



Maximizing the impact of innovative
energy approaches in the EU islands

INSULAE Project

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



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

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- ✓ 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.

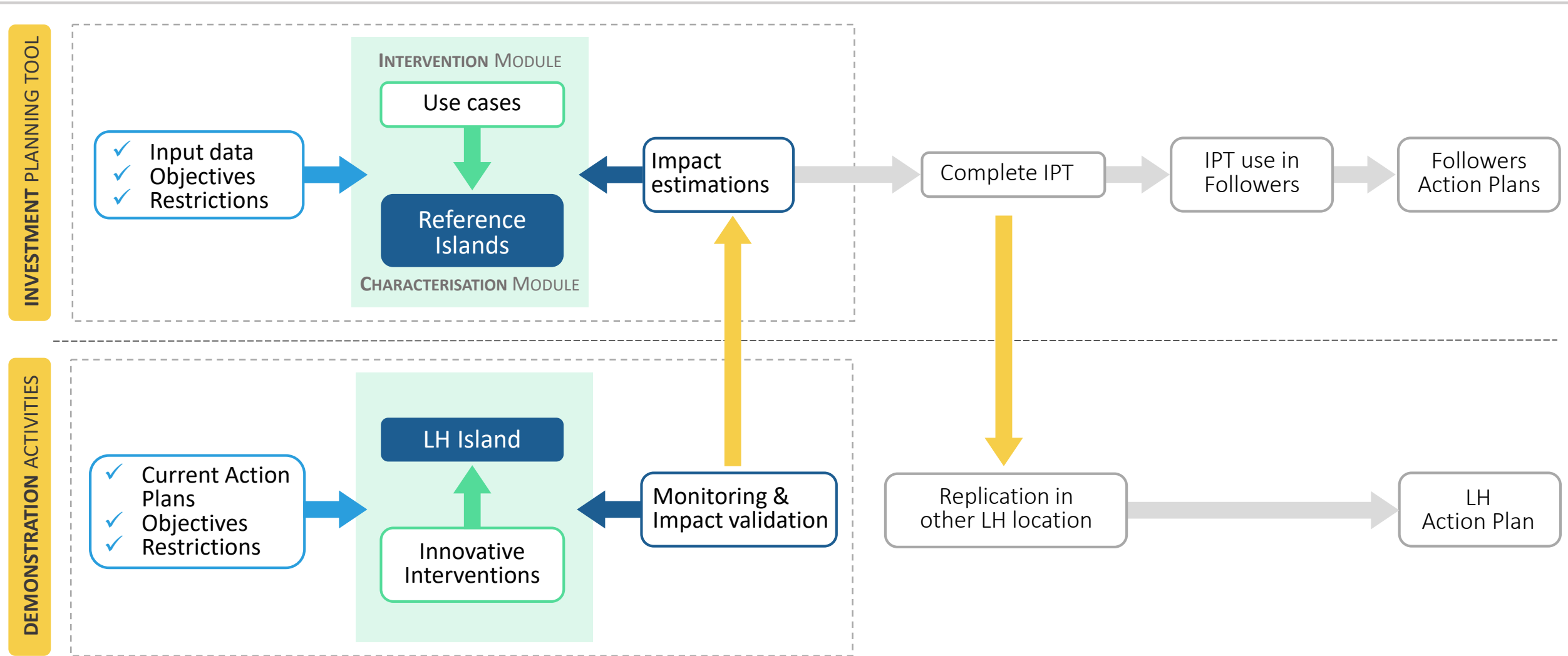
2 – Objectives, concept and expected outcome

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

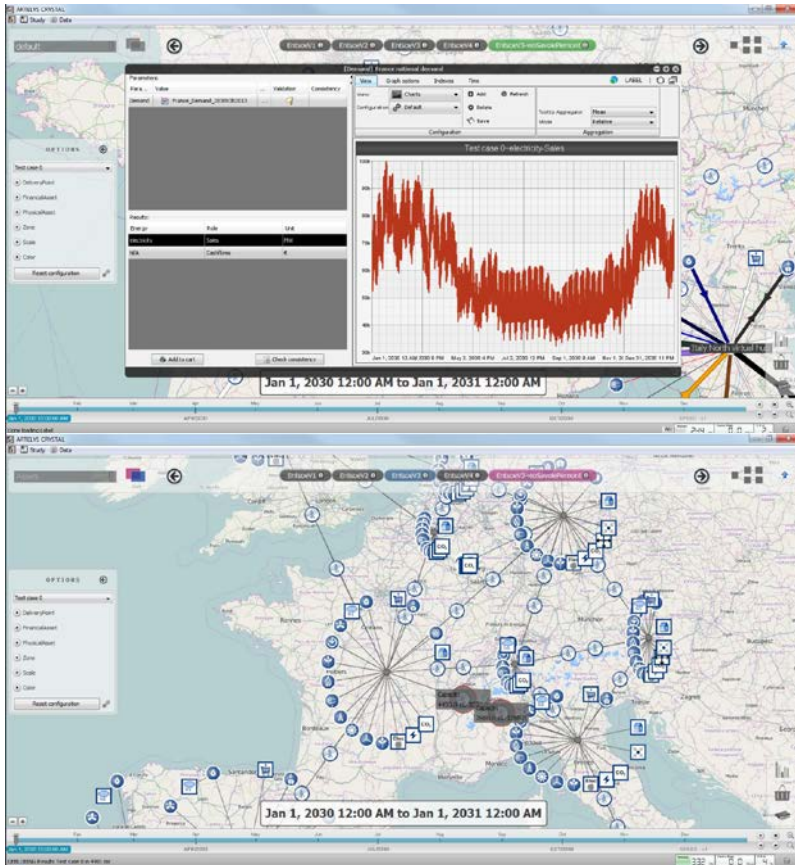
Direct impacts

- ✓ 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) CO₂ 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

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 RECOMMENDATIONS ON INVESTMENT, FOSTERING THE TRANSITION TO NEUTRAL CO2 EMISSION ISLANDS

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

#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 - 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

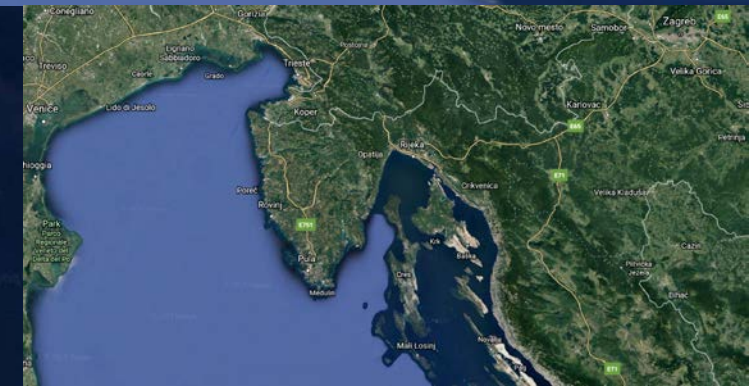
- Islands decarbonization (High Impact!)
- Provide new flexibility services assisting RES integration and grid stability

#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

Location and general description



The Island of Unije

- Surface: 16.83 km²
- 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

6 – Madeira Island

Location and general description

- 262.000 inhabitants;
801 km²
- 1000 km away from Lisbon
- Economy is mainly based on tourism and agriculture
Self-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

THANK YOU!



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