New Energy Solutions Optimised for Islands

NESOI

EUROPEAN ISLANDS FACILITY

Technology Integration for Islands' Decarbonisation – key learnings from NESOI

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SUSTAINABLE PLACES

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 864266

NESOI – European Islands Facility

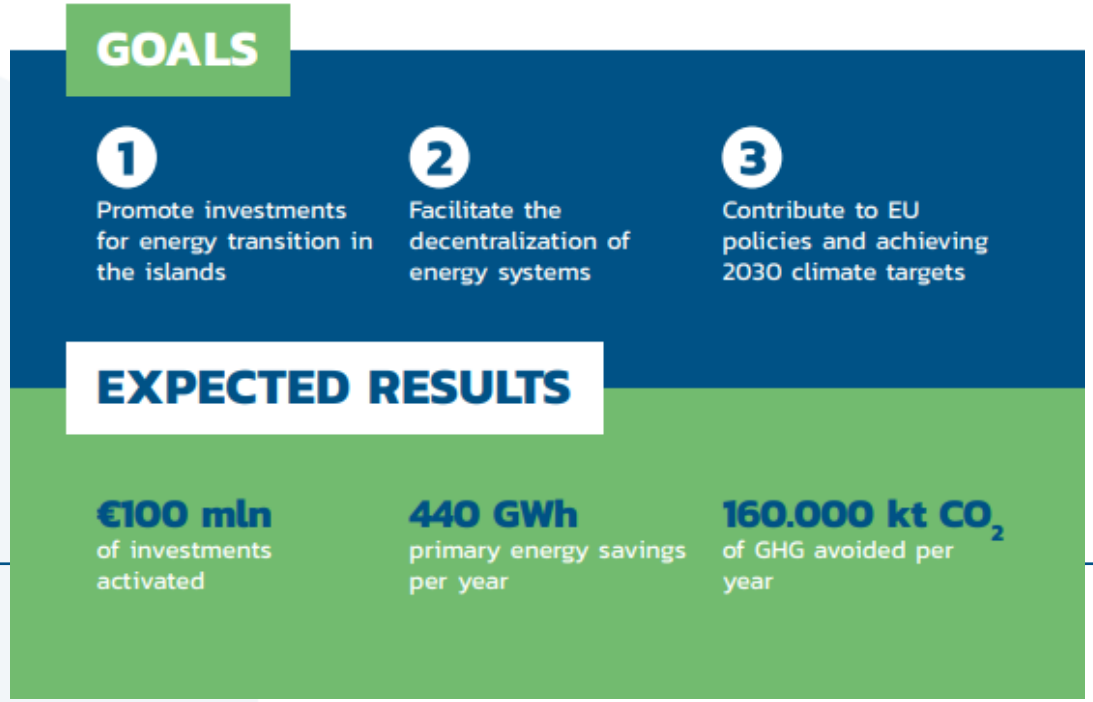
Target: to unlock EU islands potential and make them locomotives of energy transition

Duration: October 2019 – September 2023

Coordinator: SINLOC

Partners: R2M, RINA, ZABALA, CIRCE, CERTH, E.ON, WolfTheiss, Deloitte, HAEE

Budget: 10 million €, of which 3.1 million € of cascade funding



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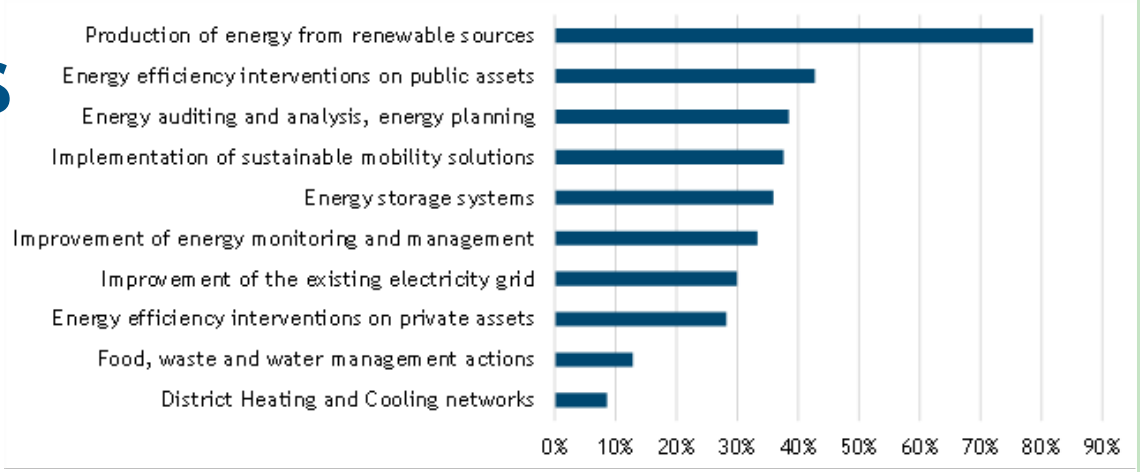
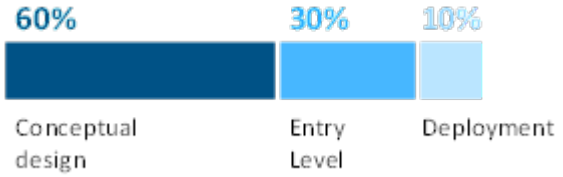
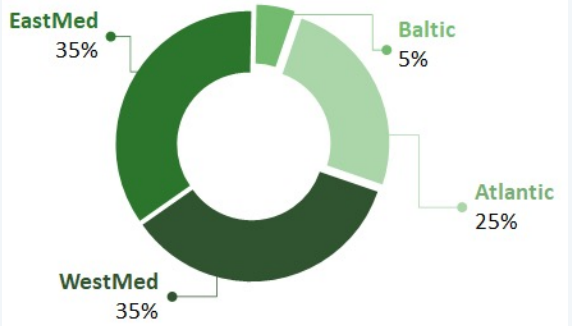
Open Calls Main Facts

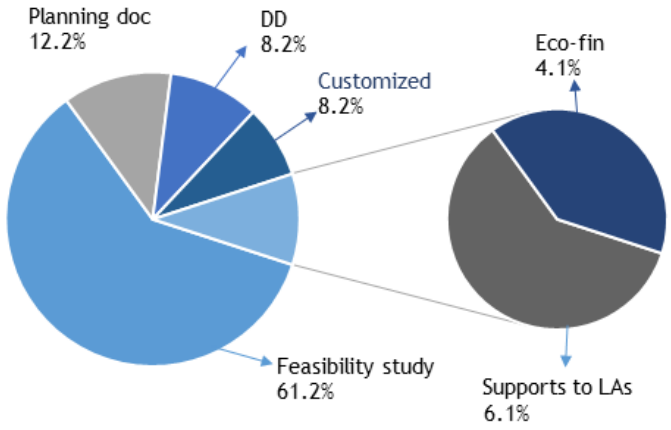
Two NESOI Open Calls, more than 160 applications received:

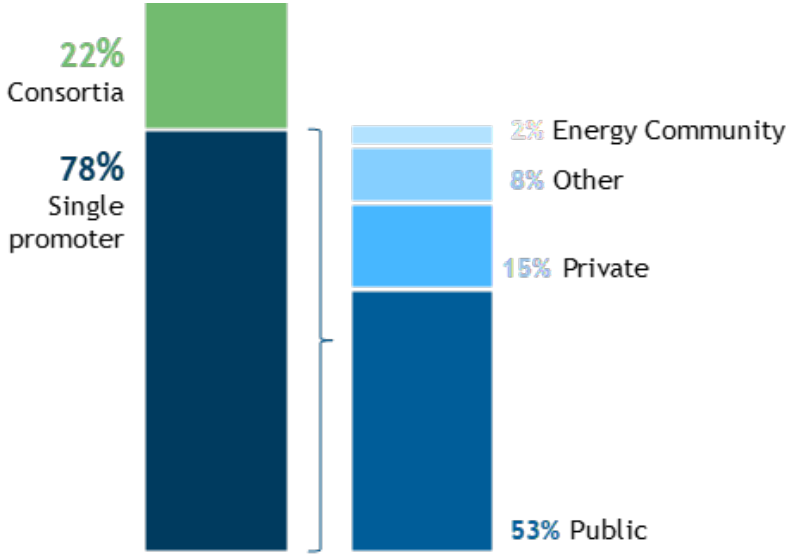
a representative sample of pathways for energy transition





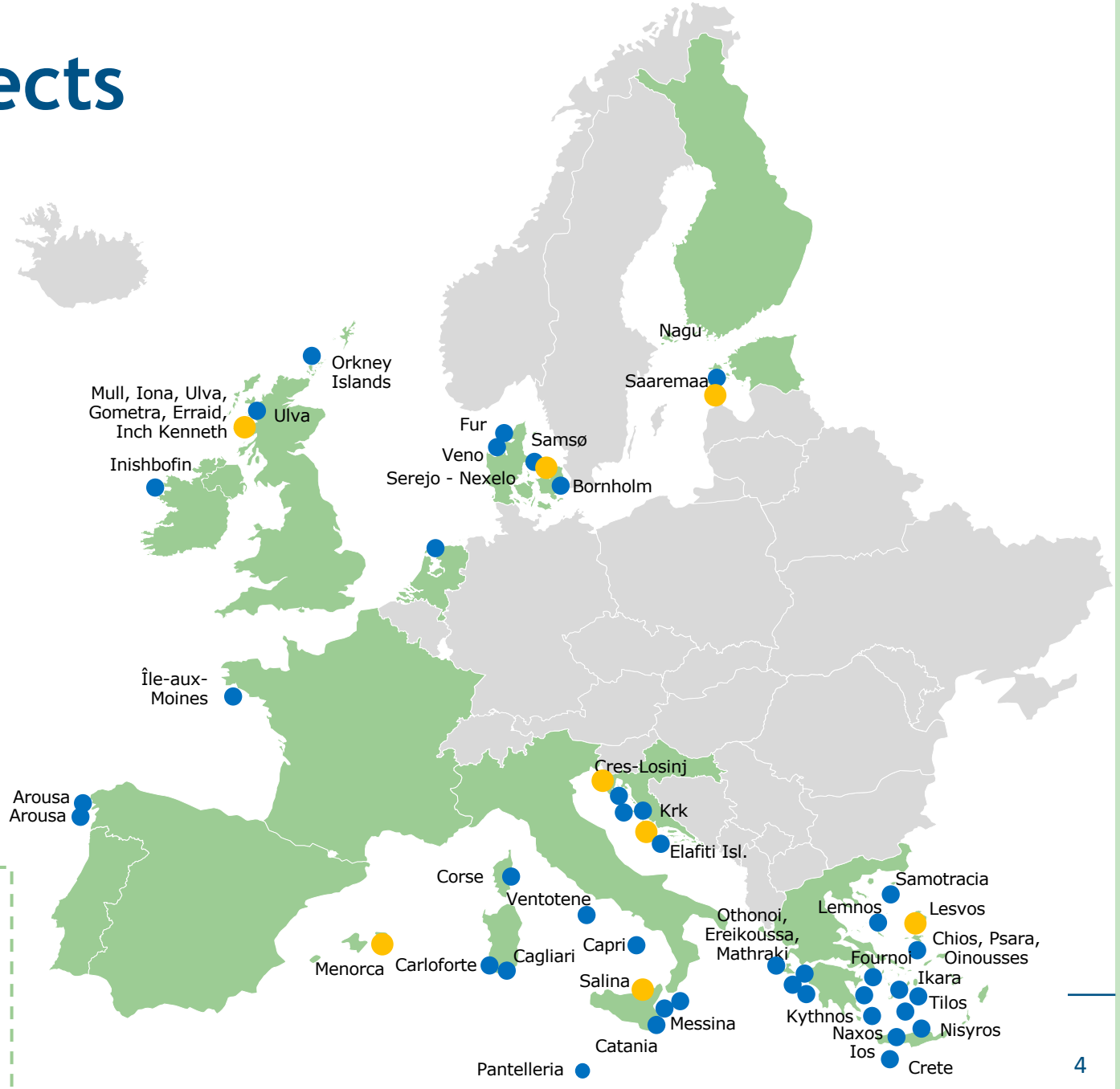






Supported Projects

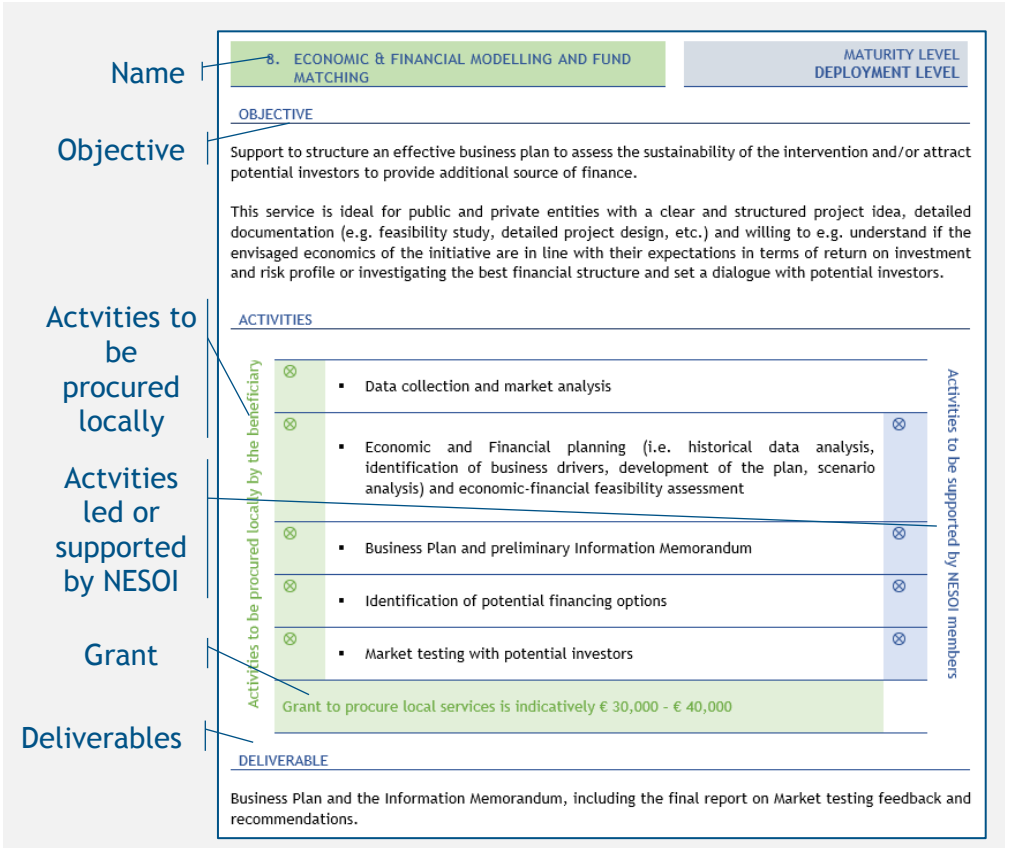
54
PROJECTS
SELECTED



Technical Assistance Menus

For each level of project maturity NESOI has provided applicants with a number of predetermined Technical Assistance Menus to choose from

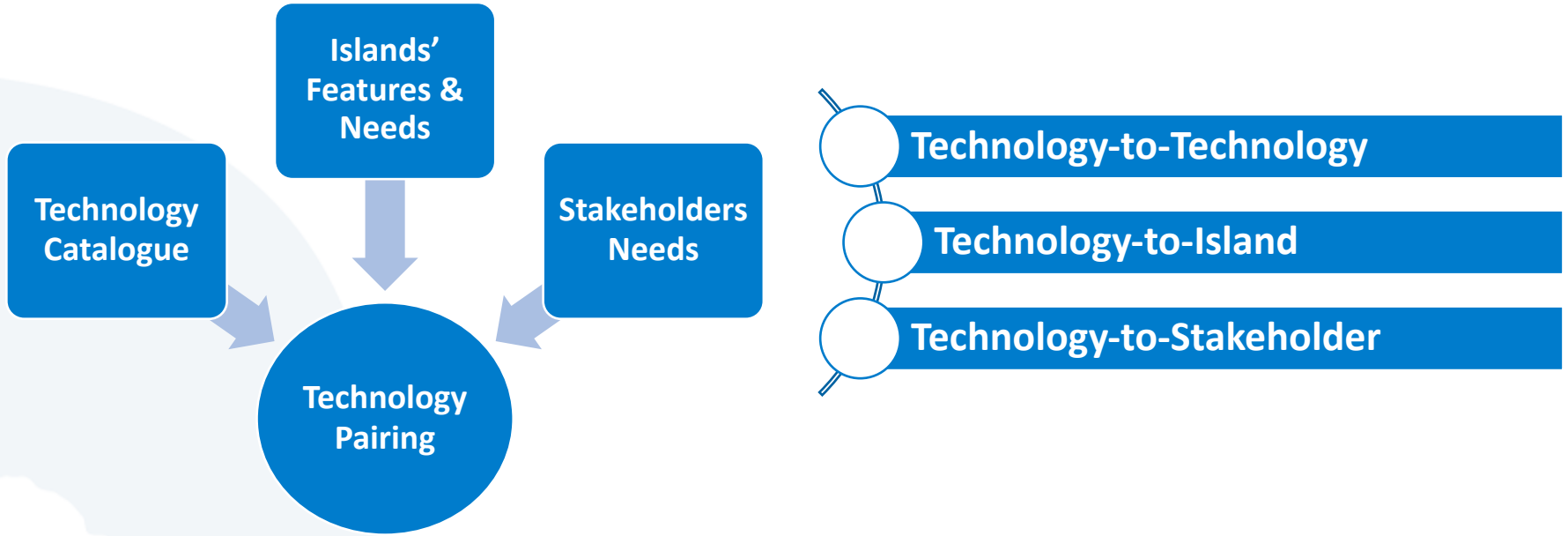
MATURITY LEVEL	TECHNICAL ASSISTANCE MENUS
ENTRY LEVEL	1. PLANNING DOCUMENTS
CONCEPTUAL DESIGN LEVEL	2. FEASIBILITY STUDY
	3. DUE DILIGENCE
DEPLOYMENT LEVEL	4. SUPPORT TO LAs IN TENDER PROCEDURES IN PPP
	5. SUPPORT TO LAs FOR THE EVALUATION OF PPP PROPOSAL BY PRIVATE PROMOTERS
	6. SUPPORT TO LAs FOR WORKS/SERVICES TENDERING PROCEDURES
	7. SUPPORT IN THE APPLICATION TO TA PROGRAMS/ FUNDS
	8. ECONOMIC & FINANCIAL MODELLING AND FUND MATCHING
CUSTOMISED MENU	▪ activities needed ▪ expected deliveries ▪ required budget ▪ timeline



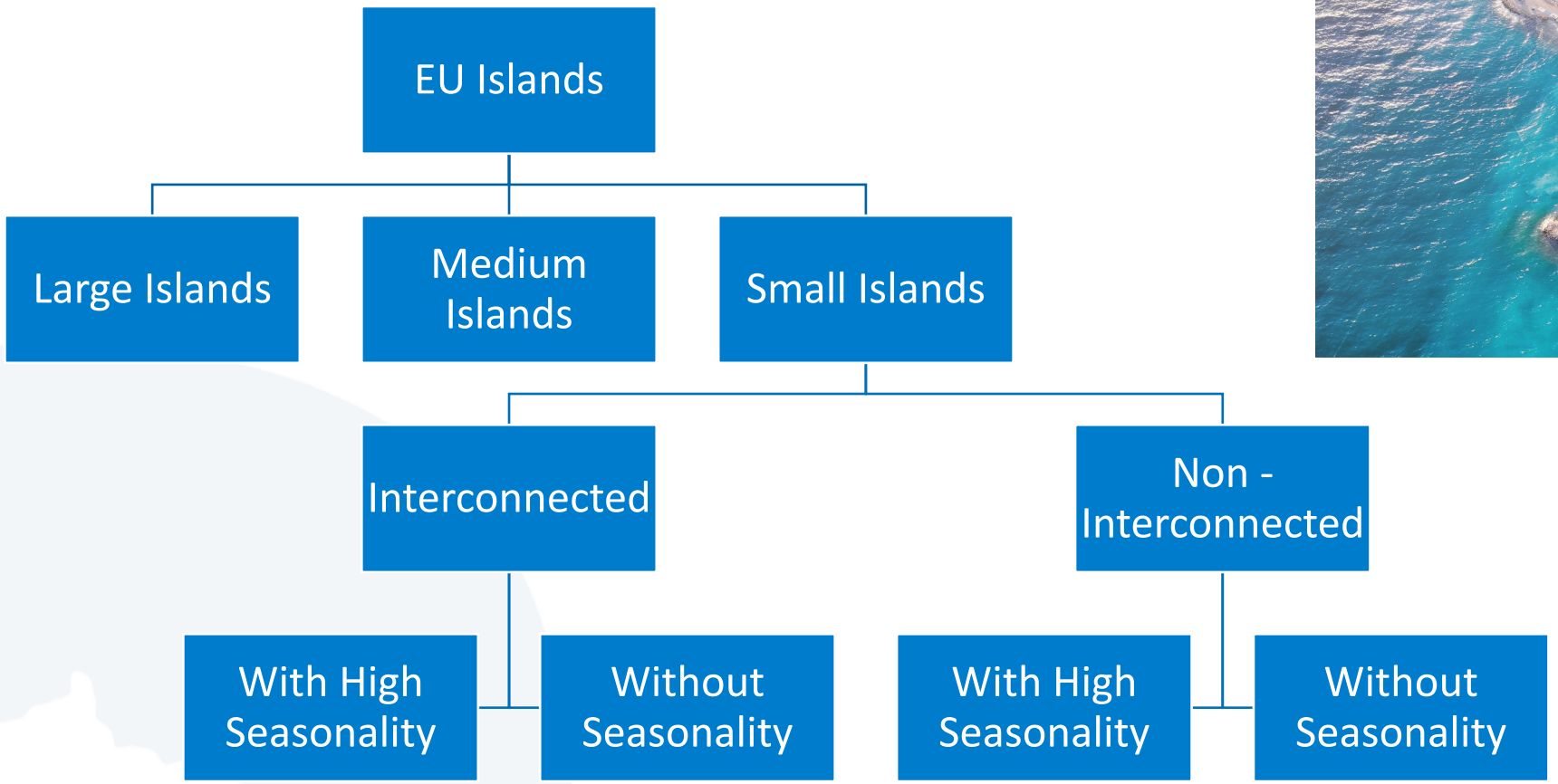
Technology Pairings

To provide useful inputs to the NESOI facilitating platform, a catalogue of technology pairings was developed:

- initially, based on scientific literature and experts' opinion
- after 1st and 2nd open call, based on applications received



Islands' Clusterization - 1st level



Islands' Clusterization – 2nd level

Criterion	Categories
By latitude	- South/Mediterranean Europe - Northern-Central Europe
By orography	- Mountainous islands - Flat islands
By population distribution	- Concentrated in town/cities - Distributed in villages
By economic activities	- Mainly tourism-based economy - Mainly agriculture-based economy - Presence of industries
By availability of resources	- Water availability - Biomass availability - etc…

Technology Clusterization - 1

Group	Categories
 Electricity production from renewables	- Solar photovoltaic - Wind - Biomass - Geothermal - Hydro - Wave/Tidal
 Thermal production from renewables	- Solar thermal - Geothermal - Biomass - Cogeneration
 Electric Mobility	- Electric vehicles - Electric ferries - Charging infrastructures

Technology Clusterization - 2

Group	Categories
Energy Storage	- Battery storage - Hydrogen - Thermal storage
Upgrade of Local Public Assets	- Power distribution grid - Public lighting - Ports - Water treatment and distribution - Waste management
Energy Efficiency in Buildings	- Lighting - HVAC - Smart metering - Building envelope refurbishment - District heating & cooling

Technology-to-Technology Coupling

	Electricity Production from Renewables	Thermal Production from Renewables	Cogeneration of Heat and Power	Electric Mobility	Energy Storage	Upgrade of Local Public Assets	Energy Efficiency in Buildings
Electricity Production from Renewables	Yes, e.g. in integrated offshore renewable farms	Yes, e.g. in hybrid thermal-electric photovoltaic plants	Yes, e.g. in the frame of smart grid projects	Yes, e.g. for renewable-based vehicles charging infrastructure	Yes, e.g. in the case of renewable power plant with integrated energy storage	Yes, e.g. for shore-side power supply in ports, solar lighting poles, biogas from waste/water treatment	Yes, e.g. for power supply to heat pumps
Thermal Production from Renewables	-	Yes, e.g. in hybrid solar-biomass or solar-geothermal systems	Yes, e.g. in hybrid high-efficiency heating systems	No	Yes, e.g. for flexible supply of heat to buildings and DH networks	No	Yes, e.g. for heat supply to absorption chillers for space cooling
Cogeneration of Heat and Power	-	-	-	Yes, e.g. in the frame of smart grid projects	Yes, e.g. for flexible supply of heat to buildings and DH networks	Yes, e.g. in the frame of smart grid projects	Yes, as source for high-efficiency heating and DH networks and for trigeneration
Electric Mobility	-	-	-	Yes, e.g. in case of integrated projects covering different types of vehicles	Yes, e.g. for RES-based vehicle charging stations	Yes, e.g. in the frame of smart grid projects	Yes, e.g. within integrated projects for building refurbishment
Energy Storage	-	-	-	-	-	Yes, e.g. in the frame of smart grid projects for peak shaving and load management purposes	Yes, e.g. in high-efficiency HVAC systems for peak shaving purposes
Upgrade of Local Public Assets	-	-	-	-	-	Yes, e.g. in the frame of smart grid projects	Yes, for refurbishment of public buildings
Energy Efficiency in Buildings	-	-	-	-	-	-	Yes, many actions for buildings' energy efficiency can be done in a refurbishment joint project

Technology-to-Island Coupling

	Size/ Interconnection	Latitude	Geographical Features	Economic Activities	Other
Electricity Production from Renewables	No specific restriction to islands' size. Utility-scale plants could be more applicable to large interconnected islands compared to small non-interconnected ones, although benefits are higher in small non-interconnected islands.	For solar technologies, higher applicability in Southern Europe than in Northern Europe. For other technologies, no strong correlation with island location and latitude.	No strong correlation with islands' geographical features such as orography and rural/urban context. For wave/tidal solutions, suitability is higher in Ocean areas.	For solar technologies, higher applicability to tourism-based islands. In large islands with variegated economic activities, the suitability of the technology is the same as in the mainland.	For wind, geothermal biomass, hydro, the suitability depends on the availability of the specific resource and on the availability of spaces and absence of environmental constraints
Thermal Production from Renewables	No specific restriction to islands' size. Solar thermal plants for domestic hot water production are more applicable to islands with high-seasonality.	For solar thermal, higher applicability in Southern Europe than in Northern Europe. For geothermal and biomass, applicability is higher in Northern Europe due to the higher heating demand.	No strong correlation with island orography; if used to supply heat to a DH system, higher applicability to urban contexts	No specific correlation with the main economic activities. Solar thermal on residential/tertiary facilities can be implemented with success both in tourism-based islands and in islands with industrial activities	For geothermal and biomass, suitability depends on the availability of the specific resource
Cogeneration of Heat and Power	No specific correlation with islands' size. In principle higher potential in larger islands with more industrial activities.	For heating purposes, higher applicability in Northern Europe due to the higher heating demand; for industrial purposes, no specific correlation with islands' latitude.	No strong correlation with island orography; if used to supply heat to a DH system, higher applicability to urban contexts	Higher applicability to islands with industrial activities; suitable also for tourism-based islands if coupled with absorption chillers for trigeneration purposes.	Fuel availability may be an issue: cogeneration makes sense if based on renewable fuels or natural gas, not on diesel or other fuels.
Electric Mobility	No specific correlation with islands' size and interconnection	No specific correlation with latitude (except if coupled with solar power production systems)	No specific correlation with orography and urban/rural context	Higher potential for sharing and rental of e-vehicles in tourism-based islands. For privately-owned vehicles, no correlation with economic activities on the island.	-
Energy Storage	For electricity: mainly applicable in small non-interconnected islands for peak shaving purposes. For heat: no specific correlation with islands' size and interconnection	No specific correlation with latitude, except for thermal storage in DH systems that is mostly applicable in Northern Europe due to higher heating demand	No specific correlation with orography and urban/rural context, except for thermal storage in DH systems that is mostly applicable in urban contexts where DH networks are present	In general, no specific correlation with islands' economic activities.	-
Upgrade of Local Public Assets	Always applicable without reference to islands' size and interconnection. For electricity grid upgrade, higher applicability in non-interconnected islands; for water- and waste-related projects, higher suitability to large islands.	No specific correlation with latitude	No specific correlation with geographical features like orography and urban/rural context	No specific correlation with economic activities on the island	-
Energy Efficiency in Buildings	No correlation with islands' size and interconnection	No specific correlation with latitude, except for DH-related measures that are mostly applicable in Northern Europe due to higher heating demand	No specific correlation with orography and urban/rural context, except for DH-related measures that are by nature mainly applicable to urban contexts	No specific correlation with economic activities on the island	-

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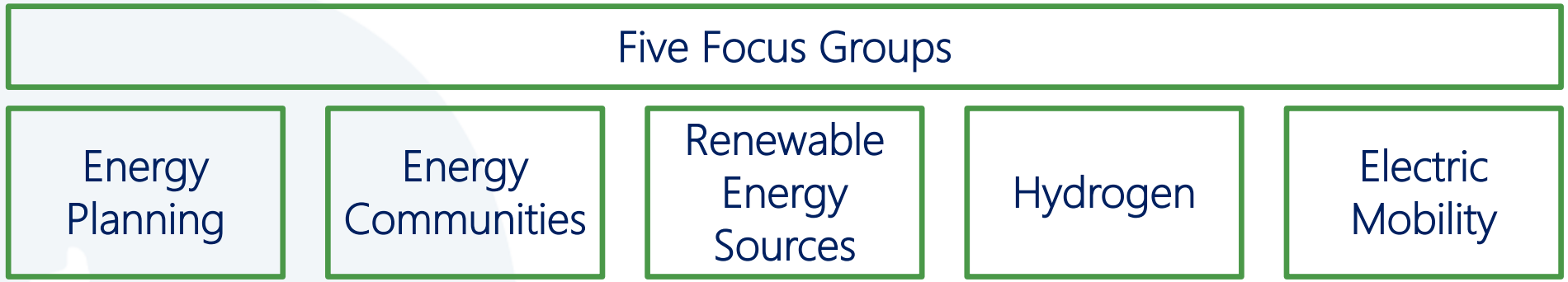
Technology-to-Stakeholder Coupling

	Municipality Other Local Authority	Public Asset Operator	Private Company	Energy Community
Electricity Production from Renewables	Yes, both at small scale for self-production on public buildings or at utility-scale supporting the promoter for power supply to the local grid	Yes, both at small scale for self-production on own assets or at utility-scale for power supply to the local grid	Yes, at small scale for self-production on own assets or at utility scale for power supply to the local electricity grid	Yes, only at small scale for power supply to the own assets of community members
Thermal Production from Renewables	Yes, both at small scale for self-production on public buildings or at utility-scale supporting the promoter for heat supply to the local grid	Yes, both at small scale for self-production on own assets or at utility-scale for heat supply to the local grid	Yes, at small scale for self-production on own assets or at utility scale for heat supply to the local DH grid	Yes, only at small scale for heat supply to the own assets of community members
Cogeneration of Heat and Power	Yes, both at small scale for self-production on public buildings or at utility-scale supporting the promoter for power/heat supply to the local grid	Yes, both at small scale for self-production on own assets or at utility-scale for energy supply to local electric/DH grid	Yes, at small scale for self-production on own assets or at utility scale for energy supply to the local electric/DH grid	Yes, only at small scale for power and heat supply to the own assets of community members
Electric Mobility	Yes, for the development of the infrastructure	Yes, for the management of the infrastructure and of the vehicles, if shared	Yes, but only for own vehicles	Yes, for the vehicles of the energy community members only
Energy Storage	Yes, supporting the relevant public asset operator	Yes, on the asset they operate (e.g. DSO or utility for electricity grid, or DH operator)	No	No
Upgrade of Local Public Assets	Yes, supporting the relevant public asset operator	Yes, on the asset they operate	No	No
Energy Efficiency in Buildings	Yes, on public buildings	Yes, on buildings related to the operated asset	Yes, on own buildings	Yes, only for buildings owned by community members

Focus Groups

To capitalize the learnings developed in the 50+ technical assistance projects, NESOI partners have decided to constitute focus groups to:

- share technical/financial/legal expertise of partners on different topics relevant to islands' energy transition
- cooperate to solve issues and identify solutions leveraging on experience developed in the first set of projects



Conclusions

- the most suitable island energy transition projects depends on local features → tailored **energy planning** plays a key role
- islands are ideal laboratories for solutions to be upscaled on the mainland: **H_2 production RES+storage, RES+e-mobility, RES+desalination, RES+DHC, "green ports"** → related to public assets but impacting on citizens & economy
- **energy communities** have a high potential → increased security of supply, mitigation of energy poverty, maximization of RES self-consumption
- not to forget: **energy efficiency** → actions done in the mainland are applicable also to islands, generally with higher environmental, social, economic benefits

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Thank you!

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