

## Project Description: (bio-)LNG solution for a Decentralized Energy Supply System

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

The pilot project aims to implement a (bio-)LNG solution for a decentralized energy supply system for buildings. The system combines the use of a combined heat and power (CHP) plant, solar energy, and smart home technology, with a specific focus on utilizing (bio-)LNG as a clean energy source. For this purpose, the project utilizes the Vaillant ecoPower 4.7 CHP system, known for its high efficiency and low emissions.

The primary objective of the project is to showcase the potential of (bio-)LNG as a clean alternative fuel for decentralized energy generation and its integration with other renewable energy sources. By utilizing (bio-)LNG, the project aims to significantly reduce carbon emissions and environmental impact associated with conventional energy sources.

The Vaillant ecoPower 4.7 CHP system is a key component of the pilot project. This CHP unit utilizes natural gas, including (bio-)LNG, to generate electricity and heat simultaneously. It boasts a high electrical efficiency of up to 36.9% and overall efficiency of up to 92.5%. The CHP system provides a thermal output of up to 13.8 kW whereas it generates up to 4.7 kW electrical power. The system's advanced condensing technology ensures optimal heat recovery, further increasing energy efficiency. Its low emissions and high heat recovery contribute to a greener and more sustainable energy generation process.

In conjunction with the CHP system, the pilot project integrates solar energy to harness renewable power generation. Photovoltaic (PV) panels are installed on the building's rooftop, converting sunlight into electricity. This solar energy complements the CHP system, reducing the dependency on grid electricity and increasing the share of renewable energy in the overall energy mix.

**(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 a alternative fuel source for the CHP plant, ensuring a low-carbon and environmentally friendly energy supply.

**Combined Heat and Power (CHP) Plant** The CHP plant will serve as the central component of the energy supply system. It will simultaneously generate electricity and heat, maximizing energy efficiency by utilizing the waste heat produced during electricity generation. The CHP plant will be fueled by (bio-)LNG, providing a reliable and efficient energy source.

**Solar Energy Integration** Solar energy will be integrated into the system to complement the CHP plant. Solar panels will be installed on the buildings' rooftops to harness clean and renewable solar power. The electricity generated by the solar panels will supplement the power produced by the CHP plant, reducing the reliance on (bio-)LNG and further enhancing the sustainability of the energy supply.

**Smart Home Technology** Smart home technology will be incorporated into the pilot project to optimize energy usage and provide users with control over their energy consumption. The integration of smart home systems will enable efficient energy management, allowing residents to monitor and adjust their energy consumption based on real-time data and preferences. This will enhance energy efficiency, reduce waste, and provide a user-friendly interface for managing the decentralized energy supply system.





The pilot project offers several benefits. Firstly, the use of (bio-)LNG reduces greenhouse gas emissions and contributes to a cleaner and more sustainable energy mix. Secondly, the CHP plant maximizes energy efficiency by utilizing waste heat, resulting in cost savings and reduced energy consumption. Thirdly, the integration of solar energy further reduces reliance on (bio-)LNG and promotes renewable energy utilization. Lastly, the inclusion of smart home technology allows for personalized energy management and enhanced user comfort.

Overall, the pilot project demonstrates the potential of integrating (bio-)LNG as a clean energy source within a decentralized energy supply system. By combining (bio-)LNG with a high-efficiency CHP system, solar energy, and smart home technology, the project showcases a sustainable and environmentally friendly approach to energy generation and consumption.



Insight, Vaillant EcoPower 4-7 CHP – technically seen nothing else than a small engine.

















Ideal layout: CHP in the red container on ground level ensures optimal access for maintenance.



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