CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

CPERI
Chemical Process and Energy Resources Institute

Creating a CCU CO_2 hub in Greece
From Power-to-X To Power-to-X-to-Power

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EUROPEAN TURBINE NETWORK

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Contents

1. **Power-to-X concepts**
    a. **SMILE project**
    b. **CO_2-hub proposal**
2. **Power-to-X-Power concept**
    a. **Methanol-to-Power**

SMART ISLAND ENERGY SYSTEMS

sm;)e

H2020 IA project

POWER

Battery Energy Storage Systems for Residential and Grid support use

BATTERY

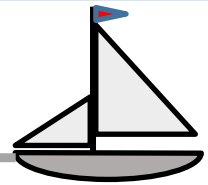
Phase Change Material Heat Batteries for Residential use

HEAT

Hydrogen Electrolyser for curtailed power exploitation

HYDROGEN

Electric Vehicles



Electric Boats

TRANSPORT

Power-to-X | Power-to-X-to-Power

SMART ISLAND ENERGY SYSTEMS

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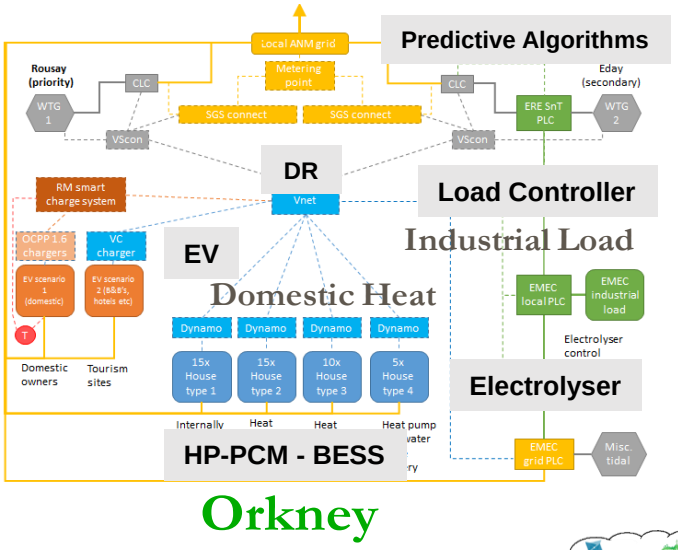
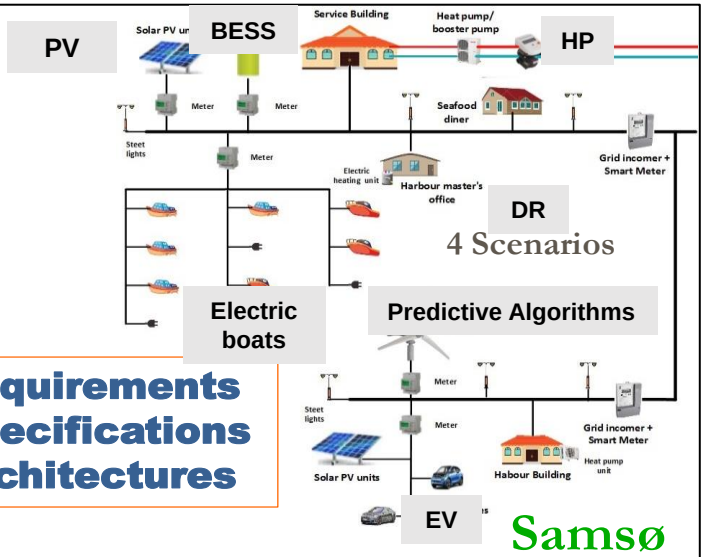
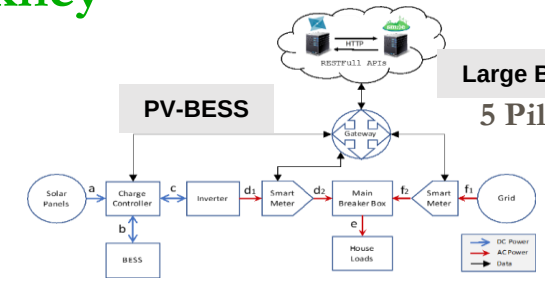
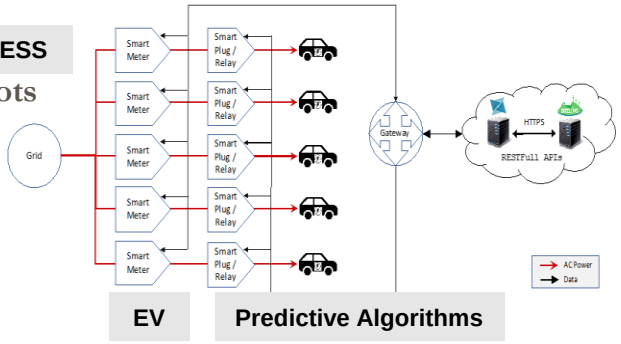






Pilots description



Consortium

Coordinator RINA

Demo leaders

ACIF | ENERGY ACADEMY | Community Energy Scotland

Horizontal WP leaders

Aalborg Universitet | university of groningen | energyvalley

Technology providers

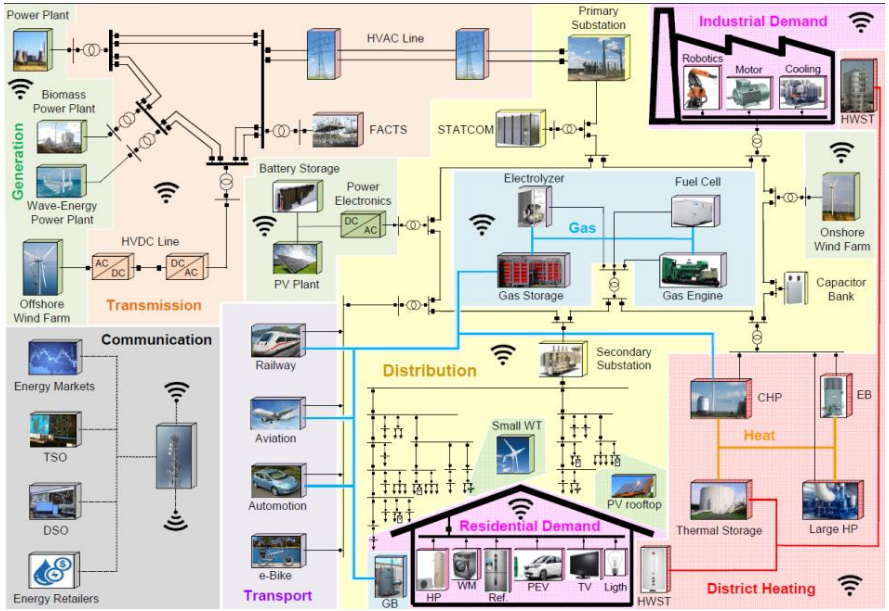
prsma | Sunamp | ROUTEMONKEY | Heat Batteries | LITHIUM BALANCE | OVO

Other

Samsø Kommune | m-iti | SAMSØ ELEKTRO ApS | DANISH TECHNOLOGICAL INSTITUTE

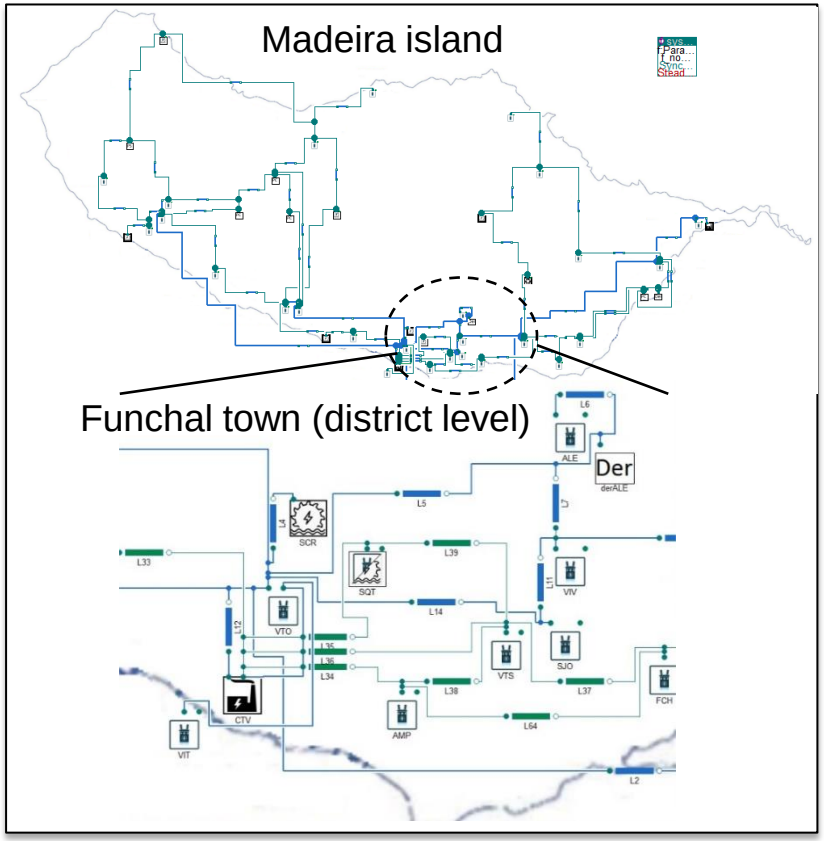
SMART ISLAND ENERGY SYSTEMS

From Pilot level….



technical analysis & control methods development and architectures

… to Island level

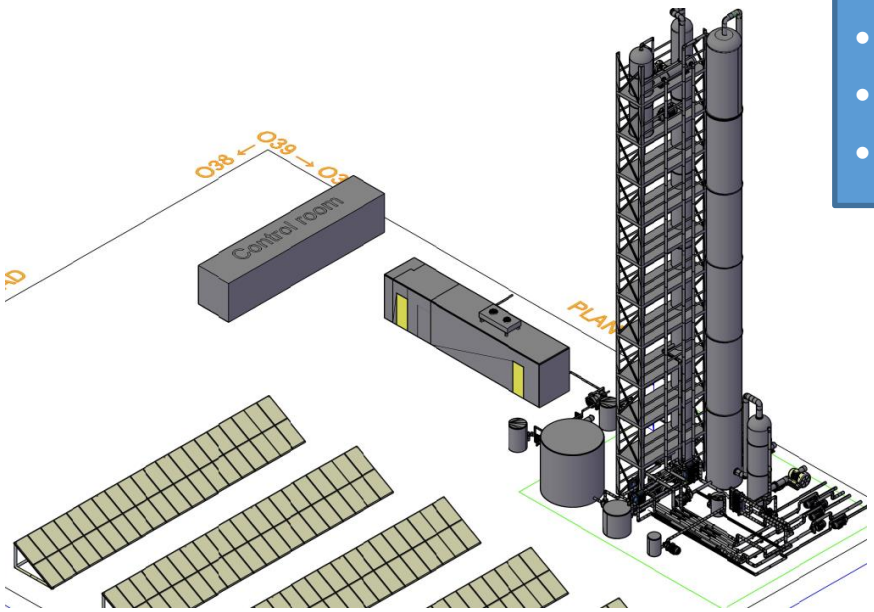


Minute based grid modeling for power loss management

Power-to-X | Power-to-X-to-Power

CO_2- HUB proposal/ Power-to-Methanol

- Installation **CO_2 capture and utilization** pilot plant next to Agios Dimitrios Power Station (P.P.C. S.A.)
- Pure CO_2 **for multiple uses.**
- CO_2 – Hub in Western Macedonia (Greece)
- Reduction of Greenhouse gas emissions derived from Thermal Plants – creation of new value chain
- Demonstration of CO_2 utilization **through methanol production from H_2** derived from water electrolysis unit.

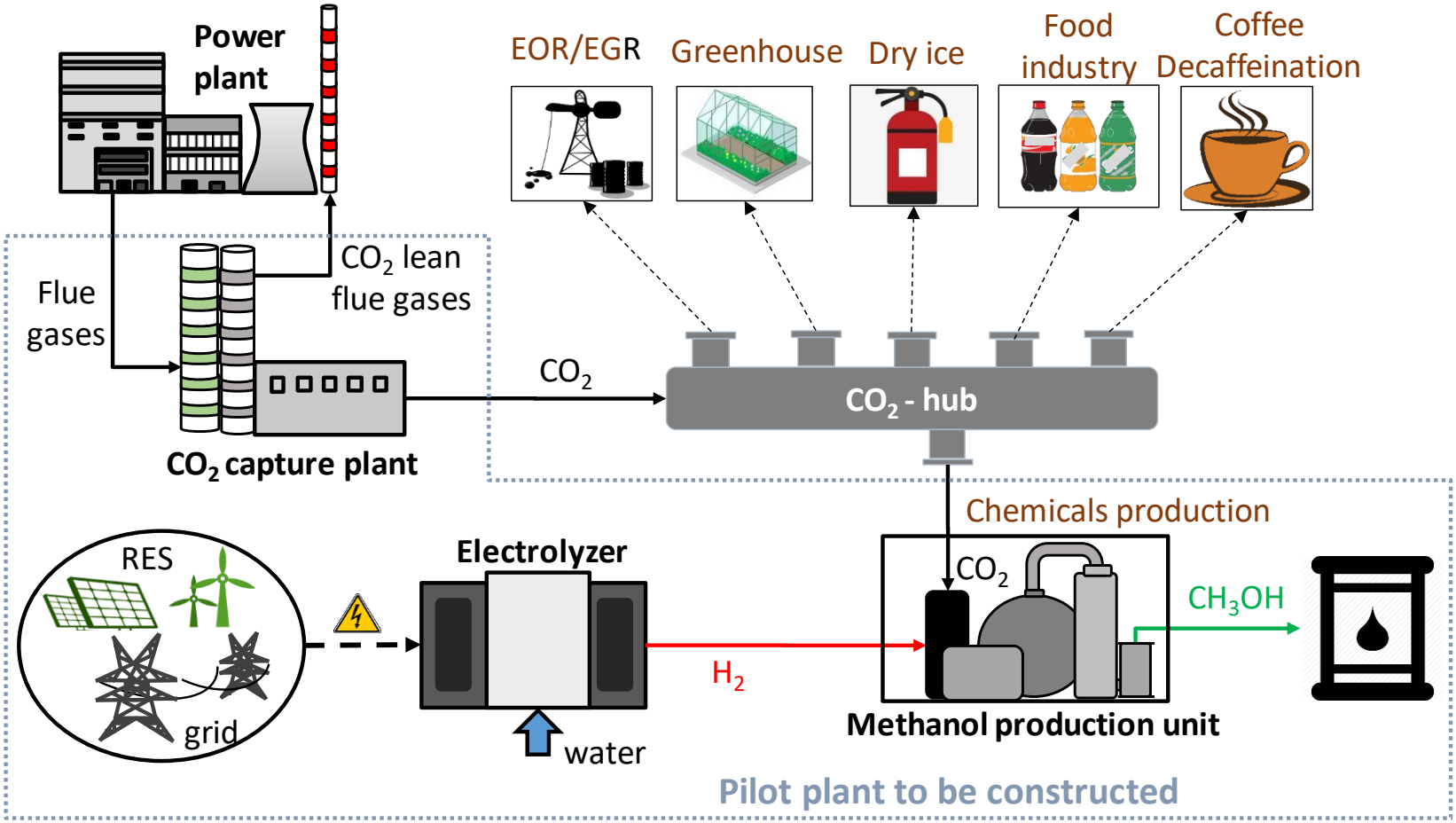


- Current status: Evaluation Phase
- Project start: **May 2019**
- Expected Pilot operation begins: **October 2020**

Targets of research project:

1. *Demonstration of CO_2 capture technology with avoidance cost **CO_2 <25 €/ton***
2. *Highly efficient capture (>90%)*
3. ***Annual CO_2 capture 5500 tn/y***
4. *Highly pure methanol production from CO_2 and H_2*
5. *Techno-economic and environmental assessment of the proposed CCUS concept*

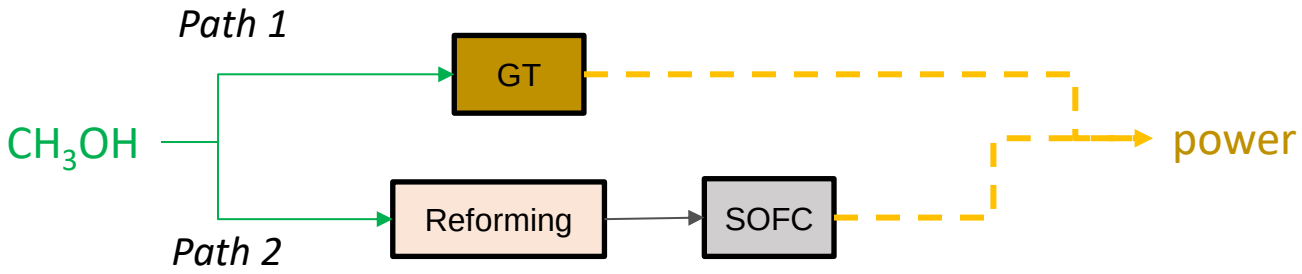
CO_2- HUB proposal/ Power-to-Methanol



METHANOL-TO-POWER

Methanol as alternative fuel:

- Very good substitution of Diesel fuel for automotive applications
- Chemical block of added value chemicals
- Very industrial applications in various sectors (power, steel, chemical)
- Lowest cost of production/conventional price for synthetic fuel production



- **CCU plant will be ready to provide with CO_2 and Methanol by October 2020**
- Application of the produced synthetic methanol for combustion in **GT**
- Methanol conversion into other synthetic fuel (DME or Gasoline) and application in GT
- Application of the produced synthetic methanol in **SOFC**

Thank you for your attention!