



Metropolitan Area  
Gdańsk Gdynia Sopot

ul. Długi Targ 39/40  
80-830 Gdańsk  
tel. 58 526 81 42  
[biuro@metropoliagdansk.pl](mailto:biuro@metropoliagdansk.pl)



# LiquidEnergy

## Liquid Energy project as pilot investments



Institut für nachhaltige  
wirtschaft und Logistik



Universität  
Rostock



Traditio et Innovatio

HIEERO



KLAIPĖDOS MOKSLO IR  
TECHNOLOGIJŲ PARKAS

biomasa  
/magazyn dla profesjonalistów  
/magazynbiomasa.pl

POLSKA  
PLATFORMA  
LNG i bioLNG

## Project I: (Bio-)LNG Solution for a Decentralized Energy Supply System

**(Bio-)LNG Solution for a Decentralized Energy Supply System** aims to implement a (bio-)LNG solution for a decentralized energy supply system for buildings. The system will integrate a combined heat and power (CHP) plant, solar energy, and smart home technology to create an efficient and sustainable energy supply. The Vaillant ecoPower 4.7 CHP system is a key component of the pilot project. Utilizes natural gas, including (bio-)LNG, to generate electricity and heat simultaneously

**(Bio-)LNG Solution.** The use of (bio-)LNG, liquefied natural gas derived from renewable sources or biomass, provides a cleaner and more sustainable alternative to conventional natural gas. The pilot project will explore the feasibility of utilizing (bio-)LNG as an alternative fuel source for the CHP plant, ensuring a low-carbon and environmentally friendly energy supply.

### ✓ The pilot project offers several benefits:

- the use of (bio-)LNG reduces greenhouse gas emissions and contributes to a cleaner and more sustainable energy mix;
- the CHP plant maximizes energy efficiency by utilizing waste heat, resulting in cost savings and reduced energy consumption;
- the integration of solar energy further reduces reliance on (bio-)LNG and promotes renewable energy utilization.



## Project II: A green opportunity for small vessel – example of Magda I ship.

Ship operation is associated with the emission of harmful exhaust components into the atmosphere due to the use of internal combustion engines. Exhaust emissions occur during voyage, port entry and exit manoeuvres, berthing in port and roadstead, port traffic, loading and unloading processes. Taking into account the composition of LNG and biogas, the lack of sulphur in the gaseous fuels and the different combustion conditions, significant emission reductions are achieved.

Further development of the research was made possible by the participation of a team from the Maritime University of Szczecin for development and use of green energy technology (acronym - Liquid Energy), implemented under the Interreg South Baltic Programme.



### The main task:

to design the installation of an engine gas supply system on a selected ship.

### The design requirement:

to use a used internal combustion engine suitable for gas supply as the main propulsion.

The team has been focusing on technical description of the selected vessel, the analysis and selection of the new energy system configuration, a detailed concept of the new energy system, the assumptions and layout of the new energy system components. One such fuel that is now most commonly used to replace liquid petroleum fuel is gas.

The participation of a team from the Maritime University of Szczecin, enabled the technical design for the conversion and refitting of a small ship with a hull length of 18 m to fuelled on gas. In accordance with the

design recommendations, a used internal combustion engine adapted to run on gas was used in the ship's energy system, which documented the feasibility of doing so.

Recently, the engine was started and the initial adjustment was made on the Magda I unit located on the wharf in yard. Currently, work is being supervised on the installations in the engine room, the final deck development, the final foundation of the tanks based on the design documentation received from the Maritime University of Technology in Szczecin.

## Project III - Mobile LNG and bio-(LNG) refueling station

The mobile refueling station for liquefied methane, created from biogas (bioLNG) or natural gas (LNG), is an absolute novelty on the market for the distribution of alternative fuels! It has only 3.5 tons of gross vehicle weight. Thanks to it, it will be possible to use liquefied methane more widely, e.g. in public transport, production plants and office buildings. The transport capacity of the mobile filling station vehicle is variable and can be adapted to the respective application scenario.

The target groups for the use of a mobile storage, transport and tank system for small-scale technical LNG application scenarios are diverse. The classification can be made into stationary site-based applications and mobile land-, rail-, road-, water- and sea-based application scenarios for the use of liquefied methane containing (LNG, bio-LNG, synthetic liquid methane).



### ✓ Technical solutions, handling processes for the use of LNG, bio-LNG in small utilization units:

- container exchange as tank vessels for direct consumption in stationary and mobile units;
- storage tanks up to 500l or mass equivalent of 250kg in stationary and quasi-mobile units;
- refuelling from a cryogenic container into a stationary or mobile container or tank.

The prototype station was built by a consortium of two companies: Baltic Engineering Flare GmbH and Ferdinand Schultz Nachfolger Fahrzeugbau GmbH, as part of the EU project Liquid Energy. It has been used extensively as a prototype to demonstrate the technical capabilities.

