NESOI
EU ISLANDS FACILITY

Promoting green and circular economy through Biogas exploitation in Lemnos

BIOG-LEMNOS

LEMNOS

"An Energy Community will be potentially established to own and operate the facility giving room for a joint investment by the Municipality, several stakeholders and citizens. "

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

BIOG-LEMNOS

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.

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ABOUT
THE PROJECT

Project Promoter Δήμος Λήμνου Municipality of Lemnos

Stakeholders Municipality of Lemnos Local agrofood businesses

Country Greece **Sector** Biogas **PROJECT VALUE** 780,000 €

DESCRIPTION

The project promotes local circular economy in Lemnos by the valorization of biowaste for biogas production. The feedstock will be biowaste derived from agrofood activities (oil mill liquid residues, cheese whey, winery residues) and municipal biowaste (such as urban sludge).

AIM OF THE PROJECT

- Designing of a biogas production facility including an Anaerobic Digestion (AD) unit and a Combined Heat and Power (CHP) unit.
- Provide necessary steps for the permitting of the system
- Investigate the profitability and feasibility of the project

FUTURE STEPS

The sizing of the biogas unit has been accomplished and the proposed unit will have a capacity of 180 kWe. To finalize this project, more studies and planning are needed. Therefore, additional investments are necessary.

HOW THE EU ISLANDS FACILITY NESOI
SUPPORTS THE PROJECT

1. Assessment of the key project sizing drivers
2. Evaluation of the primary technological solution in comparison witl other possible solutions
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
8. Financial modelling and identification of target scenario and Identification of financing/funding options

BIOG-LEMNOS

***Promoting green and circular economy through Biogas exploitation in Lemnos* - Interview**

INTERVIEW WITH

Ioannis Pontikas, Vice Mayor of Lemnos*

*While the study was conducted under the leadership of Vice Mayor Mr. Pontikas, there have been changes in mayoral leadership effective January 1, 2024

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

A: The project was initiated by the Municipality of Lemnos with the aim of utilizing organic waste from agro-food processes and promoting a circular economy model. Biogas technology was chosen because of its ability to convert this waste into energy, contributing to the area's sufficiency and environmental protection.

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

A: The main challenges were related to the supply and management of biomass, the estimation of equipment costs and performance, the acquisition of the necessary permits and the implementation of the plans. NESOI has assisted in finding appropriate sources of funding to further mature the studies.

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

A: We are now at the feasibility analysis stage. Based on this analysis, the application of biogas technology has been proposed to produce heat and electricity. The proposed unit will have a capacity of 180 kWe. The next steps include seeking further funding to cover the costs of studies and implementation of the project. NESOI's support at this stage is critical to achieving these goals, providing guidance and support to attract investment.

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

A: . Local businesses related to the agri-food sector and energy production are directly involved in the project, as they offer the waste used for energy production and benefit from the cost savings offered by producing energy from it. Therefore, the completion and successful operation of the present project could be considered as an important step towards the energy transition of Lemnos, paving the way for possible future initiatives and expansions.

THE IMPACT

ON LOCAL COMMUNITY

1. **Local Economy**
   Local enterprises are engaged and benefit from the produced thermal power. Biogas production encourages new investment in agriculture and local economy will be diversified through the development of new technology. Therefore, project helps to create both direct and indirect employment growth.

2. **Social Acceptance**
   The establishment of an Energy Community for the democratic and participatory planning of the facility helps to ensure broad social acceptance of the project. The municipality communicates the outcomes to citizens via the municipality website and social media to maximize outreach.

New Energy Solutions Optimised for Islands
NESOI
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Promoting green and circular economy through Biogas exploitation in Lemnos **– Technical Data**

FOCUS ON
BIOGAS PRODUCTION

A novel methodology for handling agrifood and urban biowaste, that allows for green handling of waste streams is created in Lemnos. In addition to the challenge of handling different types of wastes at the same facility, this technical solution tackles the seasonality of biowastes, which is characteristic of island communities. The proposed system will consist of the following subsystems.

Biowaste storage tanks, where the different biowastes will be properly stored, in order to maintain a stable and consistent year-round supply to the plant.

Anaerobic Digestion Unit that includes a system of pumps that mix water and biowaste and feed it to the Anaerobic Digestion Unit. The output of the unit will be biogas and digestate.

Combined Heat and Power Unit in which first the sulphur compounds are removed from the biogas and then, the purified mix is fed to the combustion in the cogeneration unit for heat and electricity production. The subsystem also includes the heat transfer circuit to satisfy the neighboring thermal loads.

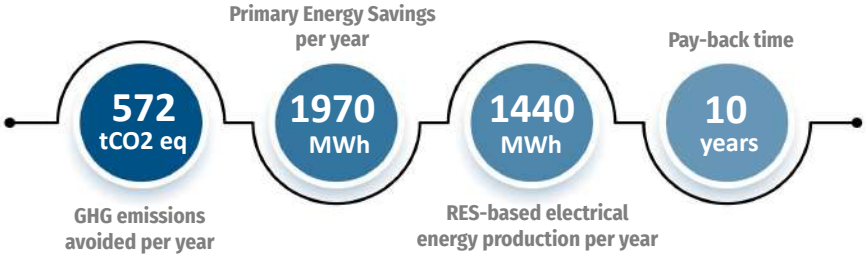
Example of a biogas plant (Photo by Schmack Biogas AG)

Digestate handling which deals with the disposal of the solid digestate from the Anaerobic Digestion Unit. The solid digestate will be used as a soil conditioner.

EXPECTED
ENERGY AND GHG SAVINGS

The renewable energy based electrical energy production 1440 MWh per year and heat production on 1618 MWh per year. The GHG emissions from the biogas plant are considerably lower compared to traditional biowaste management approaches (agrofood waste landfilling and manure direct land spreading).

KEY NUMBERS
OF THE PROJECT



REPLICABILITY
IN OTHER ISLANDS

The project could be replicated by islands with increased agrifood activity and continuous biowaste production flows during the whole year. Indicative islands with significant replication potential are Lesvos, Ikaria and Chios.

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

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