NESOI
EU ISLANDS FACILITY

Green Hydrogen Ecosystem on Kos Island

GHEKO

KOS

“This first-of-a-kind project includes the first refuelling hydrogen station in Greece together with the first hydrogen vehicles. ”

This project is supported 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

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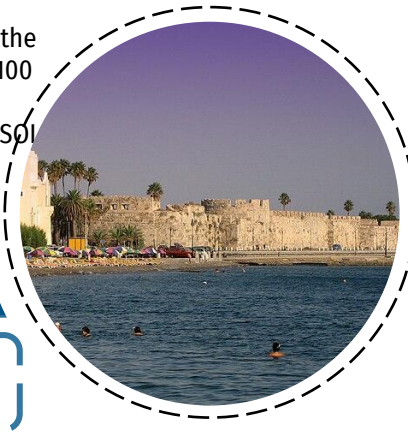
GHEKO

The European Islands Facility NESOI aims to unlock the potential of EU islands to become the locomotives of European Energy Transition. To do so, NESOI aims to mobilize more than €100 million of investment in sustainable energy projects to give EU islands the opportunity to implement energy technologies and innovative approaches, in a cost-competitive way. NESOI has selected 56 such projects across the European Union and provide them with financial resources and technical support.



Green Hydrogen Ecosystem on Kos Island

ABOUT
THE PROJECT

Project Promoter Municipality of Kos

Stakeholders Municipality of Kos, Municipal Port Fund of Kos

Country Greece | **Sector** Hydrogen | **PROJECT VALUE** 2.5 M€

DESCRIPTION

The municipality of Kos is interested is interested in the creation of a hydrogen ecosystem in Kos island. In this project the establishment of a H_2 refueling station suitable for municipal vehicles and ferries near the port of Mastichari is investigated.

AIM OF THE PROJECT

Technical support from NESOI is used to analyse the existing regulatory framework and permitting, conduct techno-economical analysis to establish suitable technologies and equipment, spatial planning for the prospected H_2 infrastructure and advice on additional funding opportunities.

FUTURE STEPS

Having understand the basic feasibility of hydrogen infrastructure in Kos, the next step is to secure funding to further mature the project. The municipality is also open to new ideas that align with their energy transition goals.

HOW THE EU ISLANDS FACILITY NESOI
SUPPORTS THE PROJECT

1. **Assessment of the key project sizing drivers**
2. **Identification of suitable technological options given existing project sizing requirements**
3. **Definition of the required environmental permitting procedures**
4. **Cost Benefit analysis and socio-economic and environmental impact evaluation**
5. **Definition of the technical, economic and financial, fiscal project inputs**
6. **Risk analysis and identification of available mitigation strategies**
7. **Assessment of existing procurement options (e.g. tender, PPP, etc.)**
8. **Financial modelling and identification of target scenario and Identification of financing/funding options**

INTERVIEW WITH
Georgia Kassioti, Deputy Mayor of Kos

Q: How was the project initially designed? Why choosing this specific sector?

A: Our municipality with the support from our technical advisor DAFNI aims to address our dependence on non-renewable sources and high energy costs. Hydrogen was chosen because of its potential flexibility in various areas.

Q: What were the challenges? How did NESOI help overcome them?

A: The project faces challenges mainly in funding and insufficient existing regulations. NESOI has been instrumental in addressing these challenges. Thanks to this project, we now have a feasibility study, we are aware of potential funding opportunities and have received guidance on the regulatory landscape

Q: What will be done next to pursue this project?

A: We are currently in the feasibility stage. Our next steps include securing the funding to further mature the project. While the support from NESOI was important, we are seeking additional sources of funding and technical support for the later stages of the project.

Q: What are your next steps towards clean energy transition?

A: While we are currently focused on this hydrogen-based project, we are always open to new projects that align with our energy transition goals. However, it is important for us to ensure the successful implementation of our current projects.

REPLICABILITY
IN OTHER ISLANDS

The project can be extended, and its outcomes can be utilized in every seaside port facility on the mainland all over EU. The coherency of the hydrogen components needs to be highlighted for the investment plan to be successful due to the large costs that come together with hydrogen transportation and storage technology.

THE IMPACT
ON LOCAL COMMUNITY

1. **Local Economy**
Tourism activity is expected to increase, which boosts the economic activity of local restaurants, accommodations, and retail businesses. New workplaces are created to serve the hydrogen infrastructure.

2. **Social Acceptance**
The Municipality is committed to the project ensuring high local acceptance. The expected increase in tourism and the green technologies that will be applied add to the project's social acceptance

New Energy Solutions Optimised for Islands

NESOI

EUROPEAN ISLANDS FACILITY

GHEKO

Green Hydrogen Ecosystem on Kos Island – Technical Data

FOCUS ON
GREEN HYDROGEN INFRASTRUCTURE

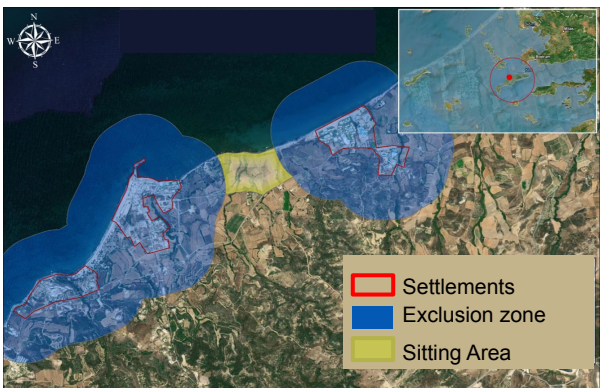
Many Greek islands are not interconnected with the mainland and use local power stations, which run on diesel and heavy fuel oil. Wind and solar potential can be only partially exploited due to grid constraints. The Kos–Kalymnos electric power system connects a total of nine Dodecanese islands and is limited to facilitate up to 10.8 MW capacity in wind farms and 6.46 MW in PV station. The new operational program of the region of South Aegean (OPSA) was published in July 2021. This program foresees energy transition and, more specifically, the development of green cities through the adoption of green mobility as one of the strategic priorities. The GHEKO project is in line with the OPSA targets.

One main intervention area is envisaged in GHEKO, which will have an impact on the entire island. It concerns the boundaries of the existing port that will be converted into the heart of the hydrogen ecosystem. The port will include all the technology components for hydrogen: electrolyser, compressor, storage tank, micro-CHP, FC bus, hybrid ferry and fuel cell stack.

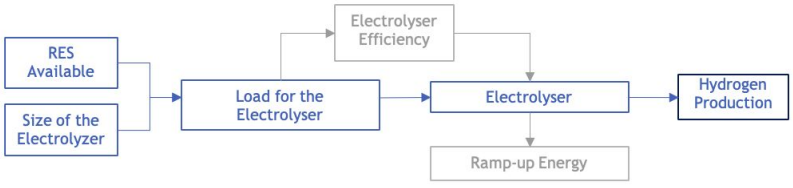
The electrolyser is simulated in an hourly time series for a year, taking into consideration the surplus electricity produced. Hydrogen production is calculated and compared with the demand of hydrogen.

Hydrogen demand is considered in the following categories.

- Transport - fuel cell bus, cars and hybrid ferry
- Buildings – heating/cooling and electricity need considering the use of micro-CHP.
- Electricity grid – conversion of H_2 back to electricity if needed.



Suitable sites for Installation of Hydrogen Plant at Mastichari Port.
GHEKO Feasibility Study presented to NESOI

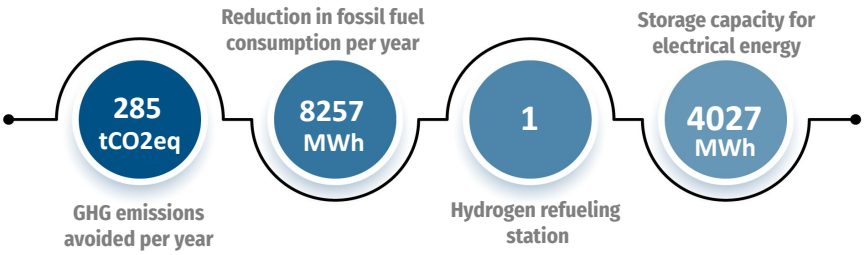


Hydrogen production simulation.
GHEKO Feasibility Study presented to NESOI

EXPECTED
ENERGY SAVINGS

Energy saving will come from using a fuel cell bus; fuel cell ferry and electricity production based on hydrogen. The project is estimated to produce 32400 kg/year of hydrogen (equivalent 1.08 GWh) from the excess renewable electricity, saving 337 toe/year of primary energy, with the higher load occurring in summer at 148 kg/day.

KEY NUMBERS
OF THE PROJECT



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RINA

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