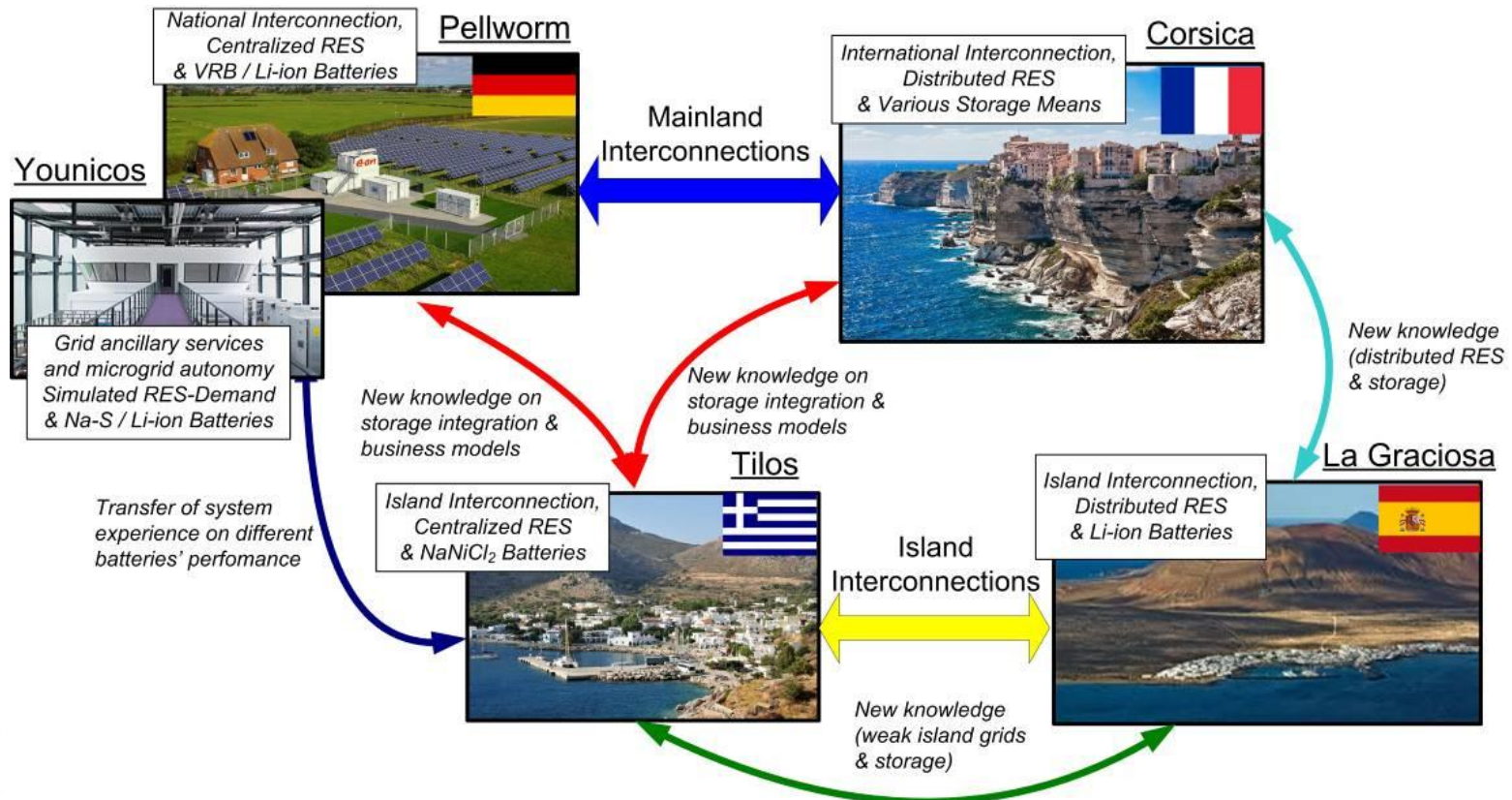
C: Almost stand-alone microgrid and smart interaction with the host grid



TILOS project goals

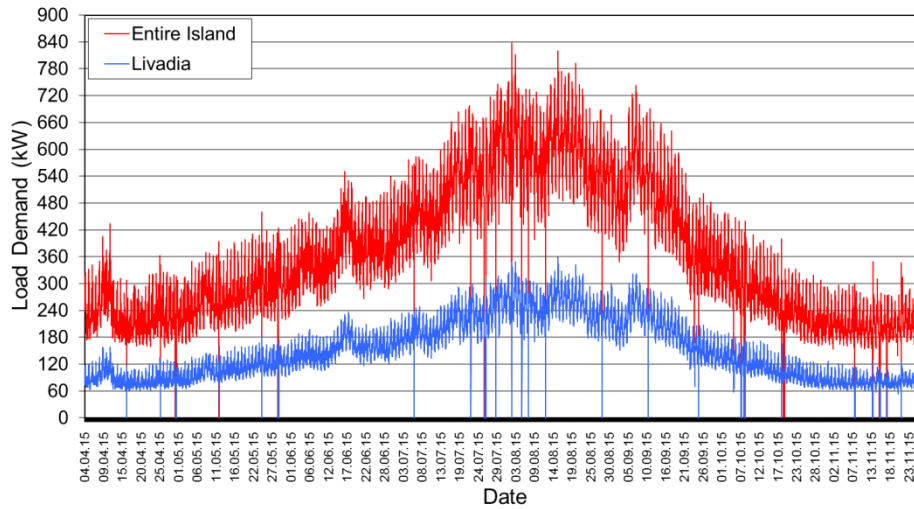
To ensure **replication** of the **developed energy solution**, a **coherent island platform** will be created and **new case studies** will be examined, including:

- **Corsica** (UCPP)
- **La Graciosa** (ITC)
- **Pellworm** (SHNG)



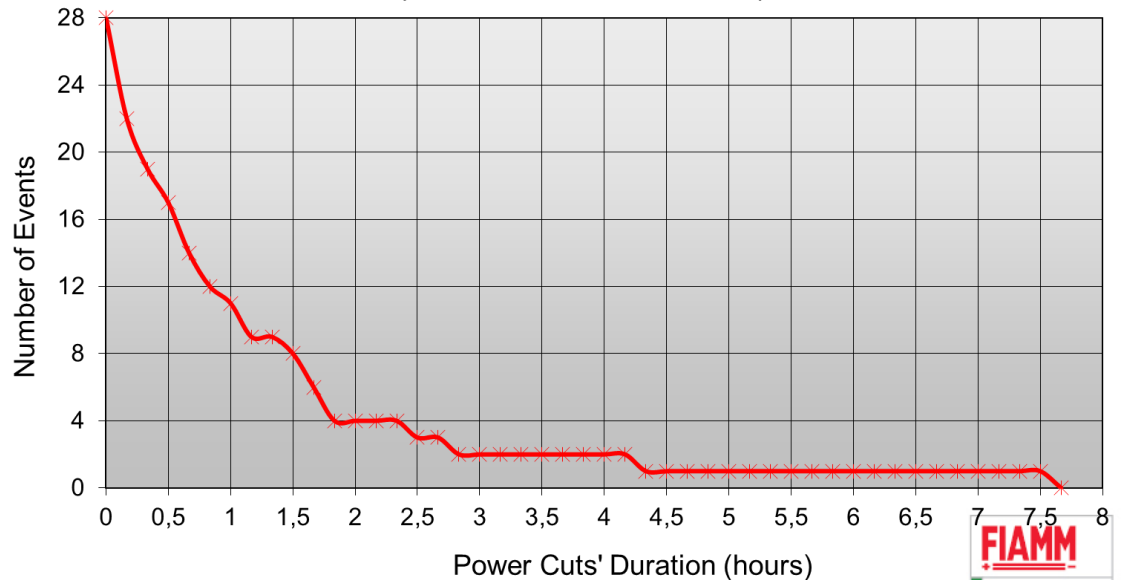
TILOS Load Demand

Load Measurements_Tilos (4/4/2015 to 27/11/2015)



Several power cuts recorded throughout the year

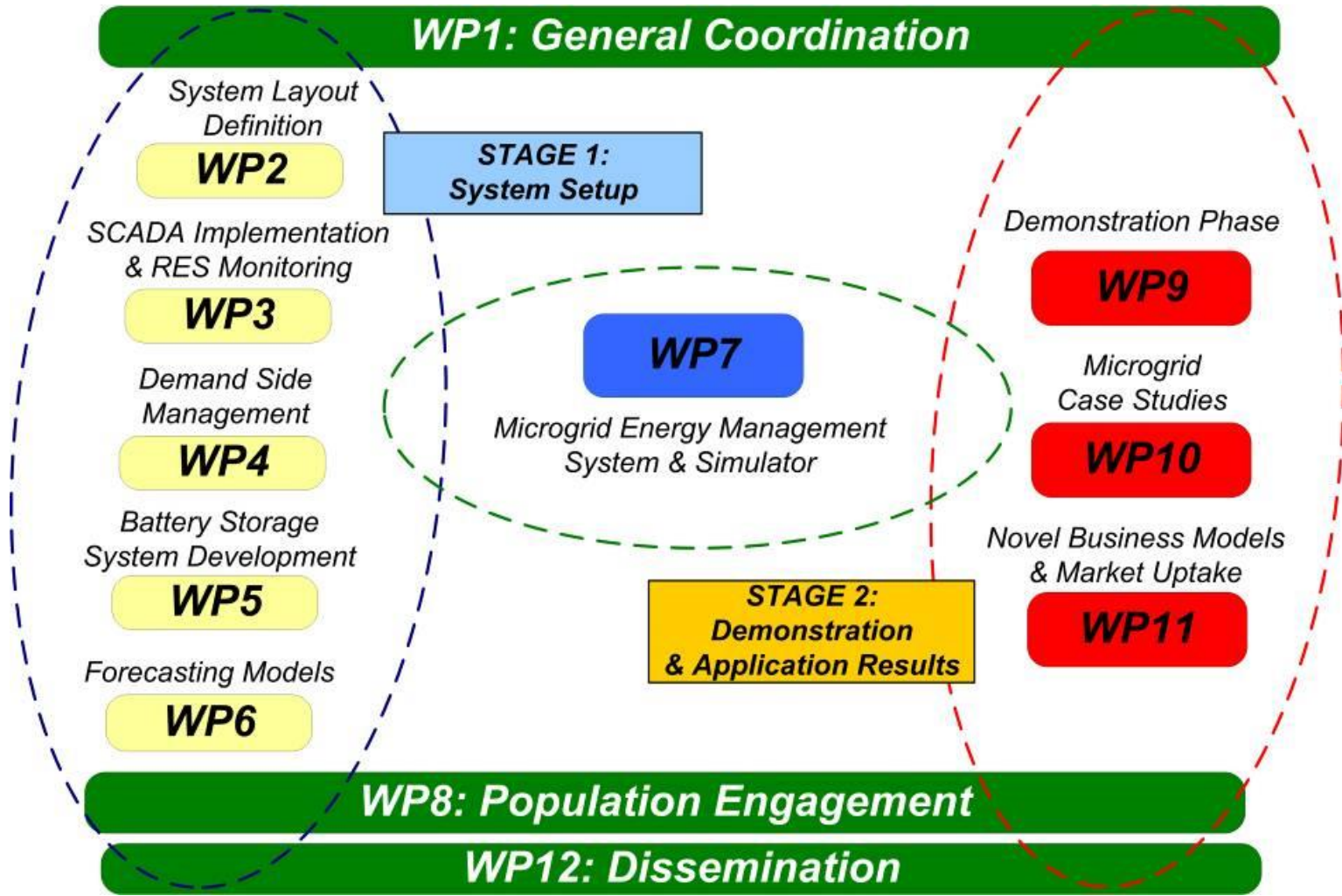
Duration Curve of Power Cuts on the Island of Tilos (4/4/2015 to 27/11/2015)



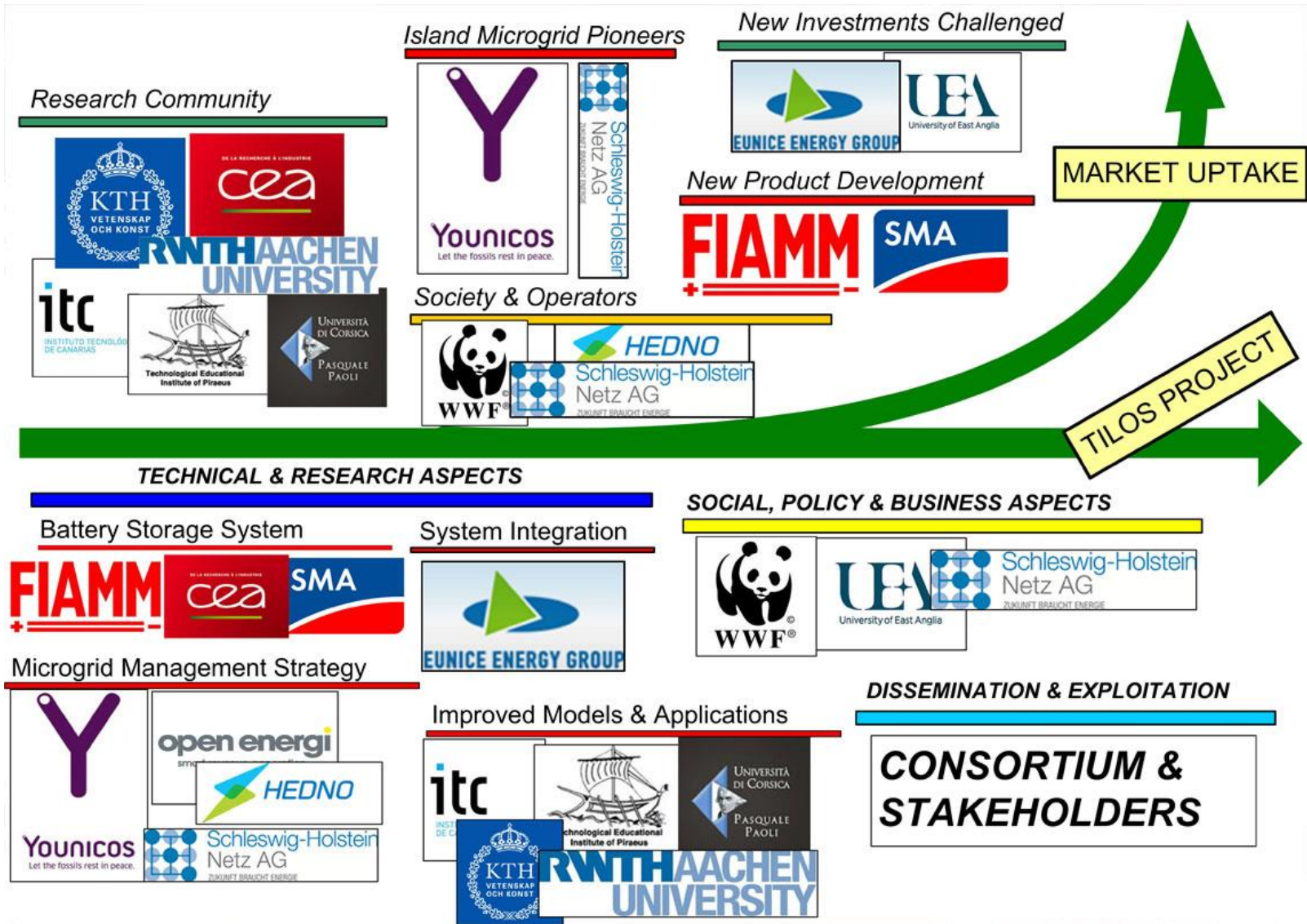
TILOS Project Consortium



TILOS Work Packages overall structure



TILOS roadmap to market uptake



How



Preliminary project discussion started in 2012

Multi-national and Multi-cultural partnership:

- Partners from 7 different countries
- Wide range of competences

Direct involvement of the DSOs (HEDNO + EON)

Ability to attract private investments:

- EPC PV (~ 1.000.000 €)
- DSO (at project conclusion)

Challenges

Over the project...



Actual Greek and European regulatory framework is not pushing yet the renewable development on the islands:

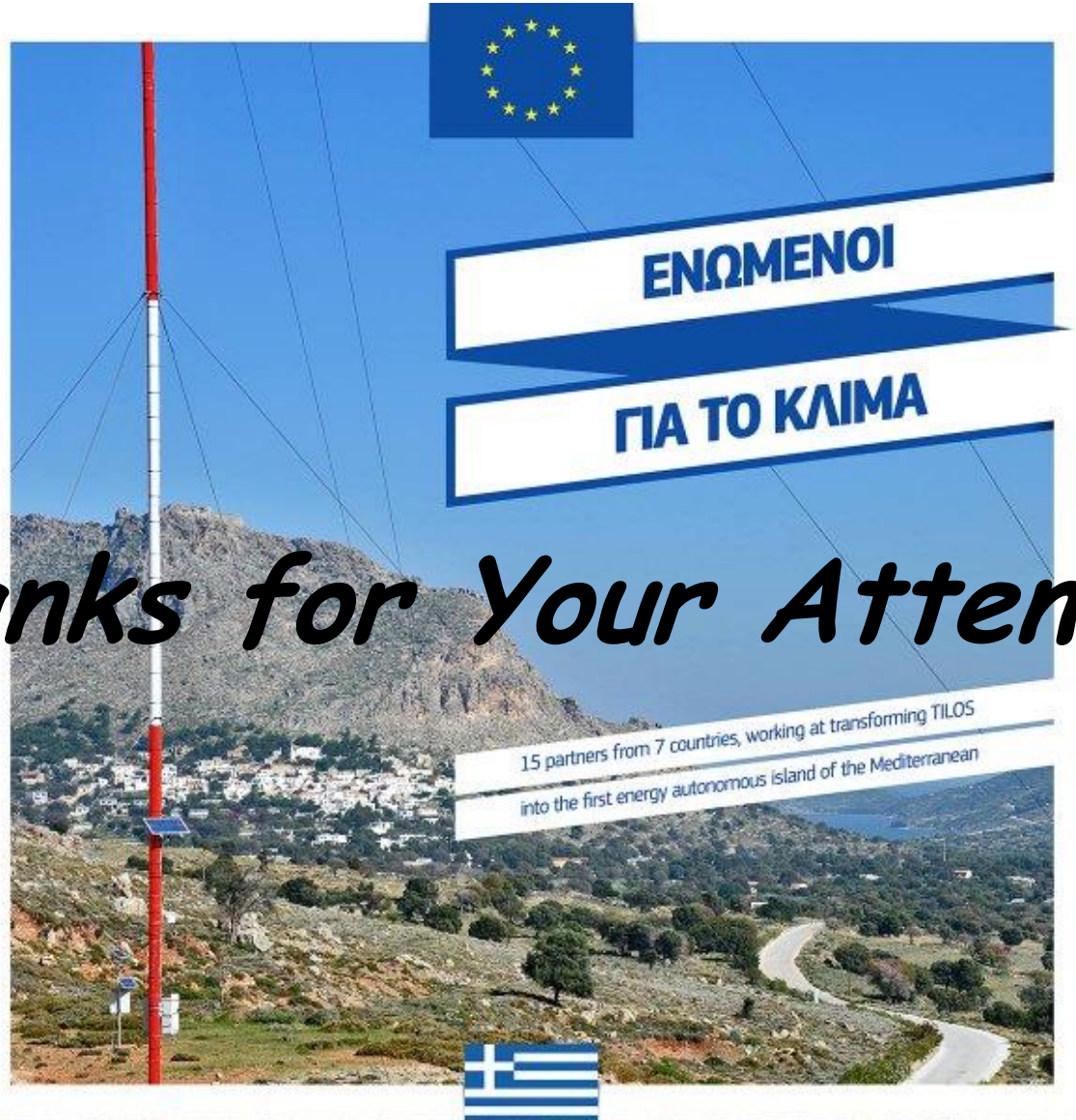
- A Common and Standard European «island» framework is possible

New challenges for sustainable tourism development:

- Thanks to WWF, TILOS has a great population involvement

Now is time for Italy to play a leading role:

- Italian minor islands not connected to the main grid



Thanks for Your Attention

<http://www.tiloshorizon.eu/>