NESOI
EU ISLANDS FACILITY

GUIDEBOOK

For replication of clean energy transition projects on islands

Your practical guide to replicate NESOI best practices

Editors: Sara Ruffini (R2M), Mario Cortese (R2M), Domenico Perfido (R2M)

Contributors / Authors: Sara Ruffini (R2M), Mario Cortese (R2M), Domenico Perfido (R2M), Giorgio Bonvicini (RINA), Alessandra Montanelli (SINLOC), Avraam Kartalidis(CERTH) Vasiliki Palla(CERTH) Ana Slovenec (WOLF THEISS), Marina Cárdenas Herrero (CIRCE), Aurora Garcia Jimenez (CIRCE), Bruno Marcos SODIRO (RINA), Tommaso Ordine (SINLOC)

Design and layout by: studiofiguro.com; Alessia Covato, Gianluca Ariello

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

INDEX

NESOI AT A GLANCE

The EU Island Facility NESOI (New Energy Solutions Optimised for Islands) is a Horizon 2020 project funded under call topic LC-SC3-ES8-2019 (European Islands Facility – Unlock financing for energy transitions and supporting islands to develop investment concepts). The project began on 1 October 2019 and will finish on 29 February 2024. It is led by a multi-disciplinary consortium of ten partners from seven EU Member States. The total budget of €10million includes approximately €3 million as part of a cascade funding mechanism to provide direct financial support to EU Islands.

Through consortium capacity-building activities, the Facility's objective was mobilise more than €100 million in public/private investment for sustainable energy projects reaching 2,400 inhabited EU islands by 2023, making it possible to test innovative energy technologies and approaches cost-effectively, resulting expected energy savings of 440 GWh/year and avoiding GHG emissions of 160,000 tCO2e/y.

The project launched a two-round open call, which received 168 applications from 16 countries. 54 projects were then selected from over 60 islands, which had the potential of mobilising more than €500 million in public/private investments and avoiding 420,000 tCO2e in GHG emissions. NESOI's technical assistance is crucial for islands to develop effective energy transition plans and feasibility studies, publish public calls for tenders in order to trigger long term investments from both private and public funds.

ISLANDS' ENERGY TRANSITION NEEDS

In the context of the global effort to tackle climate change and transition to renewable energy sources, the European Commission is taking action to make islands the drivers of the EU's energy transition efforts. Islands have specific characteristics, including geographic, economic and climate conditions. In most cases, this leads to poor access to power grids, higher power generation costs, greater difficulty in accessing finance, higher energy poverty and greater climate risks compared to mainland regions. They are therefore the perfect locations to encourage energy transition and innovation initiatives.

Energy demand is unevenly distributed across the year as peaks typically occur during high seasons with the arrival of tourists. Solutions for decarbonising islands must therefore deliver significant energy, environmental and socio-economic benefits, which can be replicated on the mainland in the future, contributing to the EU's energy transition.

In addition to the European Commission efforts, many initiatives and roadmaps for decarbonising islands are underway. As an example, the International Renewable Energy Agency (IRENA)[1] is helping islands achieve a sustainable energy future by transitioning from import-dependent fossil fuel systems to systems using renewable energy technology.

However, despite recent targeted efforts, many islands still face barriers at different project development stages: even though they share some common features with the mainland, the unique characteristics of islands require energy supply solutions to be tailored to the needs of the energy system on each individual island. Similarly, clean energy solutions must match the needs of island communities and their specific characteristics and economies.

It is significantly more problematic and expensive to provide a safe, balanced power supply on islands than on the mainland. If one considers the current energy mix on various sample islands as presented by the "Clean Energy for EU Islands" initiative, a strong push is still needed as many islands still face numerous energy-related challenges. To make matters worse, Eurelectric[2] highlighted that islands also face general economic challenges largely due to their relatively small size and isolated location.

Many of the 2,400 inhabited islands in Europe can be considered as isolated microgrids and/or small energy markets. However, these islands, home to 15 million European citizens, have the potential to lead the transition to clean energy by adopting new technologies and implementing innovative solutions. They can become a test bench for systems which are cost-effective, cheaper, more stable, and cleaner while being less dependent on mainland energy.

THE MAIN REQUIREMENTS OF ISLANDS FOR ENERGY TRANSITION INCLUDE:

- Adopting modern and innovative energy systems,
- Becoming less dependent on costly fossil fuels imports,
- Promoting energy self-reliance by optimising the local renewable potential,
- Reducing environmental impacts on island ecosystems,
- Reducing the strain on public budgets,
- Attracting investments,
- Developing and implementing Island Sustainable Energy and Climate Action Plans, and
- Tackling energy poverty and depopulation issues.

MOREOVER, ISLANDS CAN LEVERAGE SEVERAL ADVANTAGES FOR THEIR ENERGY TRANSITION:

Their RES potential is usually good,

Clean energy solutions can be installed at competitive costs (when compared with fossil-fuel systems) and optimally managed thanks to smart grid solutions (which are easier to implement on a small scale, especially in off-grid contexts),

A broad set of consolidated technology solutions is available,

Energy planning and energy transition tools and methodologies are tried and tested,

A wide range of dedicated financial solutions exist to assist in energy transition (e.g.: infra funds, European Structural Investment Funds, European Funds for Strategic Investments, European Regional Development Funds, crowd funding, etc.),

Consolidated public procurement practices are possible, in addition to Private-Public Partnership schemes,

Strong sense of community, often resulting in community-owned initiatives with high levels of agreement and acceptance.

NEVERTHELESS, ISLANDS FACE MANY BARRIERS ON THEIR PATH TO DECARBONISATION:

Operational constraints due to the insular nature of their power systems: balancing and flexibility must be handled on the island itself (when the island is not connected to the mainland grid),

Significant seasonal variations in population numbers and consequently, energy demand, requires considerable flexibility in power generation and distribution systems,

Potentially limited available space for installing renewable power plants due to complex orography, higher land costs, environmental and landscape constraints,

A diversified energy supply using less carbon-intensive fuels (i.e.: natural gas, DHC, waste heat recovery) is not always possible due to facilities not being available or easy to implement on islands,

Local government authorities lack the necessary expertise, especially from technical perspective (no offices dedicated to energy transition at the island or archipelago level),

Some islands depend on a mainland local government authority and therefore enjoy no specific planning or prioritisation measures,

Higher investment costs due to transport and logistics, longer procurement times, higher insurance costs, slower initial authorisation, and other constraints,

Lack of dedicated funding options and poor economies of scale for some work, especially in small islands (e.g.: conventional power plants, storage facilities, waste to energy, etc.),

Higher investment risks (uncertainty on costs and revenues, more fragile local economies) resulting in investors demanding higher returns.

[1] IRENA, “SIDS Lighthouses Initiative - Progress and way forward”, July 2022, https://islands.irena.org/-/media/Sids/Files/Publications/IRENA_SIDS_LHI_progress_and_way_forward_2022.pdf?rev=64199063e9fb4e4b8052c7f7a7d1f711&hash=ABE2C5D3F36A46BFAF7A4E33711E7FA9

[2] Eurelectric, “Key recommendations on the decarbonisation of European Islands”, September 2019, https://cdn.eurelectric.org/media/3981/20190903_e-islands_recommendations_neis_clean-2019-030-0484-01-e-h-E8642574.pdf

WHAT IS THE GUIDEBOOK FOR REPLICATION

The main three objective of the NESOI European Islands facility are

- ***Promote investments for energy transition in the islands***
- ***Facilitate the decentralization of energy systems***
- ***Contribute to EU policies and the achievement of 2030 targets***

By working in close cooperation with the Clean Energy for EU Islands Secretariat, these objectives aim to facilitate a bottom-up transition to clean energy on EU islands. NESOI envisages bringing this objective one step closer by providing islands with training, technical support, cooperation opportunities, and robust funding opportunities to effectively convert Island Sustainable Energy Action Plans into Renewable Energy Sources (RES) plants, building and energy infrastructure retrofitting, reducing energy bills, creating local job among other benefits.

This is the context for producing this Replication Guidebook, through which NESOI envisages promoting NESOI supported projects and encourage their replication.

Replicability denotes the properties of a system that allows it to be exactly duplicated in another location or time. In that sense, any product and/or scenario must be replicable at every operational level in order for it to have added value (Sigrist et al. 2016; van Summeren et al., 2022).

NESOI has developed this replication guidebook to encourage other islands in Europe and around the world to replicate the 54 existing NESOI projects. Common and distinctive features of all the project islands were identified to produce a guidebook of best practices and lesson learned.

The goal is to assess the replicability of their results under different/similar conditions, sectors, contexts, etc. It includes identifying the criteria for replicability (RRL) and potential barriers to overcome to achieve replication.

In this Replication Guidebook, 15 best practices were selected out of the 54 projects involved in the NESOI project. The best practices were chosen from five different focus areas (e-mobility, Energy Planning, Renewable Energy Sources, Energy Community and Hydrogen) by NESOI's technical assistance team.

To maximize the number of potential users, the Replication Guidebook, will be produced in the six different languages (EN, IT, FR, ES, HR, GR) represented by the islands in the project.

The Replication Guidebook contains an indicator of the replicability criteria that has been specifically created for this project which we call the Replicability Readiness Level (RRL). This indicator helps to identify the (societal, economic, legal, technological, environmental) replicability indicators and assign them a score from 0 to 3 (3 being the maximum score) indicating if the project is easily replicable.

Project Section

In the Guidebook for replication 15 best practices have been selected out of the 54 project participating in the NESOI project.

NESOI

Transport Electrification on Sea and land in Antiparos

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Conceptual design

Beneficiary/ies
Municipality of Antiparos and the Paros, Antiparos Ferry Cooperative

Geographical area
Eastern Mediterranean
ANTHYPAROS, GREECE

Area of Intervention
Implementing sustainable mobility solutions

Financial Leverage Factor
27.13

Technical Assistance Menu
Feasibility Study

Mobilized investment
€1,628,000

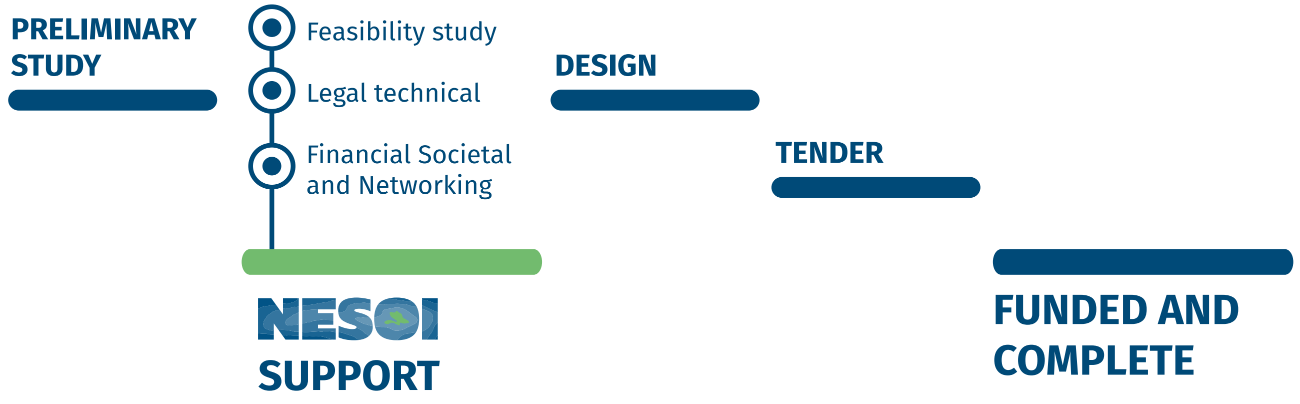
SHORT PROJECT DESCRIPTION

The project is a feasibility study, which aims to be the initial step towards fully electrifying the island's transport system, and thus, pave the way for sustainable carbon-neutral mobility in the Municipality of Antiparos on both land and at sea.

The project involves electrifying the propulsion system in one of the four ferries operating on the Paros-Antiparos ferry route, as well as installing electric vehicle (EV) charging stations and partially electrifying the Antiparos municipal fleet. These measures will be supported by installing PV plants in suitable locations. Apart from supplying the EV infrastructure, the PV plants will also provide power to 15 energy-poor households with the excess of power generated during the low season.

WHY IS NESOI SUPPORTING THIS PROJECT?

The designed solution is complex and innovative in the local context since the technology for electrifying the ferry has only recently come onto the market. NESOI has been asked to provide is a feasibility study mainly focused on developing the technology, identifying an overall suitable solution, sourcing both public and private funding and financing options and ensuring that the proposed solution complies with the local and national statutory framework.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

- Defining the required environmental authorisation procedures
- Identifying the regulatory framework, barriers to addressing legal constraints and facilitating its implementation
- Product and technology certification

AT TECHNICAL LEVEL

- Assessing the key project design drivers
- Identifying suitable technology options giving the existing project's requirements
- Conducting risk analysis and identifying potential mitigation strategies
- Drawing up an Action Plan and identifying project monitoring procedures
- Defining the technical, economic and financial inputs

AT FINANCIAL LEVEL

- Assessing potential procurement options
- Performing Financial modelling and identifying target scenario
- Identifying funding/ financing options

AT SOCIAL & NETWORKING LEVEL

- Performing Cost Benefit Analysis and socio-economic and environmental impact assessment
- Public engagement for raising awareness about RES/energy sustainability with economic, environmental, and societal impacts for the islanders

RRL

Points (0=min, 3=max)

Total
3

Geographical
Islands need no specific climate or morphology to replicate this project

3

Technological
The technology is easy to replicate on every island

3

Legal
The project has no legal barriers

3

Social acceptance
The project has a high social acceptance since it benefits the whole community

3

Funding raising/ investment actractivity
The project is highly attractive for investors

3

The Z-245 Transport Electrification on Sea and land in Antiparos project has been assessed as being highly replicable and operational, with a score of 3/3. The project will use proven technology, however it must take into consideration that the technology for electrifying the ferry is as yet immature.

NESOI

Sustaining drinking water services & electromobility in insular areas

by integrating grid-based & distributed PV power

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Conceptual design

Beneficiary/ies
Municipality of Tilos, University of West Attica

Geographical area
Eastern Mediterranean
TILOS, GREECE

Area of Intervention
Implementing sustainable mobility solutions

Financial Leverage Factor
3.3

Technical Assistance Menu
Customised Feasibility Study

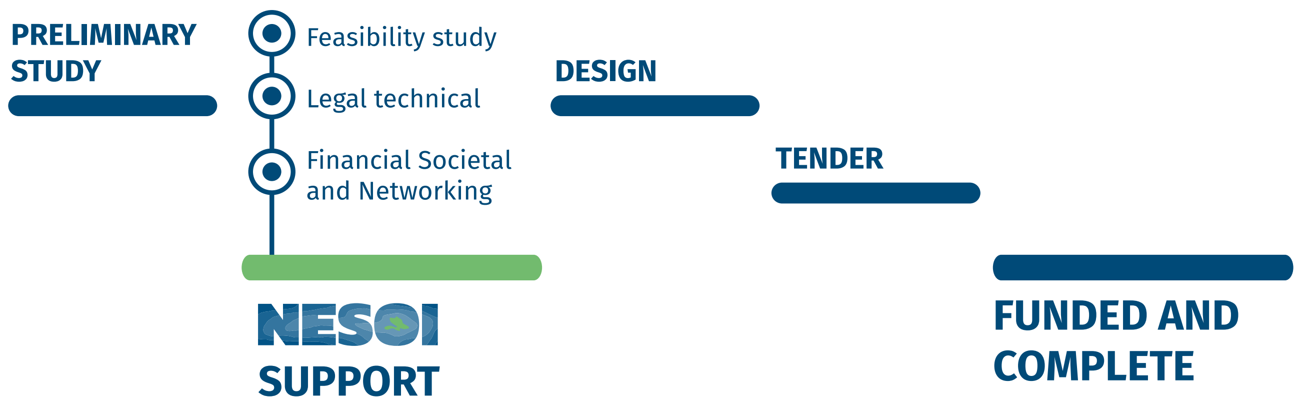
Mobilized investment
€200,000

SHORT PROJECT DESCRIPTION

NERIDA aims to conduct studies for both grid-connected and stand-alone PV facilities in order to meet the electricity demand for the public water and e-mobility sectors on the island of Tilos. Developing a balanced mix of grid-connected and stand-alone PV systems is considered an innovative solution supporting the optimum use of available solar power in grid-congested environments (such as in small-scale islands with no interconnectors) while paving the way for new innovative asset portfolio management tools and introducing distributed generation on small scale islands. At the same time, NERIDA proposed developing a toolkit of tailored energy and tendering studies as well as relevant documentation, to fast-track the implementation of similar projects across Greek islands.

WHY IS NESOI SUPPORTING THIS PROJECT?

NESOI was asked to provide a feasibility study with customised initiatives, mainly focused on developing tender documents for developing a PV-based portfolio for hydropower and e-mobility needs, in compliance with the regulatory framework.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Identifying the necessary authorisations and project development support

Identifying the regulatory framework, barriers and developing a clear action plan to address legal constraints and facilitate project implementation

AT TECHNICAL LEVEL

Reviewing energy audits and technical design of the project

Drafting construction work/services tender package

Providing support during the work/services tendering procedures Q&As

Risk analysis and identifying available mitigation strategies

AT FINANCIAL LEVEL

Identifying potential financial options

Market testing with potential investors

Defining targeted tendering process

AT SOCIETAL & NETWORKING LEVEL

Specific tasks/Lessons learned on:
Public acceptance at the local authority level

Public engagement for raising awareness about RES/energy sustainability with economic, environmental, and societal impacts for the islanders

RRL

Points (0=min, 3=max)

Total
2.8

Geographical
No geographical or climate constraints exist to replicate the project

3

Technological
The technology is easy to replicate on any island with EV facilities

2

Legal
The project has no legal barriers

3

Social acceptance
The project can achieve high levels of social acceptance since it benefits the community

3

Funding raising/ investment actractivity
The project is very attractive to investors

3

The selected technology is considered a mature solution since similar systems have been widely implemented on other islands. In the case of Tilos, a PV system operates through a net-metering scheme which provides power to the island's three EV- charging stations. Thus, the technological replicability potential of the project, is high.

Another important factor that increases the replicability potential of the project is the fact that the local community has welcomed the efforts made to electrify Tilos' mobility sector. A part of the municipal public transport fleet is electrified and covers the transportation needs of the local population (by operating an E-bus) during winter and summer periods, resulting a high level of social acceptance, as the project is beneficial for both residents and tourists. Overall, the project is social in character, reflected in the many benefits to the local community. Apart from operating the E-bus, the surplus energy from the PV installation is also used for other social purposes. It provides electricity to the street lighting facilities of a central pedestrian street in Livadia (a central residential area around the port of Tilos) and also covers the energy needs of the municipal building on whose rooftop it is placed.

Another important factor is that one of the three charging stations is housed in an information kiosk located in Livadia. The aim of the information kiosk is to keep both locals and tourists informed on the island's energy transition progress, further promoting the project's social character. By giving both locals and tourists access to the information kiosk, encourages participation in the project, while also increasing replicability.

Developing a complete toolkit to create PV portfolios in NIIs in Greece will also increase the project's replicability on other islands. The solution could be made highly attractive to investors, ensuring that the project is highly replicable, by clarifying procedures, integrating the lessons learned and developing the appropriate regulatory and financial documentation to secure the necessary funds. This can be adjusted depending on the needs of each power system.

NESOI

BEST-CT Boosting Energy Sustainability in Transport for Catania

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Conceptual design

Beneficiary/ies
Azienda Metropolitana Trasporti e Sosta Catania S.P.A (AMTS CATANIA)

Geographical area
Eastern Mediterranean
SICIlY, ITALY

Area of Intervention
Implementing sustainable mobility solutions

Financial Leverage Factor
102

Technical Assistance Menu
Feasibility Study

Mobilized investment
€15,800,000

SHORT PROJECT DESCRIPTION

The study aims to assess the technical feasibility of electrifying 5 public transport routes currently operating in the City of Catania; the selected bus services are 421, 448, BRT1, 504M, 602.

There are currently 21 diesel-powered buses operating on these routes: Routes 421 and BRT1 are operated with 12-metre-long vehicles, routes 448, 504M and 602 with 8-9 metre long-vehicles.

Electric vehicles are subject to lower mileage than typical diesel vehicles, which often means using more vehicles for the same service. Therefore, in order to determine the minimum rate of substituting combustion vehicles with electric vehicles, and based on the characteristics of the routes described above, the operations of the 5 routes were simulated using a methodology with two operational phases:

1) Calculating the average consumption of each line

2) Simulating the operations of each individual route, assuming the use of vehicles equipped with standard batteries (340 kWh for 12-metre vehicles and 160 kWh for 9-metre vehicles), which are recharged in the depot using special charging stations

WHY IS NESOI SUPPORTING THIS PROJECT?

Nesoi support was sought for a feasibility study. This project was mainly delivered via the technological development process, identifying an overall suitable solution, defining a feasibility scenario, identifying funding and financing both public and private options and ensuring that the proposed scheme complies with both the local and national legal and regulatory framework.

NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Assessing existing procurement options (e.g. tender, PPP, etc.)

Defining the required environmental regulatory procedures

AT TECHNICAL LEVEL

Assessing the key project design drivers

Identifying suitable technological options given existing project design requirements

AT FINANCIAL LEVEL

Performing financial modelling and identifying target scenario

Sourcing financing/funding options

PRELIMINARY STUDY

- Feasibility study
- Legal technical

NESOI SUPPORT

DESIGN

TENDER

FUNDED AND COMPLETE

RRL

Points (0=min, 3=max)

Total 2.8

Geographical	There is no geographical and climate constraints for the replication of the project	3
Technological	The technology is easy to replicate on every island	2
Legal	The project has no legal barriers	3
Social acceptance	The project has a high social acceptance since it benefits the whole community	3
Funding raising/ investment actractivity	The project is highly attractive for investors	3

Other cities (as well as smaller islands) across Europe face similar needs when rethinking their public transport system if they are to be more sustainable and carbon neutral. The proposed technology can be accepted by the communities on other islands as well as bigger cities on the mainland.

NESOI

Island of Krk SECAP for all

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Local action group Kvarner Islands

Geographical area
Eastern Mediterranean
KRK CROATIA

Area of Intervention
Energy generation from renewable sources, Implementing sustainable mobility solutions

Financial Leverage Factor
2,549.34

Technical Assistance Menu
Preparing Planning Docs

Mobilized investment
€38,000,000

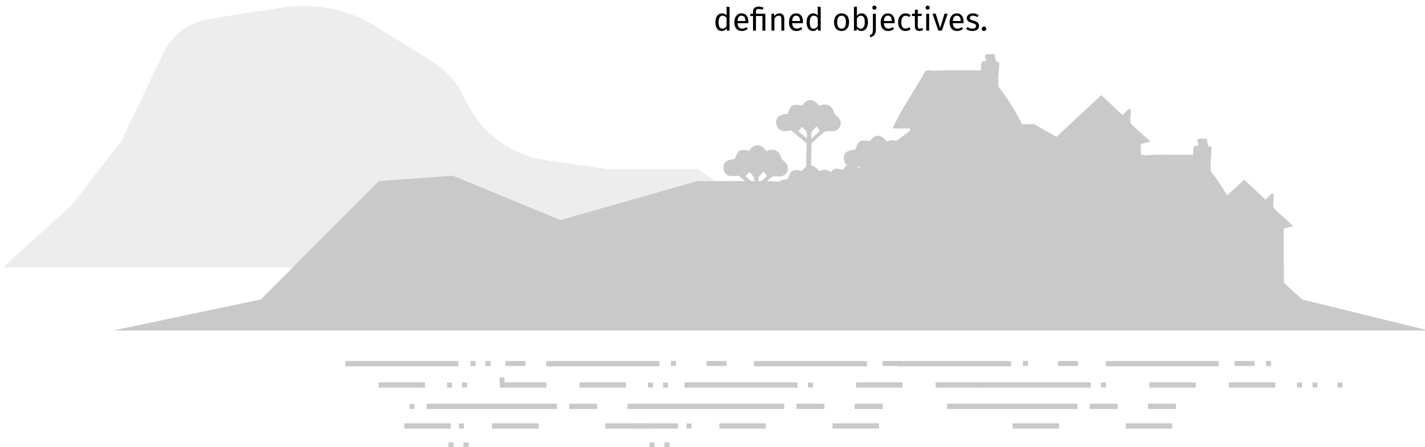
SHORT PROJECT DESCRIPTION

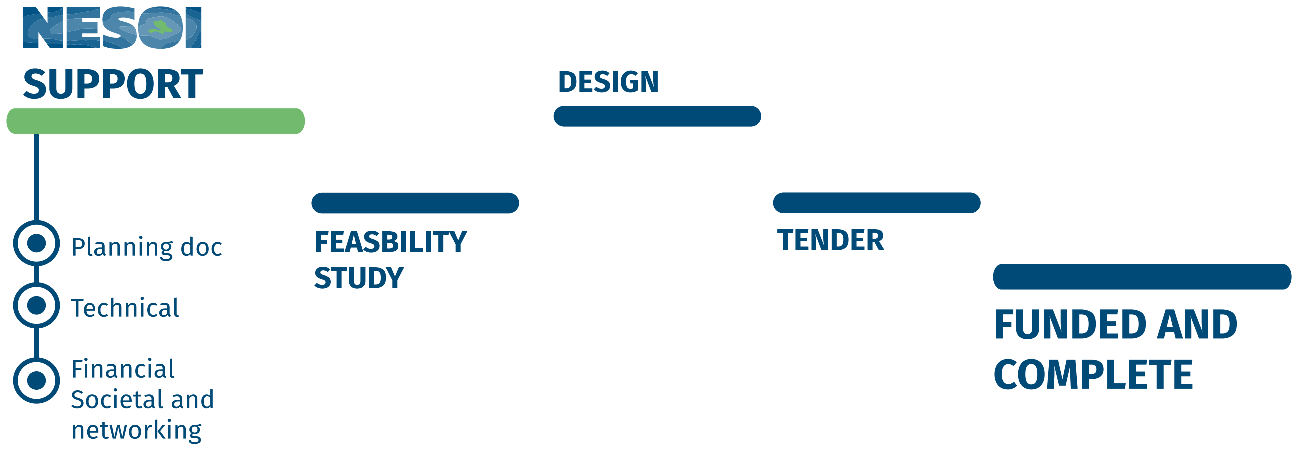
The project consists of developing high-level planning activities, including the writing a strategic planning document (SECAP) for the island of Krk, which has seven municipalities. Krk is the largest and most populated island in the Adriatic, with pronounced seasonality and pressures on the ecosystem.

The aim is to establish a centre on the island that will provide information on renewables, energy efficiency, buildings, transport, tips on water saving and drainage, which will serve as a national centre for energy transition.

WHY IS NESOI SUPPORTING THIS PROJECT?

Part of SEAP for Krk already exists. Other municipalities have no strategic document related to climate change. The SECAP developed under NESOI vehicle includes (i) Socio-economic, local governmental and environmental analyses, (ii) Defining the Local Authority's energy balance of demand and emissions and drafting the Basic Emissions Inventory, (iii) Analysing the local RES potential and local Heating and cooling demand via in-house tools, (iv) Conducting a Climate Change risk analysis and vulnerability assessment, (v) defining short, medium and long-term objectives and (vi) Identifying measures to reach the defined objectives.





NESOI Assistance: tailored solutions provided

AT TECHNICAL LEVEL

- Socio-economic, local governmental and environmental analysis
- Defining the Local Authority's energy balance of demand and emissions and drafting the Basic Emissions Inventory
- Analysing the local RES potential and of local Heating and cooling demand via in-house tools
- Conducting climate change risk analysis and vulnerability assessment
- Analysing and mapping various planning tools for techno-economic modelling (TEM)
- Identifying measures to reach the defined objectives
- Implementing an action plan and monitoring system, assigning responsibilities for their implementation

AT FINANCIAL LEVEL

- Mapping the main financial instruments available to finance the identified actions
- Implementing an action plan and monitoring system, assigning responsibilities for their implementation

AT SOCIETAL & NETWORKING LEVEL

- Communicating and disseminating the results

RRL

Points (0=min, 3=max)

Total
2.8

Geographical
The island does not need a specific climate or morphology to replicate this project

3

Technological
The technology used in the project is easy to replicate on every island

3

Legal
The project has no legal limitations

2

Social acceptance
The project is beneficial for the community, and thus has a high social acceptance

3

Funding raising/ investment actractivity
The project is highly attractive to investors

3

The project Z-129 "Island of Krk SECAP for all" has been assessed as having a high replicability and operational potential, with a score of 2.8/3. The project is based on proven technology, since it considers the pronounced seasonality of the island and the project's pressure on the ecosystem. This Joint SECAP for the Island of Krk identifies a total of 21 mitigation actions and measures and 25 climate change adaptation actions that should be implemented from 2022 to 2030.

The island has no specific geographical characteristics that would give it an advantage over other islands when deploying the technologies proposed in the SECAP. The island is located in the northern Adriatic, in the zone of moderate and mild Mediterranean climate. Its total land area is 405,8 km². The average summer temperature is 23oC and the average sea temperature in June-September is 20oC. The island enjoys 2,500 hours of sunshine in a year.

SACAP for the island Krk proposes implementing known technologies, including solar PV and wind power plants, solar thermal power plants and electric vehicles and vessels across the sectors of (i) buildings, equipment and facilities, (ii) public lighting and (iii) public transport. All technologies are easy to replicate on other islands/elsewhere.

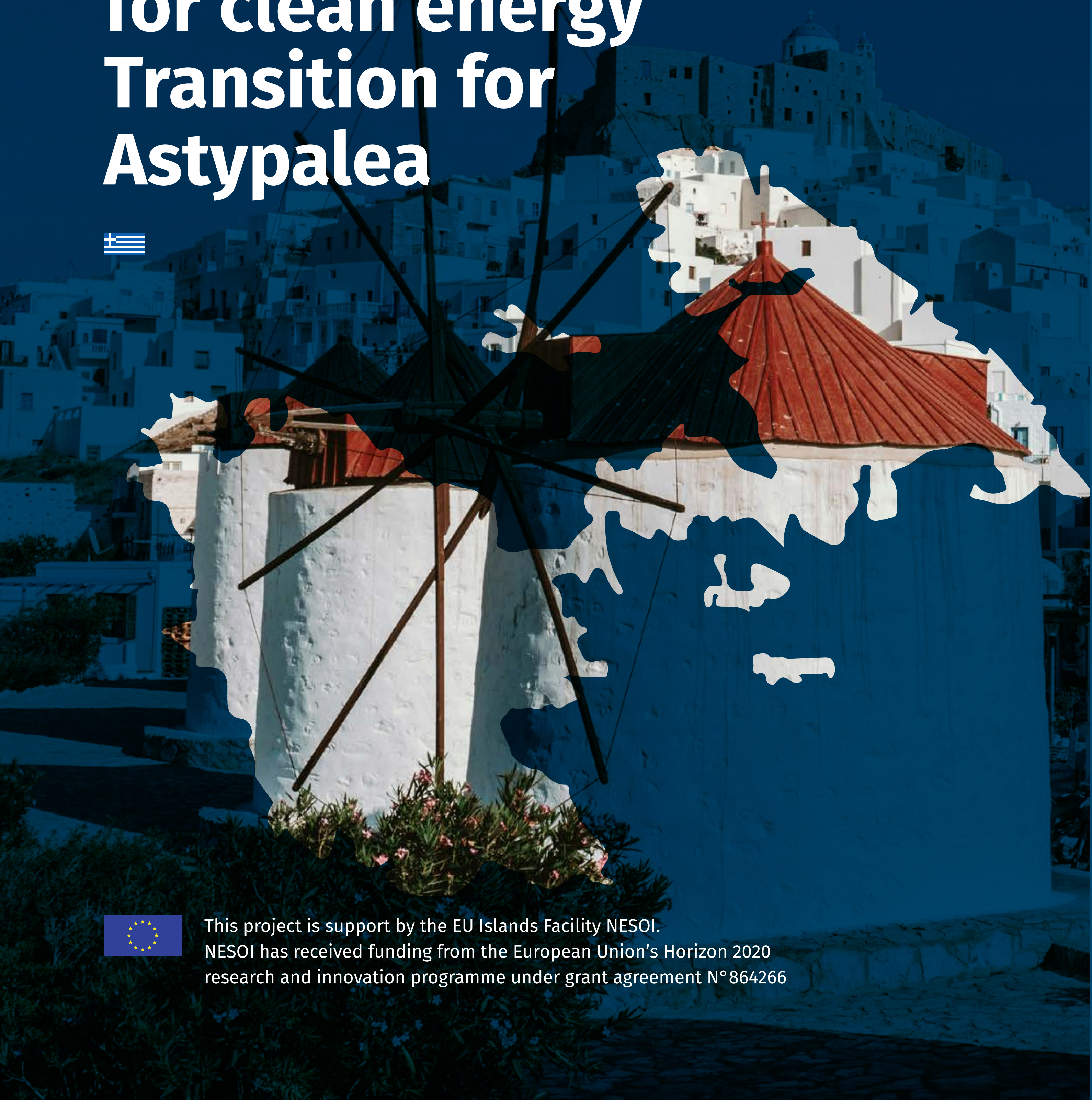
From the legal perspective, SECAP can be prepared and implemented anywhere. However, given that this strategic document is not mandatory, it might not be very attractive in every location. Also, in implementing the project on Krk, seven municipalities will be included. For this reason, additional aggravating circumstances may arise, due to it being implemented at multiple locations, a factor we do not anticipate as problematic in other locations.

The social component of replication scores the highest points, given that all technologies proposed in the document are welcome and attractive both to the public sector and inhabitants of Krk (and we assume elsewhere as well). For example, solar PV systems to be installed on the roofs of public and private buildings will reduce energy consumption and the price that responsible people pay for the energy used; the new public lighting system has remote control and monitoring, which will significantly reduce maintenance costs and increase flexibility; modern quiet vehicles with alternative fuels (electricity, natural gas, etc.) will bring more comfort to public transport passengers; the new car-pooling system will enable those without their own car to experience the flexibility and comfort of a private car.

Finally, we do not anticipate major deviations in terms of project financing in Croatia compared to other countries.

NESOI

Energy Planning for clean energy Transition for Astypalea



This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Municipality of Astypalea

Geographical area
Eastern Mediterranean
ASTIPALAIA, GREECE

Area of Intervention
Generating energy from renewable sources

Financial Leverage Factor
€45M

Technical Assistance Menu
Planning Docs

Mobilized investment
€203,946,938

SHORT PROJECT DESCRIPTION

Astypalea has a semi-mountainous terrain, and a greater part of its land is listed under Natura 2000. The project consists of developing a Clean Energy Transition Agenda (CETA) a high-level energy planning document mandated by the Clean Energy for EU Islands (CE4EUI) initiative; and a Sustainable Urban and Island Mobility Plan (SUIMP). In 2020, Astypalea signed a breakthrough project to fully electrify its transport system and achieve full decarbonisation by 2050.

WHY IS NESOI SUPPORTING THIS PROJECT?

The requested support was to create a CETA project with technical, financial support.

NESOI SUPPORT
- Planning doc
- Legal Technical
- Financial Societal and networking

FEASBILITY STUDY

DESIGN

TENDER

FUNDED AND COMPLETE

NESOI Assistance: tailored solutions provided

AT TECHNICAL LEVEL

Analysing socio-economic, local government area and environmental aspects

Defining the energy balance of the Local Authority's demand and emissions and drafting the Basic Emissions Inventory

Analysing the local RES potential and of local Heating and cooling demand via in-house tools

Conducting a climate change risk analysis and vulnerability assessment

Identifying measures to reach the defined objectives

Implementing action plan and monitoring system, assigning responsibilities for its implementation

AT FINANCIAL LEVEL

Mapping the main financial instruments available to finance the identified actions

Implementing action plan and monitoring system, assigning responsibilities for its implementation

AT SOCIETAL & NETWORKING LEVEL

Communicating and disseminating the results

RRL

Points (0=min, 3=max)

***Total* 2.8**

Geographical
The island needs no specific climate or morphology to replicate this project

3

Technological
The technology is easy to replicate on every island

3

Legal
The project has no legal barriers

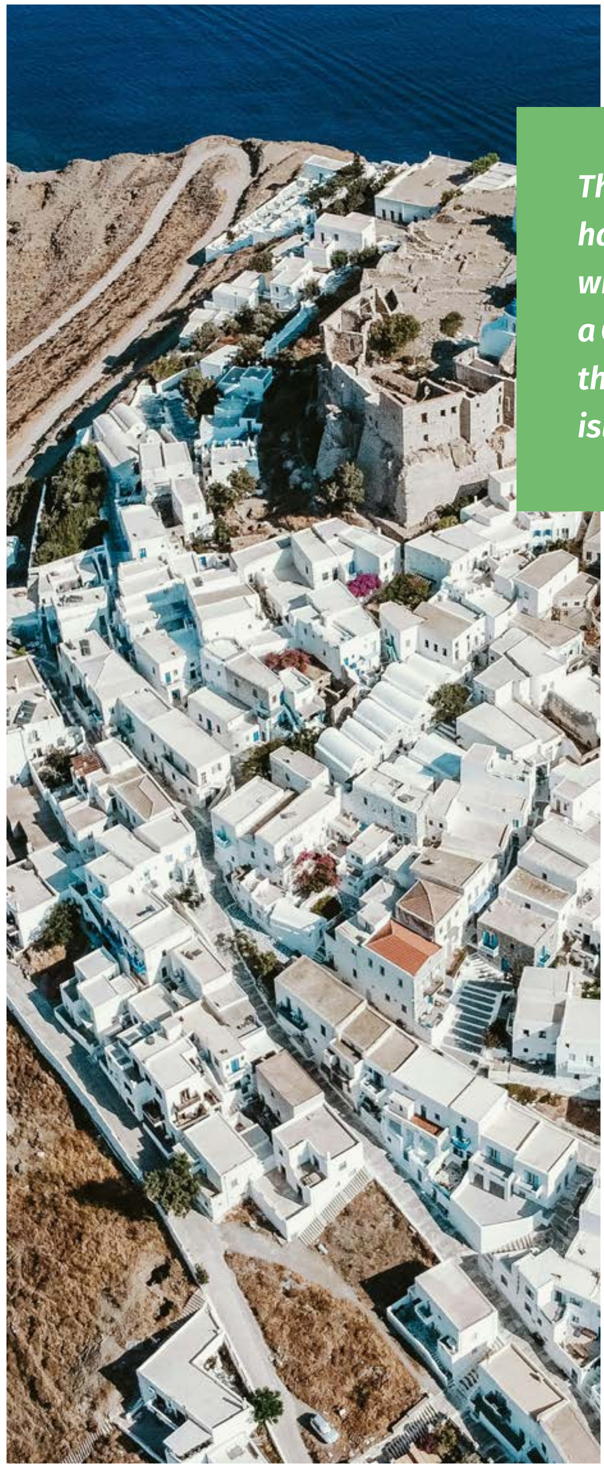
3

Social acceptance
The project has a high social acceptance since it benefits the community

3

Funding raising/ investment actractivity
The cost of the investment is very high with a low ROI

2



The Z-247 ENERRAS project has been assessed as having a high replicability and operational potential, with a score of 2.8/3. The project involves developing a CETA and a SUMP (Sustainable Urban Mobility Plan), that has been slightly modified for deployment in an island environment.

These are both energy planning documents that can -and maybe should- be applied to every island, irrespective of their morphology. There are no legal barriers when developing energy planning documents; however, the proposed projects should consider the relevant legislative framework. Social acceptance is expected to be high since developing energy planning documents automatically requires the participation of the local community. The investment cost is expected to be high but investment attractivity remains to be determined.

NESOI

Development of Consistent Key strategy of the Strait port system

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Autorità di Sistema Portuale dello Stretto di Messina

Geographical area
Western Mediterranean
SICILY, ITALY

Area of Intervention
Energy auditing and analysis, Energy planning

Financial Leverage Factor
1,060.0

Technical Assistance Menu
Planning Docs

Mobilized investment
128,384,000

SHORT PROJECT DESCRIPTION

The objective of the Project was to draft the Environmental-Energy Planning Document of Port Systems (DEASP) for the ports of Messina, Milazzo and Tremestieri, in Sicily, owned by the Port Authority of the Strait of Messina (AdSP). The obligation to draft a DEASP was introduced by Legislative Decree 169/2016. It concerns each Italian Port Authority, in accordance with the guidelines published by the Ministry of the Ecological Transition. Since the Port Authority also owns the ports of Reggio Calabria and Villa San Giovanni (located in Calabria on the Italian mainland), the DEASP also includes sections focused on these ports, but these sections were drafted by the Port Authority using its own funds and not with NESOI's technical assistance.

The DEASP defines strategic guidelines for implementing energy transition measures, in order to improve energy efficiency, promote the use of renewable energy in the port area and introduce measures that will deliver environmental benefits for the citizens of neighbouring regions as well as for the port users.

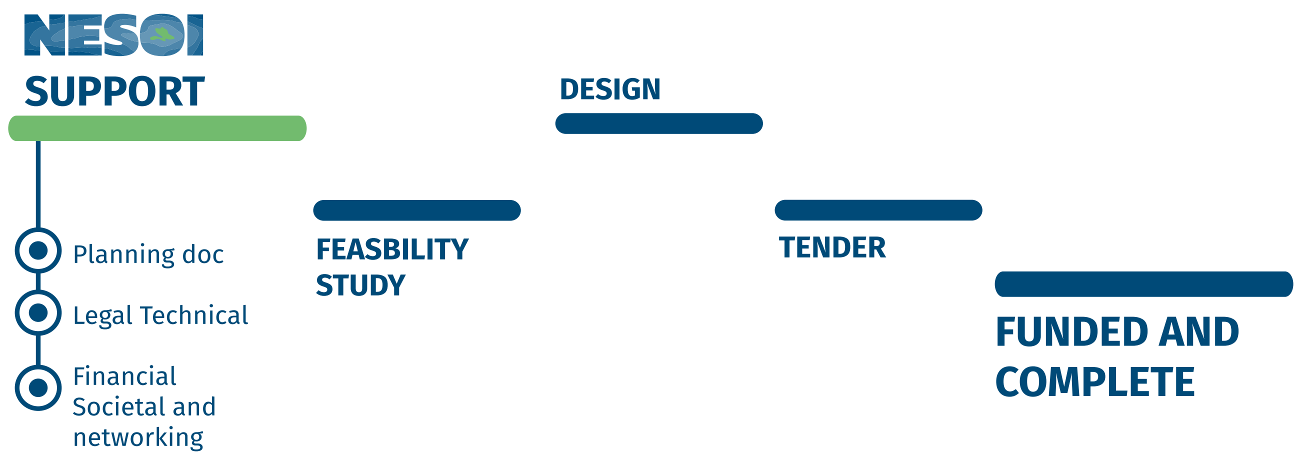
Depending on the envisaged objectives and measures, it is expected to reduce the primary energy demand by 30 GWh/y and avoid 24.373 tCO_2e/y in GHG emissions (corresponding to 58% of GHG emissions of the ports in 2020– excluding the refinery and the thermal power plant in Milazzo). The positive impacts expected from its implementation will also affect other areas such as air quality, employment growth, even in related industries and a higher share of renewable energy, particularly photovoltaic and tidal energy.

The investments connected with these measures can be estimated at approximately €130 million for construction work already financed and at various stages of completion, in addition to €60 million covering work for which government loans have already been requested. Out of this total amount, the envisaged investments are: €90 million for constructing the LNG platform (POT 2020-2022, approved on 07/08/2020), €10 million for operating the tidal power plant, €8.2 million for installing new photovoltaic systems on building roofs and parking canopies, €20 million for cold ironing systems, plus additional investments for enhancing the energy efficiency of buildings, public lighting and for new electric vehicles and associated charging infrastructure.

WHY IS NESOI SUPPORTING THIS PROJECT?

The project was implemented as a collaboration between local consultants and NESOI's programme partners who offered technical and financial expertise. The Port Authority has entered into further Grant Agreements with local consultants (University of Reggio Calabria, ENEA and CNR-ITAE).

The support was conducted by analysing the baseline situation of the ports in terms of socio-economic and environmental context, infrastructure, assets, traffic, and from analysing and mapping regional, national and European planning tools in order to ensure consistency across planning actions within the current framework.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Analysing local, regional, national, and European regulatory context

Conducting the analysis in line with the guidelines of the Italian Ministry for Ecological Transition

AT TECHNICAL LEVEL

Assessing energy balance and carbon footprint of the ports

Conducting high-level climate change risk assessment

Identifying and studying potential energy transition measures (energy efficiency of buildings and public lighting, electric vehicles, LNG storage and supply to vessels, renewable energy generation – PV and tidal power, etc.)

AT FINANCIAL LEVEL

Conducting high-level cost-benefit analysis

Identifying potential funding options

AT SOCIETAL & NETWORKING LEVEL

The activities of the D.O.C.K.S. project was presented by the of the Port Authority's CEO at the "Green Salina Energy Days" event on 9 September 2021, Port&Shippingtech2021 on 7 October 2021 in Genoa, and at several seminars as well as many press releases.

RRL

Points (0=min, 3=max)

Total 2.4

Geographical — 3

There is no replication constraint for the project since every island has a port

Technological — 3

Most of the technologies included in the energy plan have a high replicability in different contexts

Legal — 2

In Italy port energy plans are now mandatory, but this is not the same across the entire EU, thus the replicability is slightly lower. In any case, if it is mandatory, as in Italy, it will be a driver for the project. Where there are no legal barriers, it would be a voluntary process.

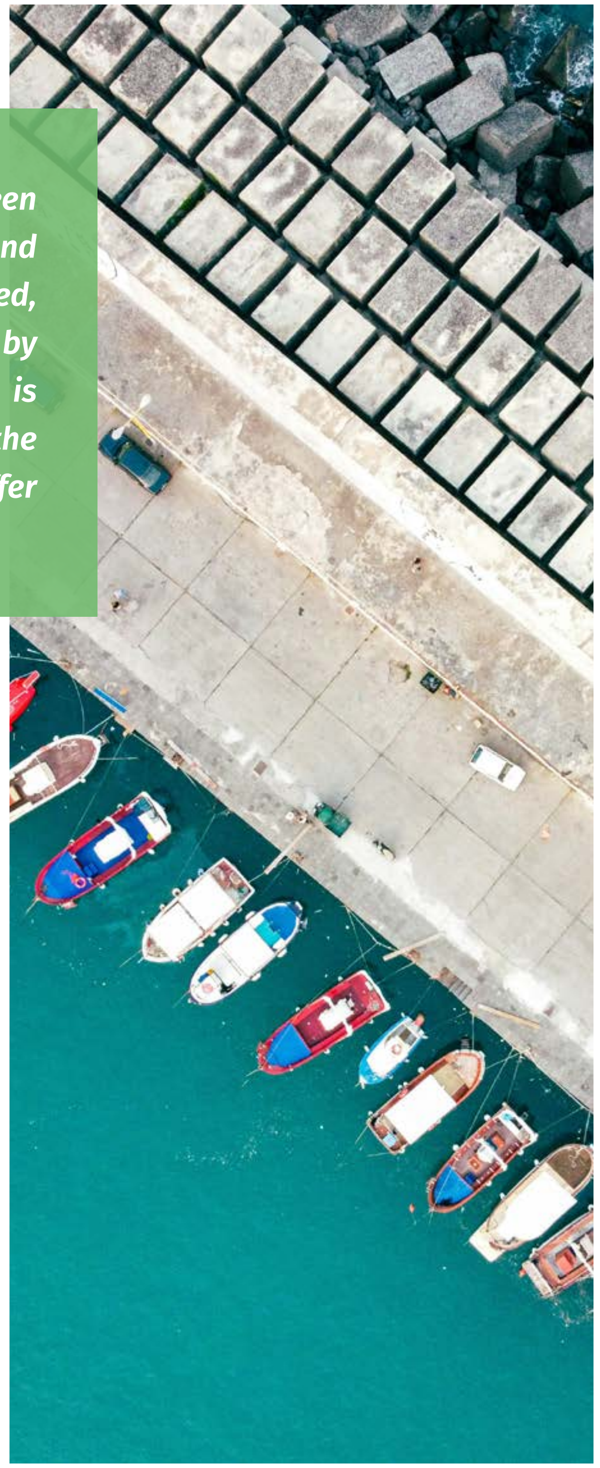
Social acceptance — 2

The project can have a high social acceptance since it benefits the community, there may be different levels of social acceptance, depending on the specific technologies selected to achieve decarbonisation

Funding raising/ investment actractivity — 2

Port authorities are generally able to call on significant investments through public and private fund streams, but if in different contexts the situation is different and there is no obligation to develop port-level energy plans, the replicability potential could be lower.

The Z-156 Port-level energy planning project has been assessed as having a moderately high replicability and operational potential, with a score of 2.4/3. Indeed, the project builds upon a methodology developed by the Italian Ministry for Ecological Transition that is applicable to all ports, whether on islands or on the mainland, with technological features that may differ from port to port depending on local conditions.



This means that replicability is very high from a geographical and technological perspective since no barrier has been identified under these categories. On the other hand, the replicability potential is moderate for legal, social acceptance and investment attractivity: indeed, on one hand the absence of an obligation to carry out port-level energy plans could prevent the replication and the funding of the project, while on the other hand the specific technologies selected for port decarbonisation could have different levels of social acceptance.

NESOI

Hydroelectric Pumping Storage

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Sasso srl

Geographical area
Western Mediterranean
CARLOFORTE, SARDINIA - ITALY

Area of Intervention
Generating energy from renewable sources

Financial Leverage Factor
22.73

Technical Assistance Menu
Feasibility Study

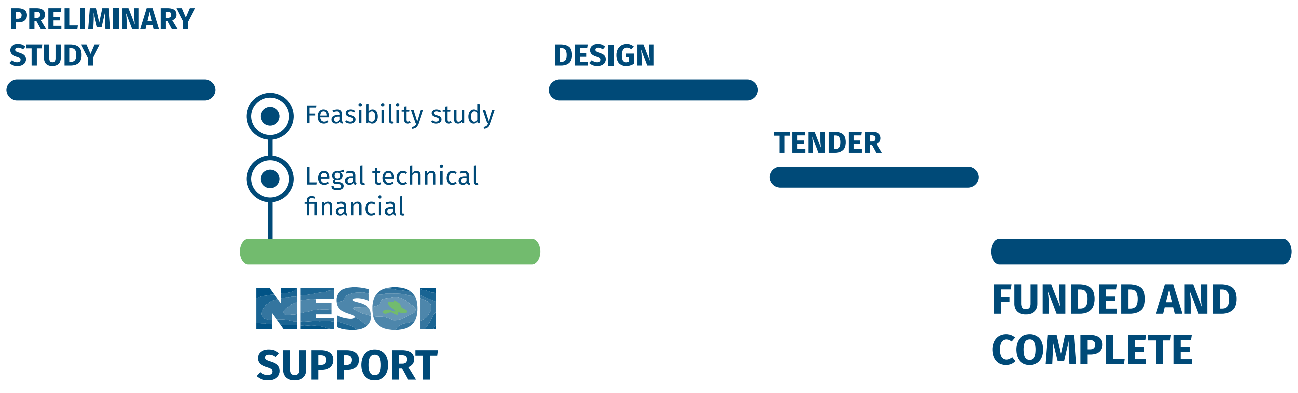
Mobilized investment
€7.440.000

SHORT PROJECT DESCRIPTION

The project consists of a feasibility study for integrating a micro-hydro power plant on San Pietro Island (municipality of Carloforte). As the island includes an energy community of about 30 homes with rooftop PV arrays, the objective is to use the excess PV power to drive pumps and store sea water in a (pre-constructed) upper reservoir. Including more energy sources (such as wind turbines) will be considered when designing the optimal hydro power plant to guarantee further development.

WHY IS NESOI SUPPORTING THIS PROJECT?

NESOI's support was sought for a feasibility study since the hydroelectric solution to be designed is complex and rare in the local context. The assistance provided was for the technological development process, identifying an overall suitable solution, defining a feasibility scenario, sourcing both public and private funding and financing options, and guaranteeing that this project complies with the local and national legal and regulatory framework.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Identifying the necessary permits/ authorisations and support to implement the project

Identifying regulatory framework, barriers and developing a clear action plan to address legal constraints and facilitate its implementation

Obtaining product and technology certification

AT TECHNICAL LEVEL

Designing the electromechanical components and penstock

Estimating costs for the structures

Assessing maximum stored energy & energy produced by the turbine

Estimating additional RES power available or needing to be installed

Conducting a specific technical feasibility study (covering inspections, measurements, field tests and dynamic simulations in the laboratory)

AT FINANCIAL LEVEL

Public-Private Partership (PPP) was established between Sasso Srl and Comune di Carloforte to co-finance the project.

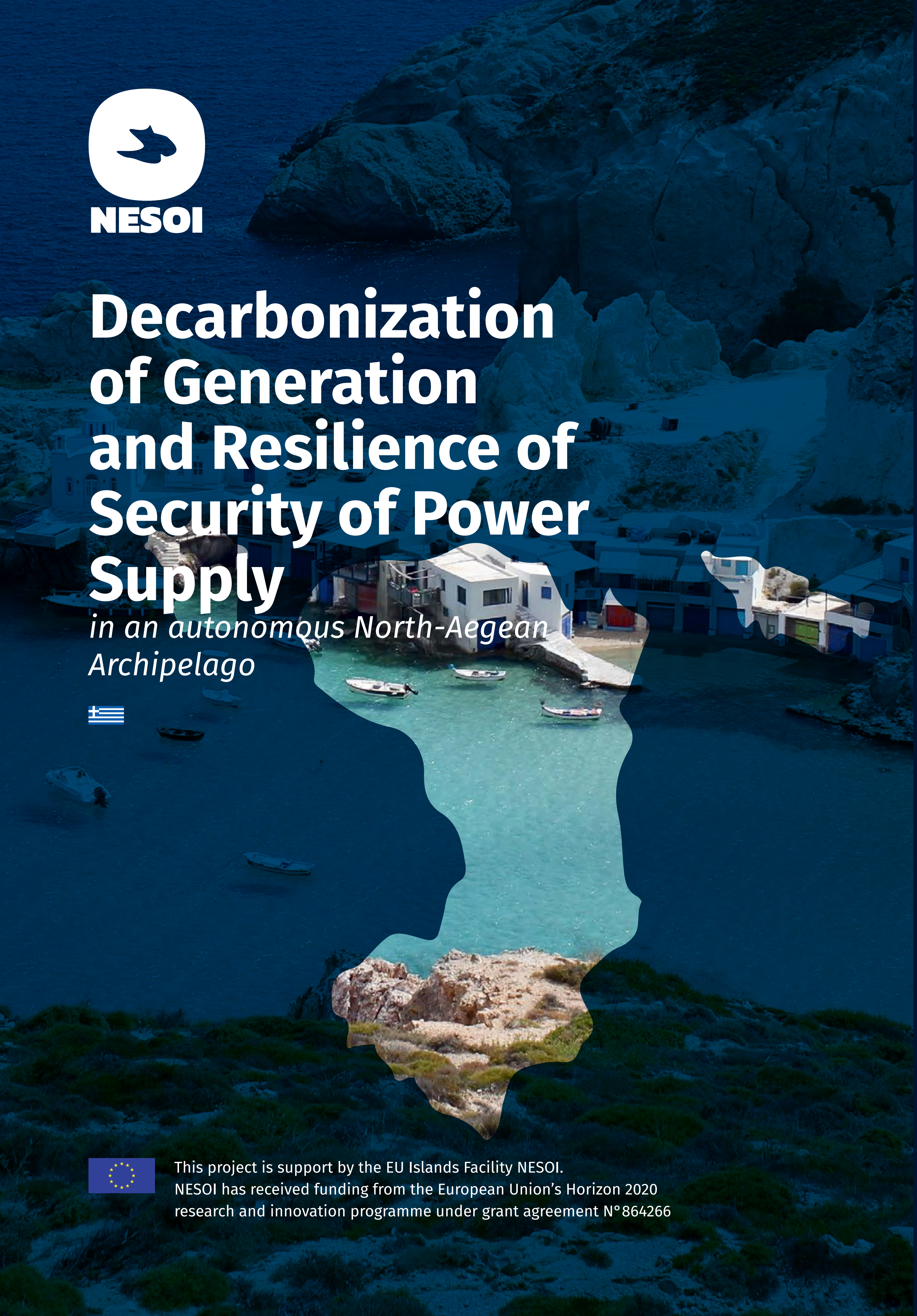
RRL

Points (0=min, 3=max)

Total 2.6

Geographical	The island needs higher cliffs to meet this criterium	2
Technological	The technology is easy to replicate on every island	3
Legal	The project has no legal barriers	3
Social acceptance	The project can have a high social acceptance since it benefits the community	3
Funding raising/ investment actractivity	The cost of the investment is very high and has a low ROI	2

The Z-114 Hydroelectric Pumping Storage project has been assessed as having a high replicability and operational potential, with a score of 2.6/3. The project is replicable in sunny and coastal areas where there are exploitable height differences between the cliffs/mountains and the shoreline and will be very effective on islands without a grid. The concept is also replicable in developing countries where electricity grids are not sufficiently developed to store PV energy far from the generation site: if suitable water pools/lakes exist, this type of plant can be an interesting alternative and more sustainable than electrochemical storage systems.



NESOI

Decarbonization of Generation and Resilience of Security of Power Supply

in an autonomous North-Aegean Archipelago

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Conceptual design

Beneficiary/ies
DAFNI, PPC

Geographical area
Eastern Mediterranean
CHIOS, PSARA, OINOUSSES
GREECE

Area of Intervention
Generating power from renewable sources

Financial Leverage Factor
520

Technical Assistance Menu
Feasibility Study

Mobilized investment
€38,713,013

SHORT PROJECT DESCRIPTION

The project consists of 6 sub-projects, jointly implemented in the Chios, Oinousses and Psara island group, which also has a grid that is not interconnected to the mainland (Psara and Oinousses are connected to Chios via submarine cables).

On CHIOS: Installing a BESS within the existing thermal power plant; installing new PV plants; partial replacing fossil diesel with renewable diesel.

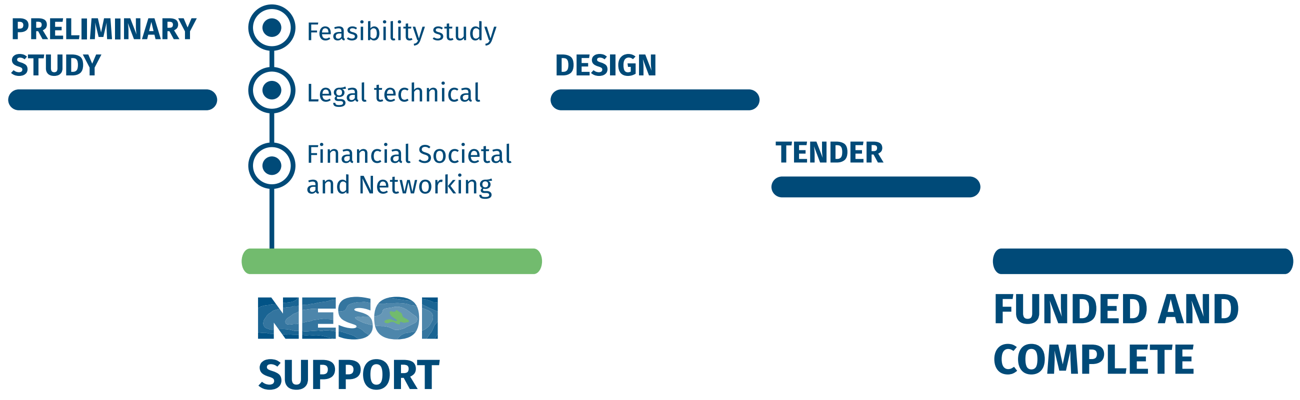
On OINOUSSES: Installing a BESS and new PV plant.

On PSARA: Installing a battery energy storage system on the site of its decommissioned thermal power plant; installing new PV plants.

Moreover, power in now being supplied to 130 energy-poor households by setting up an Energy Community.

WHY IS NESOI SUPPORTING THIS PROJECT?

NESOI support was sought for a feasibility study in view of the complex and innovative approach within the local context. Assistance focussed on the technological development process, identifying a comprehensive, suitable solution, defining a feasibility scenario, sourcing funding and financing options both at public and private level and ensuring that the project complies with both the local and national statutory framework



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Identifying the regulatory framework, barriers and drawing up a clear action plan to address legal constraints and facilitate its implementation

Analysing the authorisation application procedures and contractual framework

AT TECHNICAL LEVEL

Identifying suitable technological options in view of existing project design requirements

Selecting the preferred option and defining the relevant project inputs

Analysing risks and identifying potential mitigation strategies

Assessing existing procurement options

Drawing up an action plan and determining project monitoring procedures

Conducting an environmental impact analysis

AT FINANCIAL LEVEL

Performing a Cost-Benefit and socioeconomic analysis

Running Financial modelling and selecting target scenario

Sourcing financing/funding options

AT SOCIETAL & NETWORKING LEVEL

Providing green and cost-efficient energy solutions for reducing the energy poverty in iChios, Psara and Oinousses

Setting up Energy Communities

Job opportunities created across all phases of the hybrid RES/storage systems deployment

RRL

Points (0=min, 3=max)

Total
2.8

Geographical	The island does not need specific climate or morphology to replicate this project	3
Technological	The technology is easy to replicate on every island	3
Legal	The project has no legal barriers	3
Social acceptance	The project has a high social acceptance since it benefits the community	3
Funding raising/ investment actractivity	The cost of the investment is very high with a low ROI	2

The project has been assessed with a high replicability and exploitation potential, equal to 2,4 and it can be implemented with due adjustments on other Greek and European islands. The concept of distributed storage combined with semi-predictable renewable energy production (PV) can be also replicated in the mainland electrical system in order to provide benefits to the distribution grids through time-shift of PV generation and ancillary services. In addition, the business model of joint project development by PPC and the local authorities could also be examined for similar projects to the benefit of the distribution grids and the local communities.

NESOI

Community-Supported Energy: A Step to Community SOLAR Islands

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Deployment level

Beneficiary/ies
Zadruga NOVI OTOK

Geographical area
Eastern Mediterranean
KORÇULA, CRES-LOSINJ
CROATIA

Area of Intervention
Production of energy from renewable sources

Financial Leverage Factor
87.5

Technical Assistance Menu
Eco-fin

Mobilized investment
€11,083,158

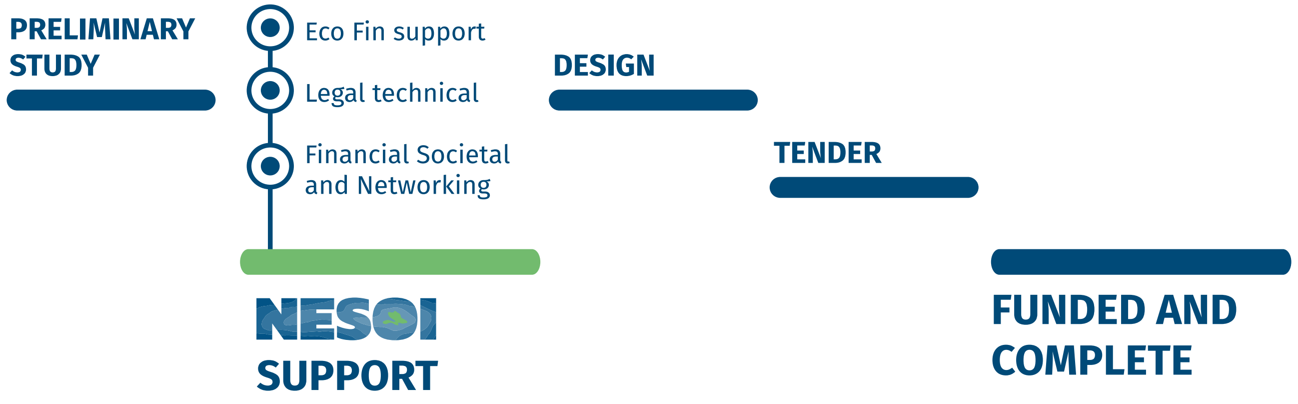
SHORT PROJECT DESCRIPTION

SOLAR Islands is a collaborative initiative undertaken by the local communities on the islands of Korčula, Cres and Lošinj to install a communal solar power plant on each of the above-mentioned archipelagos through a crowd investment model.

The grant was spent on securing the services of local experts to develop a governance model and procedural options for a cooperative in Croatia considering the challenges posed by the COVID pandemic; therefore all work involving multiple co-operative members needed to take place through online meetings – these included specifying a protocol for fund raising schemes based on blockchain technology - detailed financial modelling for Innovative models of funding RES - disseminating and communicating information + Conducting cost benefit analyses and obtaining legal advice on taxes, financial and social security.

WHY IS NESOI SUPPORTING THIS PROJECT?

The beneficiary asked for NESOI legal support and assistance in finalising the model for joint investment in communal solar power plants.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Analysing potential governance and legal structures

Obtaining legal advice on setting up a local community with focus on crowd investing

Ensuring compliance with the applicable national law on taxes, financial and social security

AT TECHNICAL LEVEL

Assessing the existing documentation and studies on: technological options, authorisation application procedures, project design and characteristics

Defining the necessary technical, economic and financial project inputs for the selected project option (assumption book)

Conducting a risk analysis and identifying available mitigation strategies (e.g. procedural, technical, contractual, etc.)

Drawing up action plan and identifying project monitoring procedures

AT FINANCIAL LEVEL

Conducting a Cost Benefit analysis, assessing the socio economic and environmental impact and identifying the preferred option

Carrying out financial modelling and identifying the target scenario

Developing a protocol specifying fundraising schemes based on blockchain technology

Drawing up an action plan and identifying project monitoring procedures

AT SOCIETAL & NETWORKING LEVEL

Disseminating and communicating information and results

RRL

Points (0=min, 3=max)

Total 3

Geographical — 3
The island needs no specific climate or morphology to replicate this project

Technological — 3
The technology used in the project is easy to replicate in every island

Legal — 3
The project has no legal limitations

Social acceptance — 3
The project is beneficial for the community, therefore has a high social acceptance

Funding raising/ investment actractivity — 3
The project is highly attractive to investors

The Z-121 Community-Supported Energy: A Step to Community SOLAR Islands project has been assessed as having a high replicability and operational potential, with a score of 3/3. The project is based on proven technology and includes a crowd investment model, making it open to investment.

Geography: The cooperation between project initiators, especially energy cooperatives, can be implemented irrespective of their geographical location.

Technology: The initiative chosen to develop a solar power plant through a cooperative model was launched with the primary aim of testing this type of financing, since solar power plants are well-established and widely deployed. If this financing model proves successful, it could be used to develop other more innovative technologies.

Legal issues: The procedures for installing a solar power plant and offsetting up an energy cooperative are not specifically tied to the micro location of the project (i.e. island/region). The same regulations apply elsewhere in Croatia. However, certain country-specific barriers may exist in other countries.

Social acceptance: One of the goals of the project was to enable the local communities to recognize the financial viability of the project and feel that they can get involved in developing something new and sustainable forfor the community's benefit. This project got individual people involved, such as those decided to sell their land to facilitate its realisation, or who decided to participate in an energy cooperative by taking a minimum share. In addition, the project specifically cooperated with local self-government units, including the towns of Cres, Mali Lošinj and Korčula. Ultimately, the positive effects of the project can enhance the region/location's positionas energy independent, therefore a high level of social acceptance is anticipated.

Fund raising: The investment's attractiveness is very high, as local stakeholders and citizens are encouraged to join the cooperative and invest in technologies that serve them and the well-being of their region. Investment would increase when the minimum stake for cooperative participation is lower, ensuring accessibility for everyone. The model of financing through cooperatives is unlimited and can be applied anywhere.

Fair Energy Communities FECOS

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level, Deployment level

Beneficiary/ies
Associazione Comunità Energetica di Fondo Saccà
Fondazione di comunità di Messina
Fondazione Horcynus Orca

Geographical area
Western Mediterranean
SICILY + SALINA - ITALY

Area of Intervention
Energy community

Financial Leverage Factor
15.55

Technical Assistance Menu
Feasibility Study, Customised

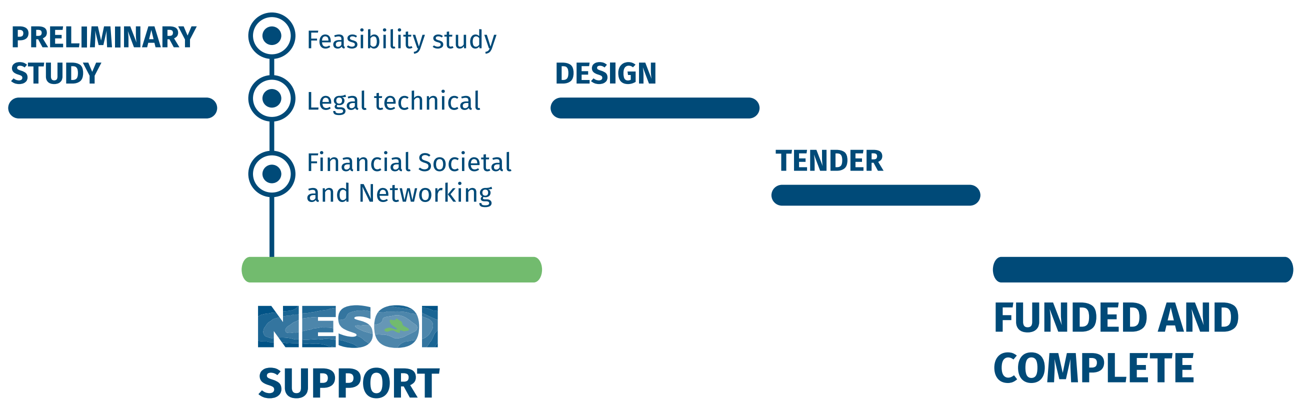
Mobilized investment
1,866,000

SHORT PROJECT DESCRIPTION

The purpose of the project was to finalise the energy community model implemented by the newly formed Energy Community (EC) of Fondo Saccà (project coordinator), located in the Municipality of Messina (Sicily), and replicate it in 3 other Sicilian local authority areas: the Municipalities of Mirabella Imbaccari, Casalvecchio Siculo and on the small island of Salina (Aeolian archipelago). In this case, Mirabella Imbaccari and Salina, the Messina Community Foundation (project partner) owns the buildings in Fondo Saccà, that will be used as the EC centre, after renovation work.

WHY IS NESOI SUPPORTING THIS PROJECT?

NESOI support was requested a feasibility study, mainly focused on developing tender documents for a PV-based portfolio to support hydropower and e-mobility projects, in compliance with the regulatory framework



NESOI Assistance: tailored solutions provided

LEGAL-REGULATORY LEVEL

The external consultant provided a detailed analysis of the legal framework and assessed existing procedural PPP constraints and options

They also defined the targeted call for tenders procedure and guidelines for the PPP contracts: drafting a document with a detailed description of the PPP procedure that a Municipality should follow in order to set up and develop an Energy Community to help energy-poor households, including the templates of the various legal instruments and documents that the Municipality must produce for the same procedure

TECHNICAL LEVEL

Collecting Data: including any invoices for the work on the buildings owned by the partner Fondazione di Comunità di Messina, at the centre of the Energy Communities in Fondo Saccà, Mirabella Imbaccari and Salina,; past power use of all targeted municipalities (Mirabella Imbaccari, Malfa and Casalvecchio Siculo);

Energy audits: all audits of the buildings owned by the partner Fondazione di Comunità di Messina were collected and the energy use analysed for all public buildings in the 3 target municipalities

AT FINANCIAL LEVEL

Defining the book of assumptions: all variables were analysed and included in the final delivery report

Economic and Financial planning: a Business Plan for the Energy Communities was produced for all target municipalities, taking into consideration all the variables

Selecting potential financing options: the main potential financing options were analysed and included in the final report. Some have already been approved and will support the replication efforts in other municipalities

AT SOCIETAL & NETWORKING LEVEL

Preliminary Information Memorandum: a preliminary Business Plan and Information Memorandum was drawn up for each Energy Community in Mirabella Imbaccari, Malfa and Casalvecchio Siculo

Market testing with potential investors: potential investors have been identified. Indeed, the same external consultant, Solidarity & Energy SpA is interested in investing in offsetting up the Energy Communities, given that it is a registered Energy Service Company engaged in several energy efficiency and production initiatives.

RRL

Points (0=min, 3=max)

Total *2.6*

Geographical — 2
Islands of different geographical morphology and climate

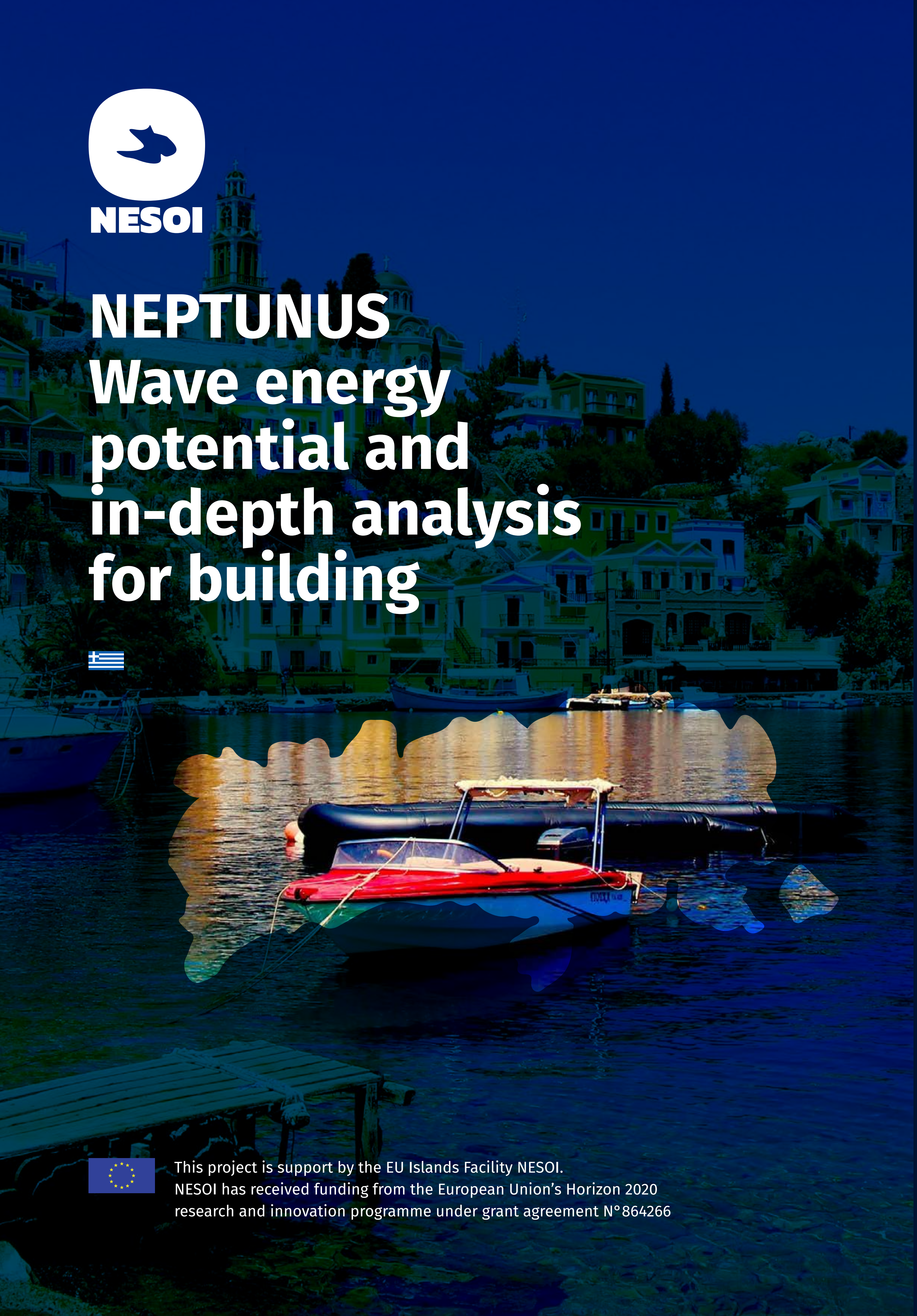
Technological — 3
The technology used in the project is easy to replicate in every island

Legal — 3
The project has no legal limitations

Social acceptance — 3
The project can raise an high social acceptance since it has benefit for the community

Funding raising/ investment actractivity — 2
The project is investable

The project aims to replicate the energy community model implemented in Fondo Saccà in 3 other Sicilian local authority areas: the Municipalities of Mirabella Imbaccari, Casalvecchio Siculo and on the small island of Salina (Aeolian archipelago)



NESOI

NEPTUNUS Wave energy potential and in-depth analysis for building

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Municipality of Halki

Geographical area
Eastern Mediterranean
HALKI, GREECE

Area of Intervention
Energy community

Financial Leverage Factor
18.18

Technical Assistance Menu
Feasibility Study

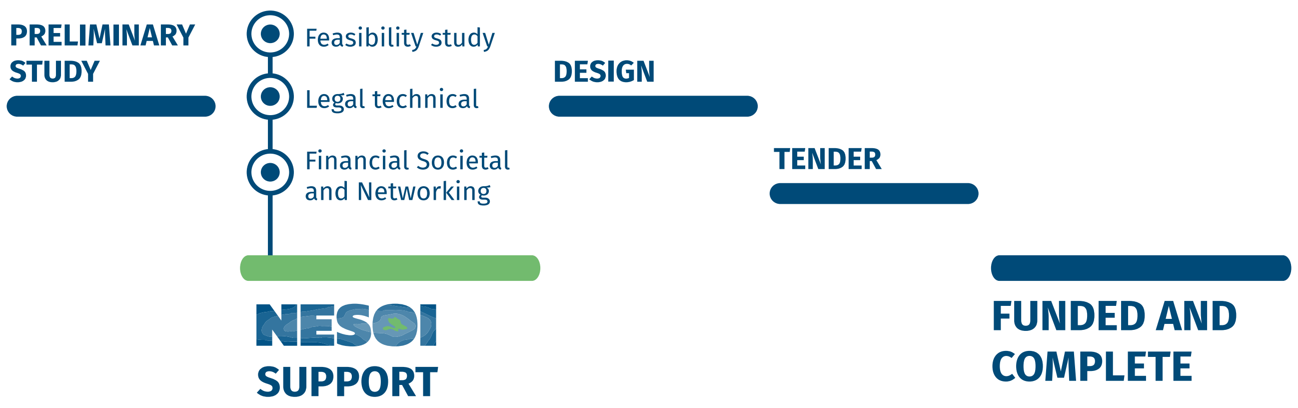
Mobilized investment
€1,000,000

SHORT PROJECT DESCRIPTION

The municipality of Halki set an initial goal of transitioning the island's energy system to a renewable power generation model that will meet or even exceed its energy needs. In line with this objective, the project consists of conducting an in-depth analysis of the wave energy potential, identifying a suitable location for a wave energy power plant and applying for the appropriate permits and authorisations, while ensuring that the local environment and ecosystem remain protected.

WHY IS NESOI SUPPORTING THIS PROJECT?

The project introduces the innovative solution of exploiting wave energy. In this regard, NESOI's support is important for the technological development process, by identifying a comprehensive suitable solution and defining a feasibility scenario, sourcing both public and private funding and financing options and ensuring that the project complies with both the local and national statutory framework



NESOI Assistance: tailored solutions provided

AT TECHNICAL LEVEL

- Defining the required environmental authorisation procedures in view of the identified project options
- Drawing up an action plan and identifying project/process monitoring procedures

AT TECHNICAL LEVEL

- Analysing existing planning documentation, identifying project boundaries and existing planning constraints
- Assessing key project design drivers (e.g. expected users, baselines, energy demand, production, peaks, etc.)
- Identifying suitable technological options given existing project design requirements and constraints (efficiency, power, performance, size and lifetime, cost, etc.)
- Conducting wave study
- Analysing risks and identifying potential mitigation strategies
- Commissioning a civil engineering company to examine the condition of the on-site marine structures and estimate the installation cost of the project on the breakwater

AT FINANCIAL LEVEL

- Performing economic and financial planning and economic- financial feasibility assessment
- Identifying potential financing options
- Conducting a Cost Benefit analysis and socio economic and environmental impact assessment and selecting the preferred option
- Assessing existing procurement options (e.g. tender, PPP, etc.)
- Defining the technical, economic and financial, fiscal project inputs for
- the selected project option (book of assumptions)
- Performing financial modelling and selecting target scenario

AT SOCIETAL & NETWORKING LEVEL

- Enhancing consumer engagement, environmental awareness and community's involvement
- Considering local geographical, socio-economic characteristics and constraints

RRL

Points (0=min, 3=max)

Total
2.8

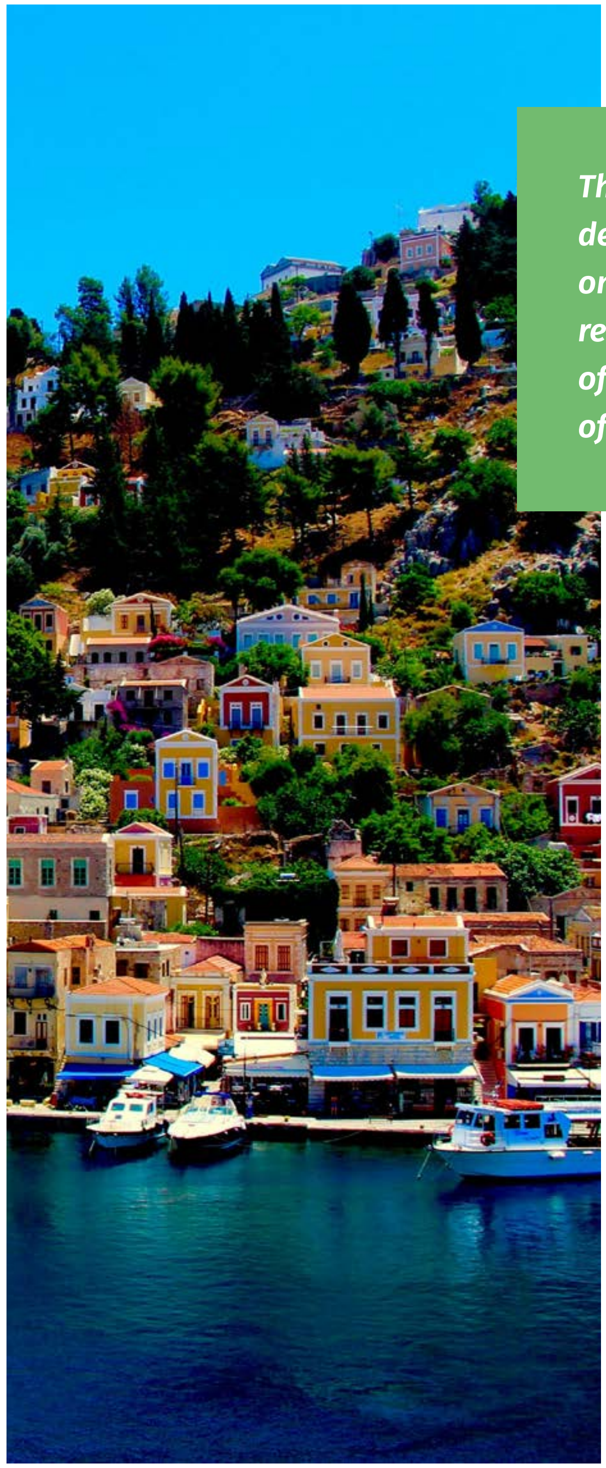
Geographical
Islands with different geographical morphology and climate
2

Technological
The technology is easy to replicate in every island
3

Legal
The project has no legal barriers
3

Social acceptance
The project can have a high social acceptance since it benefits the community
3

Funding raising/ investment actractivity
The project is attractive to investors
2



The project Z-085: wave energy potential and in-depth analysis to build a wave energy power plant on Halki Island was assessed as having a high replicability and operational potential, with a score of 2.6/3. The project concerns the proven technology of wave energy.

However, the solution acknowledges that wave energy is quite an innovative and immature technology. Wave characteristics on other islands of the Aegean archipelagos are similar—if not better. The results of this project demonstrate that no special land or sea conditions, other than waves, are required to replicate the recommended solution. Scalability can also be achieved, in both directions, by simply providing the available length of the WEC (Wave Energy Converter). The proposed system can only be implemented in coastal areas of the mainland. Given the improved grid infrastructure and other resources on the mainland, the proposed system can be replicated at any scale on the mainland's coastline, if wave conditions are favourable.

NESOI

POSIDON Develop feasibility studies to maximize the solar resource,

in a context of smartgrids and local energy communities

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Conceptual design

Beneficiary/ies
Consell Insular de Menorca – CIME

Geographical area
Western Mediterranean
MENORCA, SPAIN

Area of Intervention
Energy community

Financial Leverage Factor
19.80

Technical Assistance Menu
Feasibility Study

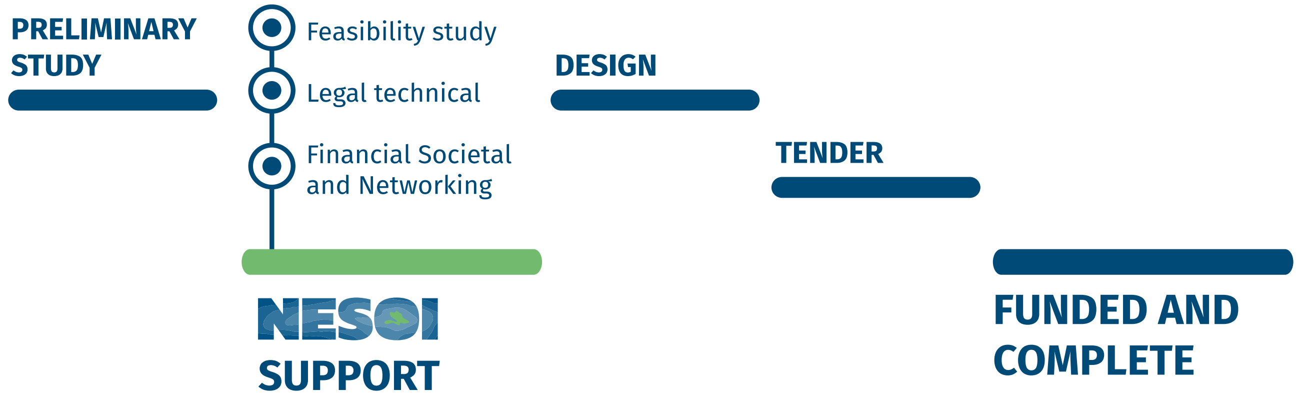
Mobilized investment
€1,187,866.67

SHORT PROJECT DESCRIPTION

The POSIDON project is an initiative promoted by the Consell Insular de Menorca (CIME). The purpose is to analyse the feasibility of developing citizen energy communities in Menorca, by studying existing planning documentation, identifying boundaries and technological options, and performing a cost-benefit analysis including both socio-economic and environmental impact assessments. The POSIDON Project will act as a catalyst to join the energy sector, enabling ICTs and communities to achieve a significant positive environmental impact, contribute to new digital social innovation initiatives (citizens are treated as ‘prosumers’), and help empower citizens.

WHY IS NESOI SUPPORTING THIS PROJECT?

The Menorca 2030 Strategy, which sets the roadmap to decarbonise Menorca’s energy system, focuses on placing citizens at the heart of the energy transition process. The POSIDON project, funded by NESOI, aims to fill in knowledge gaps and fund the development of feasibility studies for 4 different types of energy communities being developed. Aiguasol conducted studies on energy communities in the urban zone of Mahón, and in hotels like Hotel MarSenses. Cinesi's study on island shared mobility in Menorca Island found a potential for electric vehicle communities. A solar PV plant energy community with citizen participation was halted due to grid connection difficulties and legal challenges.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Drafting and defining the legal framework for LEC in tourist areas, while ensuring it adheres to regional and national regulations.

Creating a standardized PPA (Power Purchase Agreement) template to streamline the process of energy transactions within the scope of the project.

Assessing contracting alternatives with the LEC's members

AT TECHNICAL LEVEL

Performing a Technical and economic feasibility analysis of Renewable Energy Communities in Menorca Conducting a Feasibility study for an e-mobility carpooling community in Menorca

Carrying out a Feasibility study for the Trepuconet solar farm. Identifying Methods to boost uptake and citizen engagement

Guidelines and recommendations were prepared for designing and installing a photovoltaic farm, which emphases all the necessary

components and selecting the most suitable type based on local conditions and characteristics.

Drawing up a risks identification and mitigation plan for setting up the LEC.

AT FINANCIAL LEVEL

Performing financial modelling and selecting potential uses

Sourcing funding opportunities and financial instruments

AT SOCIETAL & NETWORKING LEVEL

Communicating and disseminating strategies to engage decision-makers and citizens in shared mobility initiatives

RRL

Points (0=min, 3=max)

Total
2.6

Geographical

Geographical isolation: Problems in sourcing spare parts and/ or carrying out repairs due to long distances, transportation challenges and lack of skilled manpower in the area.

2

Technological

The technology (energy communities based on solar PV energy and shared sustainable mobility) is easy to replicate in every island

3

Legal

No legal framework defining energy communities exists. Today energy communities are mainly defined under the format of endogenous energy use according to Spanish Royal Decrees RD 244/2019 and RD 23/2020.

2

Social acceptance

The governance models and the technical methodology developed during the POSIDON project can be implemented in island environments with similar demographic, economic and social characteristics.

3

Funding raising/ investment actractivity

There is a significant potential for providing financing tools and instruments for energy communities. This need not be a major investment in technology or infrastructure, rather authorities can provide seed funding, a small grant for obtaining advice on legal and planning issues, or for funding feasibility studies and preparing business plans. This will therefore support the initiative until sufficient citizen finance has been raised to sustain it, via a revolving fund. Additionally, public authorities can become members of energy communities themselves, working with citizens and local authorities.

3

The Z-254 POSIDON project has been assessed as having a high replicability and operational potential, with a score of 2.6/3. The project involves setting up four energy communities using on solar PV power and shared sustainable mobility.

This project has potential for replication. The project can be very successful in the European Union since the necessary regulatory framework is in place. However, the technology is innovative, and not very well known. Being able replicate this project and transfer the results of this project to other islands in the European Union and worldwide is crucial. The Consell Insular de Menorca has plans to replicate the feasibility studies supported by POSIDON in other cases. A future step would be to determine where such studies can be replicated.

NESOI

Green Orkney Hydrogen Market Expansion

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
PlusZero Limted

Geographical area
North-East Atlantic
ORKNEY, UK

Area of Intervention
Generating energy from renewable sources, hydrogen

Financial Leverage Factor
0.3416666667

Technical Assistance Menu
Feasibility Study

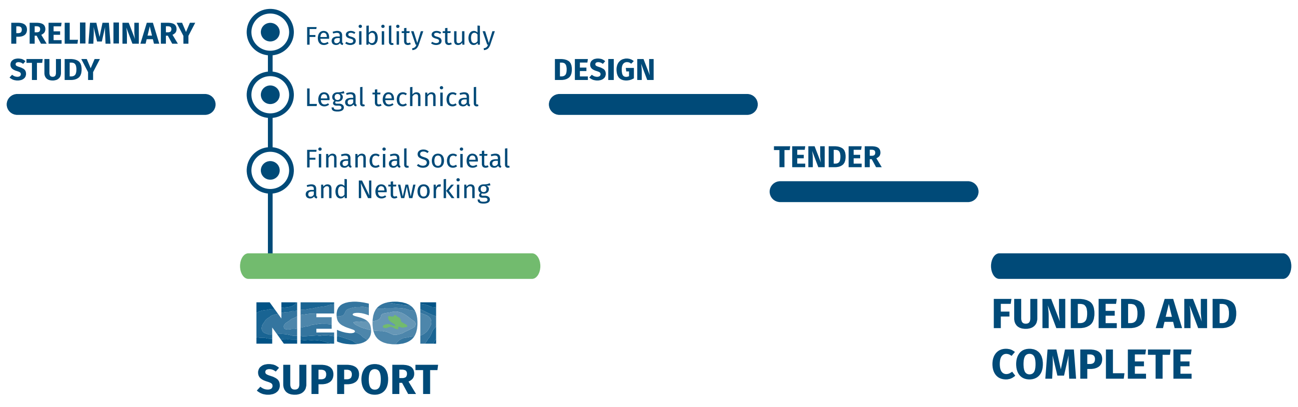
Mobilized investment
€3,170,000

SHORT PROJECT DESCRIPTION

The project consists of a feasibility study that to identify a safe and viable transport logistic solution for transporting green hydrogen gas produced on Orkney to new markets on the mainland and to calculate the positive impact of such a project on Orkney's energy system (e.g. increased economic output from existing assets, opening new investment opportunities), local economic growth and community savings and overall GHG emission reductions.

WHY IS NESOI SUPPORTING THIS PROJECT?

The project objectives aligned well with the available NESOI support under the Feasiblity Study Activity Descriptions. The NESOI technical partners bring both hydrogen technology domain expertise, innovation project development, financing and commercialisation which would be of significant value for the project. If other partners were able to draw from this expertise, this would help strengthen and accelerate feasibility studies and complement the contextualised knowledge and expertise of the identified local partners.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Identifying/reviewing options and risk/ safety/regulatory issues for transporting hydrogen gas from the island to the mainland including ‘virtual pipelines’ (tankers and ferry) and bulk transfer using dedicated vessels, together with associated H^2 bunkering and related operations at ferry terminals and end user sites.

AT TECHNICAL LEVEL

Reviewing existing Orkney hydrogen production assets and evaluate potential production scenarios & model local energy system and economic impacts of increased demand

Reviewing transportation and storage options for moving hydrogen from Orkney to mainland user sites and appraising preferred solution options

Assessing whether customers attach added value/USP to green hydrogen produced in remote island communities, compared to other mainland industrial green, blue or grey hydrogen production

AT FINANCIAL LEVEL

Performing financial modelling and sourcing funding options

AT SOCIETAL & NETWORKING LEVEL

Linking the UK’s most advanced green hydrogen production ecosystem

on Orkney to a high profile early adopters of hydrogen fuel cell

generator technology that have a strong interest in supporting green hydrogen

production (Edinburgh’s International festivals) to significantly raise

awareness of the technology and increase demand for Orkney hydrogen.

Establishing whether potential customers would attach a price premium to green

hydrogen produced in remote island communities, compared to industrially

produced blue or grey hydrogen.

RRL

Points (0=min, 3=max)

***Total* 2.8**

Geographical
Regardless of the scenario, different transport and hydrogen storage solutions can be assessed

3

Technological
The technology is easy to replicate even in long term scenarios

3

Legal
The project has no legal barriers besides RTFO (Road Transport Fuel Obligation compliance)

2

Social acceptance
The project can have a high social acceptance since it benefits for the community

3

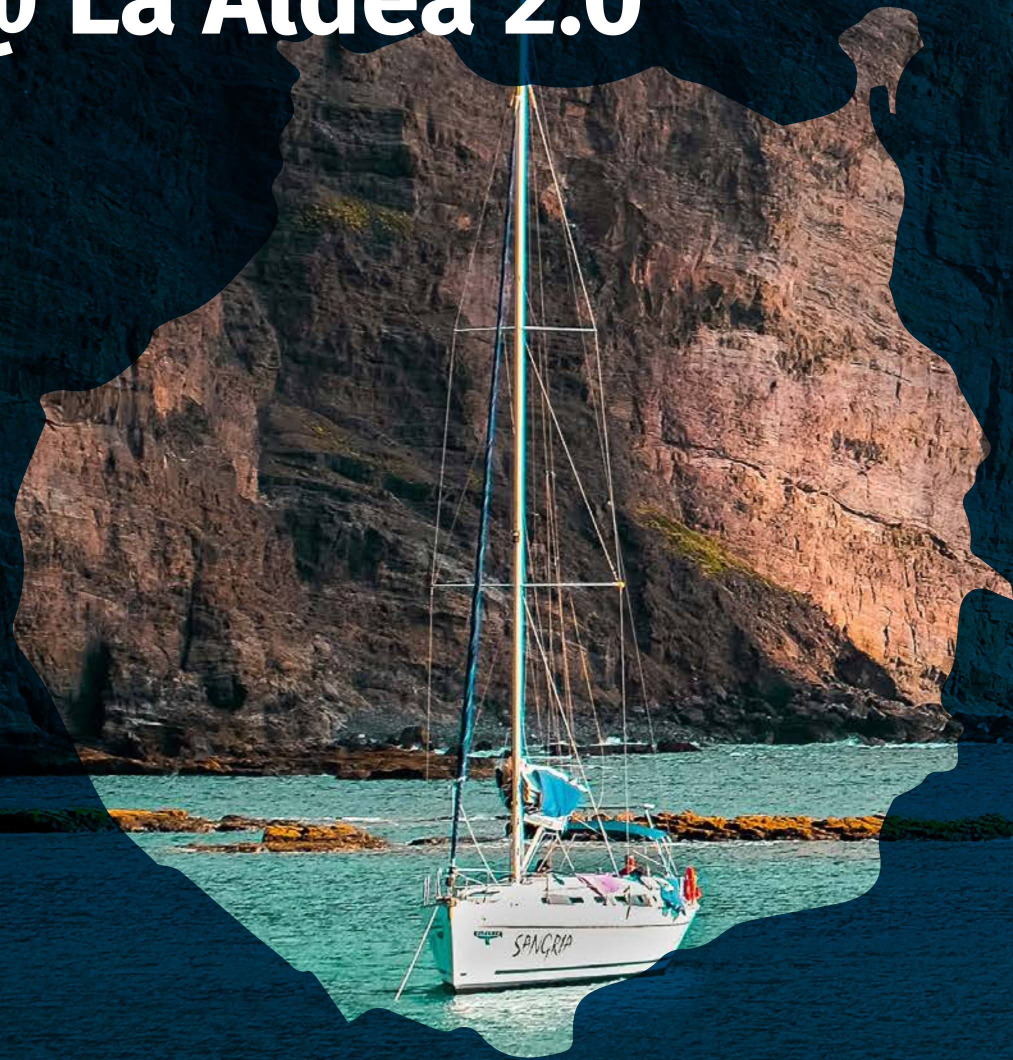
Funding raising/ investment actractivity
Public Sector organisations currently have access to investment support mechanisms for fleet decarbonisation which will help create RTFO compliant transport demand use cases in the public sector

2

The Z-175 Green Orkney Hydrogen Market Expansion project has been assessed as having a high replicability and exploitation potential, equal to 2.8/3. The project is based on proven hydrogen transport and storage technologies, but the solution considers various scenarios, including distance, route and hydrogen volume transported. The project concept can be applied to any island by adapting the technological choices to the local context.

NESOI

REAL 2.0 REMOTE @ La Aldea 2.0



This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Politecnico di Torino

Geographical area
Western Mediterranean
GRAN CANARIA, SPAIN

Area of Intervention
Generating energy from renewable sources, Implementing sustainable mobility solutions and energy

Financial Leverage Factor
18.52

Technical Assistance Menu
Economic & Financial modelling and fund matching

Mobilized investment
€1,000,000

SHORT PROJECT DESCRIPTION

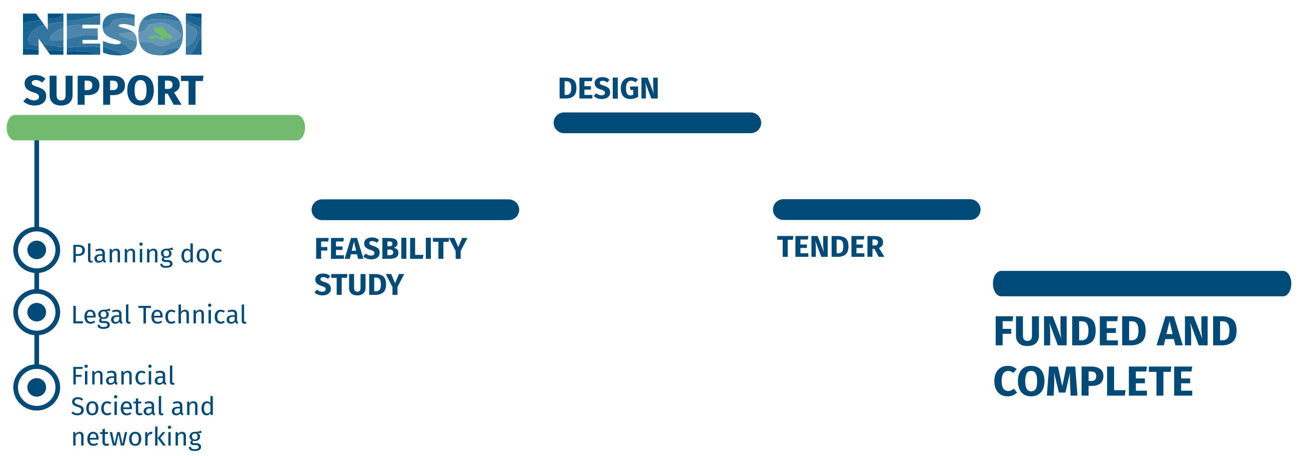
REAL2.0 is a techno-economic analysis of the potential use of a hydrogen generation plant with a refuelling station to feed a small fleet of fuel-cell buses to connect the municipality of La Aldea with the capital of the island, Las Palmas de Gran Canaria, as a renewable mobility solution. Additionally, the project seeks to provide electricity to the local community.

The technical analysis includes understanding the local context (i.e. roads, local renewable resources, demand for hydrogen mobility, etc.), finding a suitable location and designing the plant (including renewables generators). The technical-financial analysis to assess the hydrogen cost for the solution proposed. The economic analysis includes a market analysis and producing a business plan, assessing the financing options, and presenting the results to potential investors. The project also included a review of local regulations.

Politecnico di Torino is the project beneficiary, while the local external advisor ITC (Instituto Tecnologico de Canarias) provided technical support. The goal of the Politecnico di Torino analysis is to assess the feasibility and impact of a renewable mobility project in the Canary Islands that can be implemented in the future.

WHY IS NESOI SUPPORTING THIS PROJECT?

REAL2.0 can be considered an extension of the scope of the REMOTE project (H2020 project 779541, coordinated by Politecnico di Torino) in La Aldea (Canary Islands, Spain). Within the former project, a demonstrator was implemented to supply local renewables (solar and wind) to a cattle farm using a hybrid hydrogen battery storage connected to a micro-grid, together with hydrogen-based devices to also cover the demand for local green transport systems. NESOI helped to develop a technical-economic feasibility study to extend the technical scope of the P2P solution already planned for La Aldea (as part of the REMOTE project) and to conduct a design optimisation study to also include the additional P2H route. The results of REAL2.0 will allow Politecnico to apply for grants (EU and/or national) to develop the project as a large-scale demo, and attract relevant companies that can provide and develop hydrogen mobility technologies within the demonstration project.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

Analysing local regulations and plans for energy and mobility

Providing information about other initiatives under the Spanish regulation

AT TECHNICAL LEVEL

Analysing local context, including:

Local availability of renewable resources (solar and wind), the local electrical grid, demography and road transport sector requirements

Producing hydrogen demand projections for road mobility purposes and the related infrastructure required for implementing the hydrogen refuelling station for the project

Cost parity between produced hydrogen and diesel

Implementation of the mobility case by the design, sizing and optimising a power-to-hydrogen system, including:

Technical solutions available for implementing a hydrogen refuelling station in La Aldea.

Suitable potential sites for installing the hydrogen generation plant and renewable power generators (photovoltaics and wind turbine) needed to power the solution.

Technical-economic analysis of the hybrid P2P-P2H configuration.

AT FINANCIAL LEVEL

Assessing the economic and financial planning and economic-financial feasibility

Developing a Business Plan

Sourcing and checking eligibility of potential financing options including market testing with potential investors.

AT SOCIETAL & NETWORKING LEVEL

Analysing local context and defining business case for hydrogen mobility

Benchmarking with local authorities

Communicating and disseminating activities connected to developing hydrogen mobility, including a joint workshop with REMOTE project.

RRL

Points (0=min, 3=max)

***Total* 2.4**

Geographical

3

Geographical complexity is not a concern in this kind of project. The climate of Gran Canaria allows a high RES capacity factor and consequently and high capacity factor for the electrolyser. Replicability in other climates is possible, but with a larger ratio between RES power installed and electrolyser size. The project can also be replicated on mainland sites.

Technological

3

The technology is provided in containerised solutions and it is easy to replicate on every island and mainland site.

Legal

2

Moderate replicability outside of Spain because of the specific Spanish regulations. The legal framework is country-specific; in general, in many EU countries similar HRS installations are allowed by current regulations.

Social acceptance

3

The project is expected to have a high social acceptance as is providing a solution for greening the public mobility without affecting the habits of public mobility users.

Funding raising/ investment actractivity

1

The cost of the investment is very high and the return of the investment and financial benefits for the final user are expected to be low

The Z-299 REAL 2.0 project has been assessed as having a high replicability and operational potential, with a score of 2.4/3. The project is used proven technology (electrolyser) provided in containerised solutions, thus can easily deployed on other islands or on the mainland.

The project is developing the hydrogen generation and refuelling station while considering local regulations and siting constraints. The hydrogen generator is integrated with different RES (wind and solar) and a compressed storage to exploit the dynamics of the combined sources using a hydrogen buffer. The added value of the project will be developing an operation strategy for combined hydrogen generation and bus refuelling that will maximize the use of combined RES for hydrogen mobility and maximize RES-to-hydrogen conversion. The technology can be monitored remotely, and maintenance can be performed by local manpower with the remote support of specialised technicians. The project demonstrates how it can be deployed in remote locations with limited effort. From the point of view of the investment, the project was developed considering the traditional diesel-based mobility and will demonstrate the feasibility of reaching the cost parity between diesel and hydrogen mobility, proving that is possible to provide alternative mobility solutions that have a higher efficiency and a better environmental performance at the same cost of traditional fossil-based solutions.

NESOI

GHEKO

This project is support by the EU Islands Facility NESOI.
NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°864266

Key Project Data

Maturity Level
Entry level

Beneficiary/ies
Municipality of Kos

Geographical area
Western Mediterranean,
Eastern Mediterranean
KOS GREECE

Area of Intervention
Production of energy from renewable sources

Financial Leverage Factor
124

Technical Assistance Menu
Feasibility Study

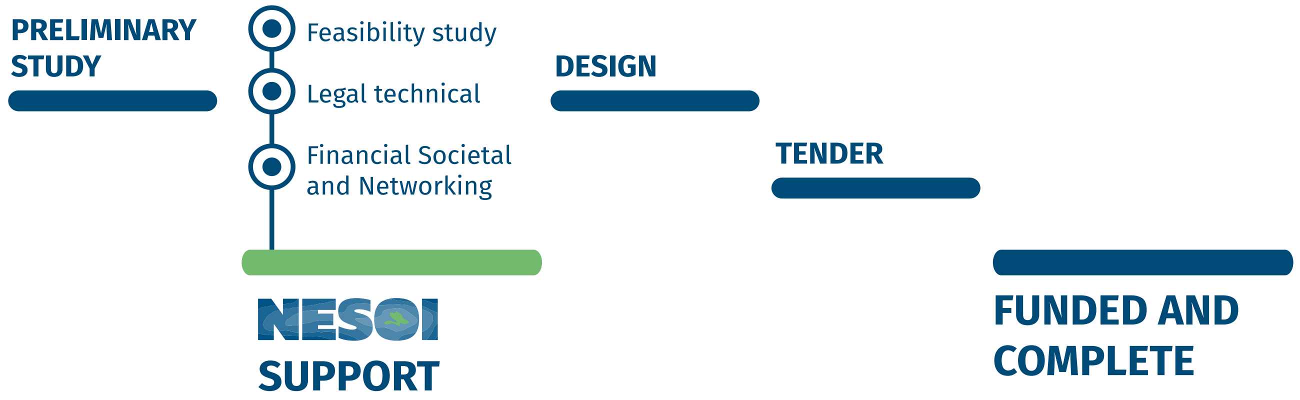
Mobilized investment
14,879,740

SHORT PROJECT DESCRIPTION

The project aims to establish a hydrogen ecosystem on Kos Island, with Mastichari port serving as its focal point. Hydrogen generation will be facilitated by harnessing excess electricity generated by local wind farms, currently facing significant curtailment. This comprehensive ecosystem will feature facilities for both hydrogen generation and storage, as well as use. Notably, a refuelling station will be established for municipal vehicles and ferries, equipped with electrolysers and hydrogen storage tanks. Fuel cells situated nearby will manage hydrogen storage levels and inject electricity to the grid. Additionally, the project includes commissioning a fuel-cell bus to replace a conventional vehicle, hybridising an existing ferry using hydrogen and diesel, and implementing micro-combined heat and power systems fuelled by hydrogen.

WHY IS NESOI SUPPORTING THIS PROJECT?

The Municipality lacks the technical expertise and manpower to conduct a thorough feasibility study for the planned actions. Technical support is required to apply for planning and other authorisations, perform a series of studies including a market analysis to select equipment, spatial planning to minimize conflicts, financial modelling for funding sources, optimise business models, and provide management consulting service to produce an action plan for project implementation with stakeholders.



NESOI Assistance: tailored solutions provided

AT LEGAL-REGULATORY LEVEL

- Defining the required procedures to obtain environmental permits given the identified project options
- Assessing existing procurement options (e.g., tender, PPP, etc.)

AT TECHNICAL LEVEL

- Assessing key project design drivers while also taking into consideration local constraints
- Identifying suitable technological options given existing project design requirements
- Defining the technical, economic and financial, fiscal project inputs
- Performing a risk analysis and identifying potential mitigation strategies
- Drawing up an Action plan and identifying project monitoring procedures

AT FINANCIAL LEVEL

- Conducting a Cost Benefit analysis and socio-economic and environmental impact assessment
- Performing financial modelling and identifying a target scenario
- Sourcing financing/funding options

AT SOCIETAL & NETWORKING LEVEL

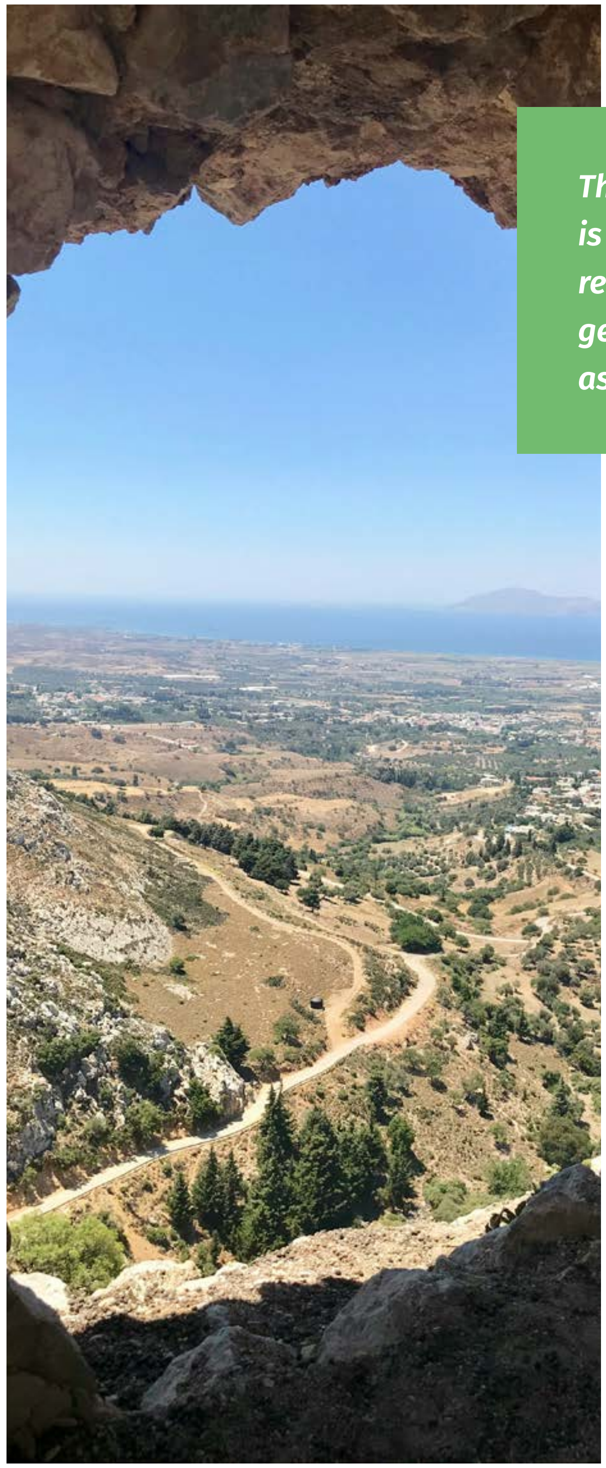
- Assessing the socio-economic and environmental impacts
- Sourcing financing/funding options
- Drawing up an Action plan and identifying project monitoring procedures

RRL

Points (0=min, 3=max)

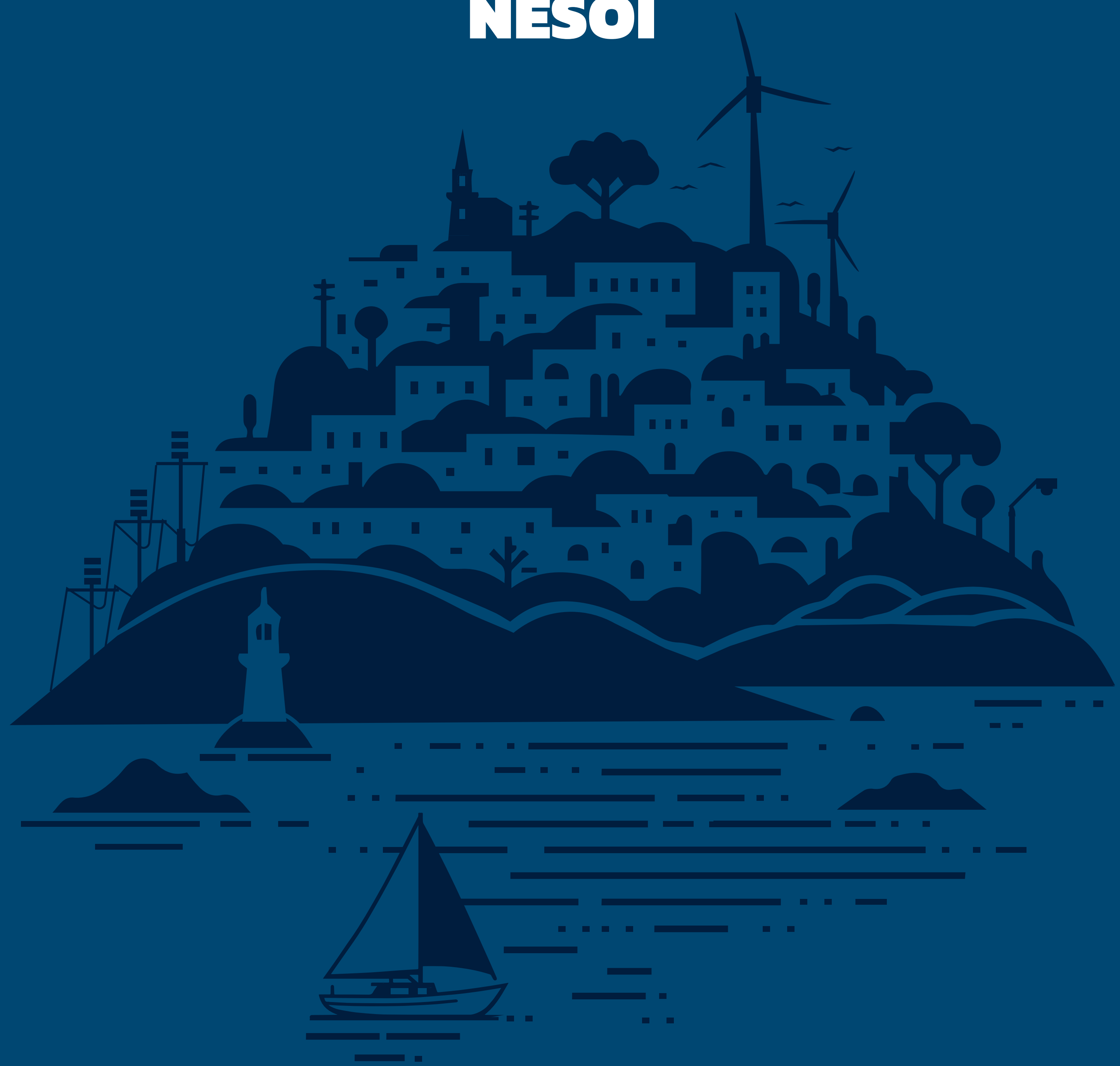
Total
2.6

Geographical Islands of different geographical morphology and climate	**2**
Technological The technology is easy to replicate on every island	**3**
Legal The project has no legal barriers	**3**
Social acceptance The project can have high social acceptance since it benefits the community	**3**
Funding raising/ investment actractivity The cost of the investment is very high and low ROI	**2**



The replicability potential of the GHEKO project is indeed high, given that many islands in the region share similar conditions, encompassing geographical, environmental, and regulatory aspects.

The attractiveness of hydrogen, particularly in harvesting the curtailed energy from already installed wind facilities, has garnered significant interest from local communities in Non-Interconnected Islands (NIIs). Hydrogen, emerging as a multipurpose resource for these, serves as a versatile solution, fostering efficient sector coupling. Nevertheless, the replicability of such projects can be influenced by specific conditions, including the absence of RES or water supply. One of the major challenges lies in the scarcity of a skilled workforce, both for the initial construction of hydrogen ecosystems and for their ongoing O&M. Overcoming these challenges will be pivotal in unlocking the full replicability potential of projects like GHEKO and ensuring their successful implementation across various island contexts.



Conclusion

Replication Potential of Energy Technologies in Different Islands' Categories

THE REPLICATION POTENTIAL OF ENERGY TECHNOLOGIES IN DIFFERENT ISLANDS' CATEGORIES

Since the purpose of this guidebook is to stimulate the replication of NESOI projects in other islands, in addition to the analysis of the best practices shown in the previous chapter the present chapter presents some general considerations on the potential applicability of different energy technologies in different categories of islands (related to islands size, interconnection, geographical features and economic activities.

The following paragraphs focus on seven groups of technologies as studied in NESOI D3.2, i.e. 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 GENERATION FROM RENEWABLES

This group of technologies includes electricity generation from solar, wind, biomass, geothermal, hydro and wave/tidal sources.

Below we describe the pairing of such technology with the needs of the different island clusters:

• size/interconnection: these solutions are applicable to islands of any size; installing utility-scale plants is more feasible on large islands due to their higher electricity demand and/or in interconnected islands which can inject excess power into the national grid. This is especially true for islands with high seasonality. However, the relative decarbonisation impact may be much higher in non-interconnected islands unable to import electricity from the mainland, although this implies installing either energy storage systems or smart solutions for load management,

• latitude: due to the higher availability of solar radiation, solar power production systems are more applicable to Southern Europe than Northern Europe. The suitability of other technologies depends more on the local availability of specific resources (wind, biomass, geothermal heat, etc.) rather than the latitude; wave/tidal solutions are generally more applicable to oceanic islands rather than to those in inland seas,

• geographical features: renewable power generation systems are applicable to islands irrespective of the orographic configuration and urban/rural pattern;

mountainous islands have a slightly higher potential for wind power, while rural islands have a higher biomass potential, but significant variations may exist from one island to the next,

• economic activities: in islands dependent on tourism, energy consumption patterns exhibit high seasonal variations, with the peak season generally aligning with summer period. This makes solar power generation high suitable for such islands since the period of maximum energy supply corresponds to the period of the highest demand. However, other renewable energy technologies that generate energy more consistently throughout the year require proper sizing in order to fully exploit their potential even during the low-season. Islands where primary sector activities such as agriculture, animal husbandry or fishery) prevail, may present a higher potential for biomass-technologies. In conclusion, islands with diverse economic activities, the potential for renewable power generation systems is robust and closer to that of the mainland.

THERMAL PRODUCTION FROM RENEWABLES

This group of technologies includes solar thermal, biomass and geothermal.

As mentioned above for solar power generation systems, the potential for this technology is higher in Southern Europe than in Northern Europe, especially for islands with high seasonality and a developed tourism sector compared to islands with no tourist season. The presence of industries on an island may lead to significant potential for integrating solar heat generation into industrial processes, especially those for food and beverage production and agri-food facilities. On the other hand, no significant correlation between the size of the island and the applicability of solar thermal was identified since solar thermal systems are largely stand-alone facilities to generate heat in the buildings where they are installed.

The potential for using biomass in boilers to generate heat depends more on whether suitable resources are available on the islands rather than the island's specific characteristics. Nevertheless, a significant demand for heat is necessary to install such a system; therefore, Northern Europe islands exhibit a slightly higher potential.

Similarly, with geothermal heat pumps, their application potential mainly depends on the geological characteristics of the subsoil rather than on other characteristics such as size, geographical morphology or economic activities however, a significant demand for heat is required, so once again islands in the north of Europe exhibit a slightly higher potential.

COGENERATION OF HEAT AND POWER

Combined heat and power generation is particularly applicable to buildings/industries with a high demand for both thermal and electric energy. This solution of installing such systems in building is particularly interesting for residential and office complexes in the islands of North-Central Europe. Where the cogeneration plant is coupled with an absorption chiller in the case of a trigeneration system, the solution may also be of interest for residential and office complexes in Southern Europe since it may also cover summer cooling needs.

The potential for cogeneration in industrial sites is clearly higher on large islands with a diverse economic sector, where heat may be required in industrial processes.

At island level and utility-scale, this technology may only be of interest if a district heating system exists. The highest potential for this solution will therefore be in islands in North-Central Europe and in islands with population concentrated in urban area, where district heating systems are typically located.

ELECTRIC MOBILITY

This category refers to installing the necessary infrastructure for charging different types of electric vehicles (electric cars, scooters, buses, boats/ferries) and replacing existing conventional vehicles with electric versions.

This kind of technology may be particularly of interest if coupled with renewable power generation systems, as already discussed in the technology pairing section, or to build a comprehensive smart grid.

In island clusters, there is no significant correlation with the latitude (except for the potential for renewable power generation, mentioned above) or with geographical characteristics (since public and private internal mobility on the island is needed both in urban and rural, mountainous and lowland contexts); a higher potential for electric public transport and e-bikes or e-scooters rental may exist on islands with high seasonality due to a developed tourist sector and on smaller islands compared to larger ones.

ENERGY STORAGE

This includes both electricity storage systems (battery storage, pumped-hydro storage) and thermal energy storage.

Thermal energy storage systems are particularly interesting for district heating systems (therefore a higher potential for islands in Northern Europe where most of the population live in urban areas) or for industrial applications related to heat recovery and solar thermal energy generation (higher potential for large islands with developed industrial sectors).

Electricity storage solutions provide maximum benefits when coupled with non-programmable renewable power generation systems, or when upgrading the local power grid to handle peak shaving as part of a comprehensive smart grid project. This means that these solutions show the highest application potential in small non-interconnected islands. Hydro power storage systems are particularly applicable to mountainous islands with good water resources.

UPGRADE OF LOCAL PUBLIC ASSETS

smart metering: applicable across This category includes a diverse range of technological solutions related to upgrading the different aspects of public infrastructure:

- power distribution grid: improving the local grid is always beneficial, but these are particularly relevant for small non-interconnected islands and less so on larger islands with electricity grids similar the mainland; for islands with major industrial sectors, specific initiatives to manage the impact of the grid of large industrial energy consumers are highly applicable,
- public lighting: switching to LED lamps and improving the management of public lighting systems is applicable across the board irrespective of the island characteristics; Solar-powered streetlights, and the above-mentioned pairing criteria also apply for solar power production systems,
- land-based electricity in ports: this solution may be particularly interesting if coupled with renewable power generation systems or in general where the energy mix is relatively clean. No significant correlation was identified with other island characteristics, except for a slightly higher potential for islands with peak tourist seasons,
- special energy topics: projects for improving water desalination are more applicable to any size of island in Southern Europe affected by low water resources. Wastewater and waste-related projects on the other hand could be more suitable for medium to large islands with few tourists, which generate significant waste during the year. In this case medium-large scale plants would be suitable.

ENERGY EFFICIENCY IN BUILDINGS

Improving energy efficiency in buildings covers initiatives such as lighting, HVAC systems, thermal insulation of buildings, smart homes and building energy management systems, smart metering, district heating and cooling.

Since most of these technologies concern single buildings, there are few specific island-related issues, summarized below:

- lighting: switching to LED lamps and improving the management of public lighting systems is applicable across the board irrespective of the island characteristics,
- HVAC systems: retrofitting heating, ventilation and air-conditioning systems is applicable in all contexts; depending on the technological retrofitting solution

chosen, specific requirements may apply, e.g. for f solar, biomass or geotherma energy sources or cogeneration; it is clear that depending on the climate of th island, HVAC needs will vary, e.g. in an island in the north of Europe, demand fc heating is very high, whereas in a Mediterranean island, the demand for cooling in summer is much greater,

• thermal insulation of building: generally applicable in all contexts, but with higher benefits if implemented in areas with high heating (or cooling) demand, i.e. northern Europe for heating and southern Europe for cooling,

• smart homes and building energy management systems: applicable to all contexts; no specific issues when applied to islands,

• the board; no specific issues when applied to islands,

• district heating and cooling: the highest potential is found in islands located in north-central Europe due to their higher heating demand and in islands with population concentrated in urban areas, where these systems are more feasible due to the close proximity of energy users.

PROJECT PARTNERS

We would like to acknowledge all the project partners and island beneficiaries, who contributed with their hard work and dedication to creating the Guidebook for Replication during the NESOI project.

Coordinator SINLOC
Andrea Martinez andrea.martinez@sinloc.com

Guidebook creator R2M
Email: sara.ruffini@r2menergy.com
Mario.cortese@r2msolution.com
Domenico.perfido@r2msolution.com

NESOI

EU ISLANDS FACILITY

www.nesoi.eu