



Small-scale CHP wood gasifier for village cooperative (Cooperative Ilmasaare)

Project partners



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Project relates to one of the stage of development of energy cooperative, which is planning to become an independent community and independent form energy grids on next 10-15 years. There are 4-6 single-family homes under construction in the village and for the future it is planned up to 55 sites for construction. Project is focused on energy supply for Ilmasaare village and woody biomass transformation to energy through combined heat and power (CHP) unit based on wood gasifier technology. Energy needs for first stage can be solved by electrical capacity of 45 kW and 110 kW for heat. In future households will install PV-panels and cooperative solar park will be developed for electricity production. Supply chain covers stockpiling necessary materials for CHP unit installation (equipment, technology, woodchips and byproducts of forest industry) and selling of produced energy to villagers and enterprises located in the area.

Partners

Commercial Association Ilmasaare is a commercial cooperative and the whole of its activity is based on the cooperative business. The main activity of the "self-financed" village Ilmasaare is the administrative and economic arrangements of village. Researcher from Tallinn University of Technology, Ülo Kask, prepared a preliminary study for independent energy supply and investment project. Tartu Regional Energy Agency is consulting Ilmasaare Village.

Background and objectives

Ilmasaare eco-community is interested of energy solutions that are energy efficient, minimally polluting the environment, and that work at the local wood or other renewable sources of energy and/or local. Ilmasaare is evolving self-sufficient eco-village and in the future energy cooperation that is independent from grid. Administrative association of Ilmasaare was founded in 2014. It is in North-Estonia, 45 km away from Tallinn, the capital of Estonia. Two years earlier, in 2012 NGO Ilmasaare Society was founded for the purpose to develop local villages economy, social life and culture and advocating green stances to save nature. Co-operative goal for Ilmasaare is to organize all



The vision of Ilmasaare eco-village

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the village's energy supply and management, both for households and for business purposes. Ilmasaare village economy and energy independence is based on sawmill that residues can be used to produce electricity and heat for village's households. The plans foresee the next 10-15 years of Ilmasaare village development. There are up to 55 households planned to build into Ilmasaare village with average 150 m² of heated space per house that consumes annually around 13 MWh of energy.

Actions and results

Co-operative goal is to organize all of the village's energy supply and management, both for households and for business purposes. For this, they are planning to set up in 2017 a new legal body, an energy cooperative NGO "Ilmasaare Energy", whose principal activity is the production of electricity and heat in cogeneration plants. The heat-and electricity cogeneration will based on wood-fuel pyrolysis.

On the recommendation of the management of the village the study addresses on the three alternatives- solar energy generation with PV panels, micro station of combined heat and power generation and micro power plant working for wood-gas. In the study was evaluated profitability of three alternatives. The cost-benefit also sensibility and risk analysis were made. In terms of cash flow, and a sensitivity analysis has shown that from the three alternative electricity generation the using of solar PV panels is the most profitable. But as village needs also heat energy, the calculations showed if heat demand will rise to 420 MWh the micro CHP will become profitable also. An option is also power generation station running on wood-gas without producing heat energy. Payback time was 16 years, but it is more stable on production and security of supply of electrical energy then PV panels.

In result of study and knowledge gained the village cooperative need to move forward for developing the concept of village. Several meetings was held in this reporting period with topic of updating the concept of village and they energy management and to find possible investors for CHP plant. Also, meetings was targeted to prepare the roadshow. TREA proposed different options, three –steps roadshow, for community to find resources for investment on CHP plant. First step was looking for opportunities in national grant schemas. There is no available national grants for planned actions. Second step was - visiting of local banks for business loan possibilities, getting familiar with conditions and ask for proposal from banks. Representatives of village visited banks and checked possibilities for bank loan. There is option to use bank loan for financing of CHP. Third step was to arrange, with help of RLP (TREA), one-to- one meeting with possible investors. Meetings with TREA and two energy companies was organized for discuss of one to one meeting when village is ready to introduce their pilot.

State of implementation (May 2018)

There are no investors who would be willing to invest in the project and previously planned use of national grants didn't happen because grants are not open yet.