INSULAE Project

Sustainable Places 2019

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Maximizing the impact of innovative energy approaches in the EU islands

Project info

- ✓H2020-LC-SC3-2018-ES-SCC Call
- ✓ Innovation Action
- ✓ EU Funding 12.160.234,50 €
- ✓ Duration 48M
- ✓ Coordinator CIRCE
- ✓ 27 partners

circe
RINA
Artelys OPTIMIZATION SOLUTIONS
CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS
Suite5 We Deliver Intelligence
DNV·GL
DEPARTMENT OF ENERGY TECHNOLOGY AALBORG UNIVERSITY
WWF
ΔΑΦΝΗ / DAFNI
FSB
ERICSSON Ericsson Nikola Tesla
REA KVARNER
DTU
BORNHOLMS ENERGI & FORSYNING
BORNHOLMS REGIONSKOMMUNE
FREMSYN
Electricidade da Madeira
efacec
albufera Energy Storage
ACIF Câmara de Comércio e Indústria da Madeira
PPC Renewables Innovation • Development • Environment
Municipality of Psara
STEINBEIS-EUROPA-ZENTRUM
STADTWERKE NORDERNEY
CONSELL INSULAR DE MENORCA

Summary

- ✓ Objectives, concept and expected outcome
- ✓ Expected impact of the project
- ✓ Investment Planning Tool
- ✓ Use cases
- ✓ Lighthouse islands
- ✓ Follower islands

2 – Objectives, concept and expected outcome

2 – Objectives, concept and expected outcome

- ✓ The main goal of INSULAE is to foster the deployment of innovative solutions aiming to the EU islands decarbonization by developing and demonstrating at three Lighthouse Islands a set of interventions linked to seven replicable use cases, whose results will validate an Investment Planning Tool that will be then demonstrated at four Follower Islands for the development of four associated Action Plans.

2 – Objectives, concept and expected outcome

Specific goals

- ✓ To create an Investment Planning Tool ready to guide EU islands decision makers (energy system planners, utility owners, project promoters and public authorities) in the design of cost-effective Action Plans for decarbonizing their energy systems.
- ✓ To carry out a complete demonstration program up to TRL 8 in three Lighthouse Islands, involving seven interventions from seven use cases, able to cope with the main challenges of the EU islands energy systems.
- ✓ To ensure a large project replication directly manageable by the consortium bringing INSULAE results to a 13% of the total EU island population.

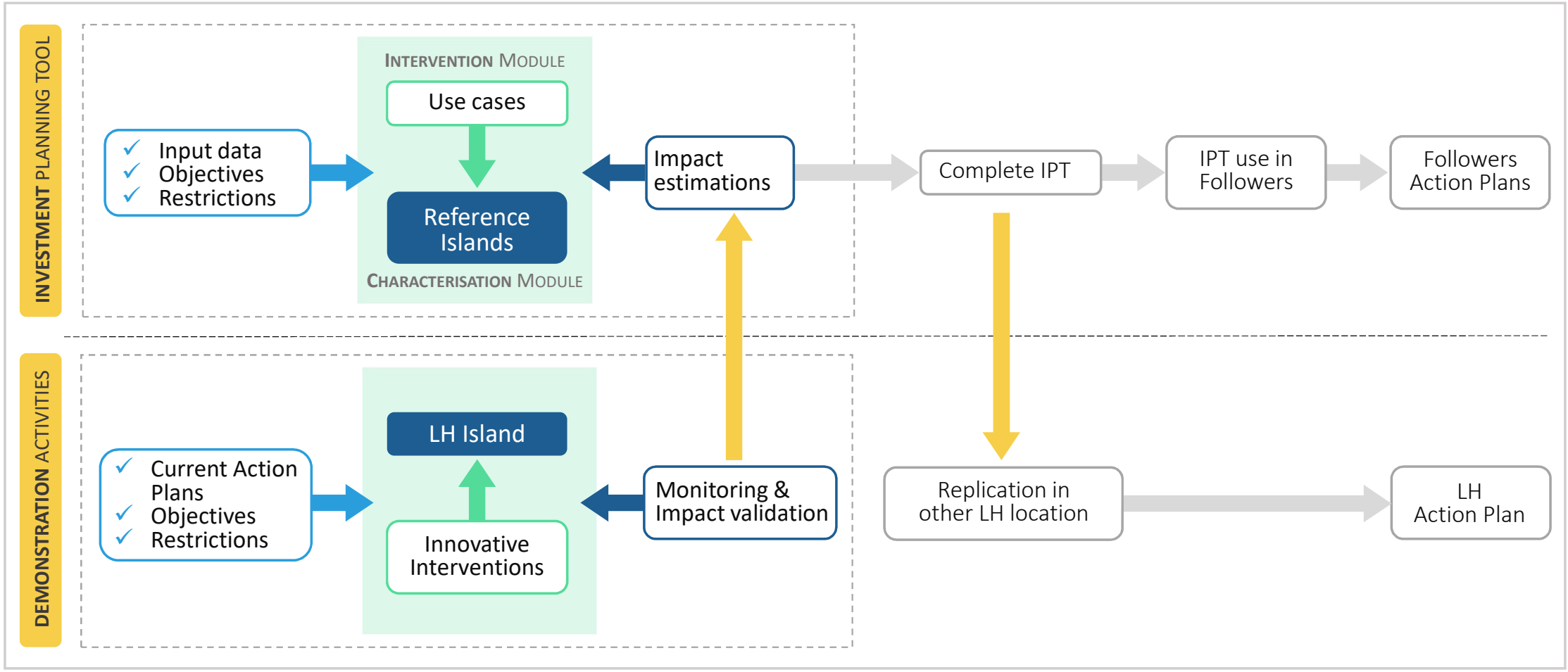
2 – Objectives, concept and expected outcome

Specific goals

- ✓ To engage islands inhabitants in the transition towards a low carbon economy considering them as an active player in the energy system
- ✓ To protect the islands ecosystems preserving its biodiversity, as well as its cultural heritage, making them attractive for tourism
- ✓ To create a critical mass of professionals ready to replicate INSULAE use cases relying on training actions and experience sharing between islands.
- ✓ To exchange knowledge within the BRIDGE Initiative working groups while contributing to the Clean EU Islands Initiative and contribute to homogenize the fragmented island regulation

2 – Objectives, concept and expected outcome

INSULAE Overall concept



3 – Expected impact of the project

3 – Expected impacts of the project

Direct impacts

- ✓ The main impact of the project in relation to the INSULAE IPT development is the creation of specific Action Plans in the 7 INSULAE islands.
- ✓ Innovative interventions implemented and tested throughout the project execution will impact the 3 lighthouse islands, fostering their decarbonisation.

	Unije	Bornholm	Madeira
1) RES generation integrated in the grid	497 MWh/year	5.400 MWh/year	300 MWh/year
***Final share of RES**	100 %	68 %	30 %
2) Energy savings due to efficiency improvements	499 MWh/year	109 MWh/year	0,1 MWh/year
***Fossil fuels savings**	499 MWh/year	5.509 MWh/year	300 MWh/year
3) CO_2 emissions reduction	362 tCO_2/year	3.994 tCO_2/year	213 tCO_2/year
4) Cumulative investments	730.000 €	390.000 €	240.000 €

4 – Investment Planning Tool

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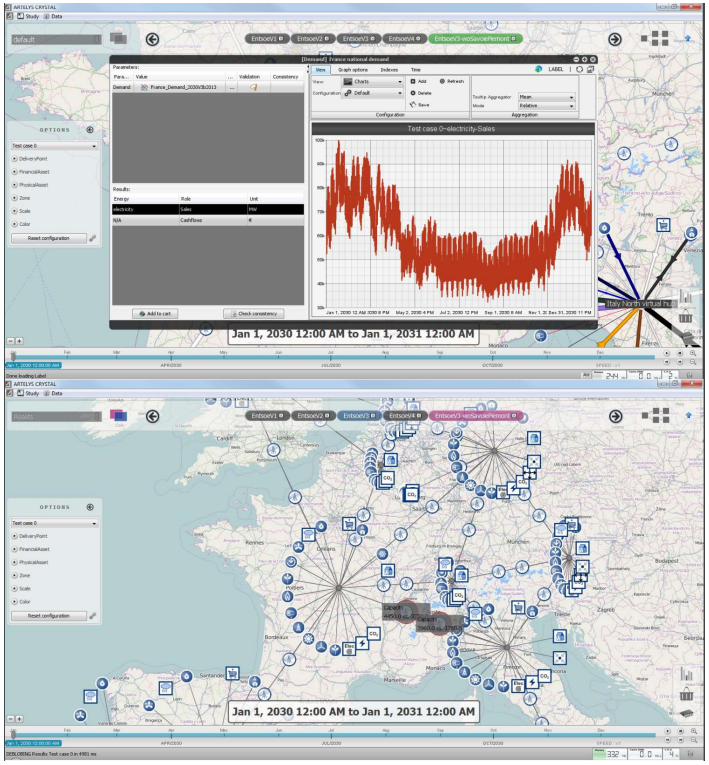
4 – Investment Planning Tool



- ✓ Create a model of the multi-energy system of an island and its interaction with other networks (water, telecom, transport);
- ✓ Define business as usual scenarios on which interventions will be applied;
- ✓ Evaluate the medium and long-term impacts of the considered interventions through a range of island key performance indicators (KPIs), through a cost-benefit analysis (CBA);
- ✓ Propose combinations of interventions so as to reach a predefined set of objectives;

TO PROVIDE THE ISLANDS STAKEHOLDERS WITH RECOMMENDATONS ON INVESTMENT, FOSTERING THE TRANSISTION TO NEUTRAL CO2 EMISSION ISLANDS

5 – USE CASES

5 – USE CASES

#1 - Joint management of hybridized RES and storage

- Reduce costs
- Minimize GHG emissions
- Increase grid's performance

#2 - Smart integration and control of water and energy systems

- Consumption reduction
- Enable the use of RES to power desalination plants

5 – USE CASES

#3 - Empowerment of islands' energy communities through 5G and IoT technologies for flexibility services

- Boost islands decarbonisation
- Strengthen islands local economy
- Improve grid's performance

#4 - Transition to DC grids

- Minimization of the grid connection cost and power losses
- Allow a higher share of renewable energy production in the grid
- Faster introduction of electric vehicles
- Provision of auxiliary grid services by storage

5 – USE CASES

#5 - Local bio-based economies supporting the electrical, thermal and transport systems integrated management

- Decrease in fossil fuels use
- Increase in the air quality
- Improvement of local economy

#6 - Electrification of the islands' transport looking to grid frequency and voltage regulation

- Islands decarbonization (High Impact!)
- Provide new flexibility services assisting RES integration and grid stability

5 – USE CASES

#7 - Storage and power electronics for the stabilization of weak grids and microgrids

- Ensure a safe and stable electricity supply
- Allow a smarter and automated management of the grid
- Enable the provision of demand response and flexibility services
- Balance the production coming from RES

6 – Lighthouse Islands

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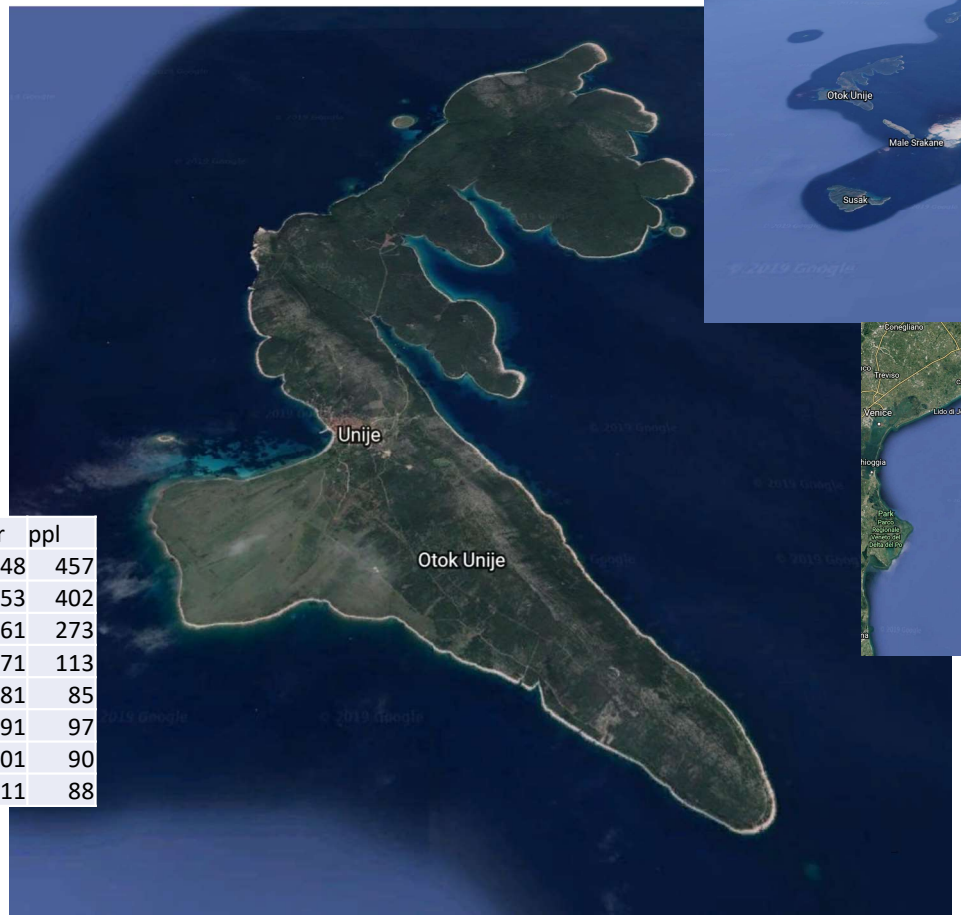
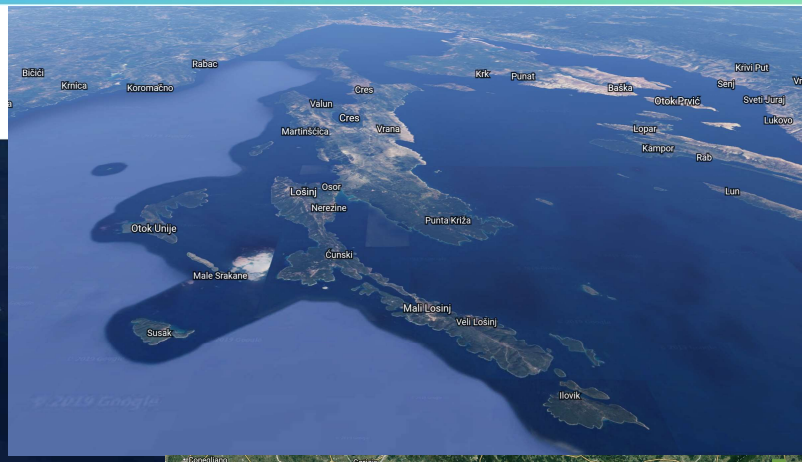
6 – UNIJE Island

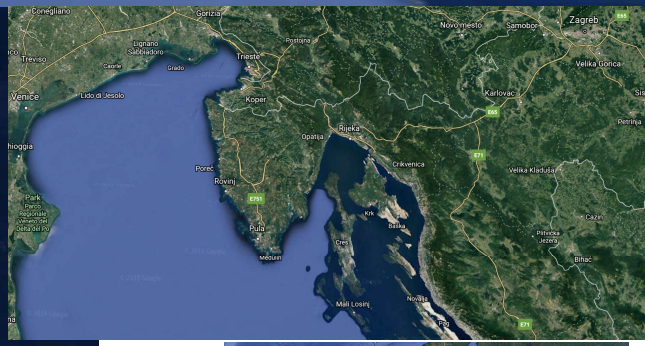
Location and general description

The Island of Unije

- Surface: 16.83 km^2
- Coastline: 38.012 km
- the island peak: 138 m.a.s.l
- Unije, only settlement
- 85 people
- 47 households
- 292 objects
- No cars on the island
- Small sea port and airport







year	Ppl.	year	ppl
1869	520	1948	457
1880	630	1953	402
1890	678	1961	273
1900	696	1971	113
1910	758	1981	85
1921	783	1991	97
1931	717	2001	90
1945	639	2011	88

6 – UNIJE Island

USE CASES

#1 - Joint management of hybridized RES and storage

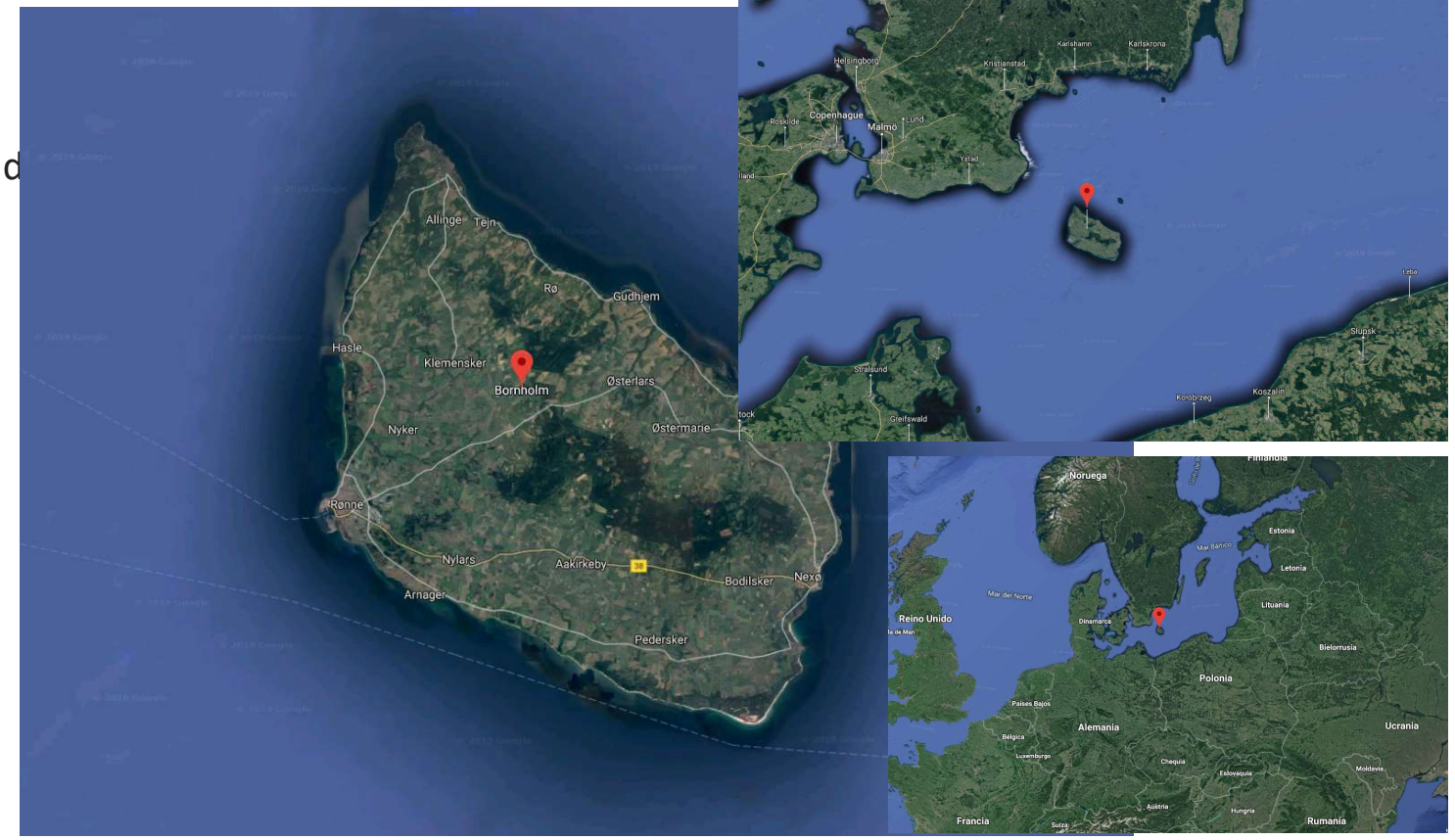
#2 - Smart integration and control of water and energy systems

#3 - Empowerment of islands' energy communities through 5G and IoT technologies for flexibility services

6 – BORNHOLM Island

Location and general description

- 40000 inhabitants; 588.3 km2
- Approx. 1% of Denmark (size and population wise)
- Touristic/historical attraction; presence of industry
- Self-sufficient community
- Target to be 100% carbon neutral by 2025
- Pioneer in smart grid projects



6 – BORNHOLM Island

USE CASES

#4 - Transition to DC grids

#5 - Local bio-based economies supporting the electrical, thermal and transport systems integrated management

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6 – Madeira Island

Location and general description

- 262.000 inhabitants; 801 km2
- 1000 km away from Lisbon
- Economy is mainly based on tourism and agricultureSelf-sufficient community
- Counts with a **Sustainable Energy Action Plan**

6 – Madeira Island

USE CASES

#6 - Electrification of the islands' transport looking to grid frequency and voltage regulation

#7 - Storage and power electronics for the stabilization of weak grids and microgrids

7 – Follower Islands

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7 – Follower Islands

NORDENEY

MENORCA

PSARA

CREATE ACTION PLANS FOR DECARBONIZE THE ISLAND USING THE IPT

THANK YOU!

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