

Alpua village: a pioneer in energy community through the installation of a CHP plant in Northern Ostrobothnia, Finland



Highlights

- The Alpua village established a village development association to buy the village school that had been closed.
- A small CHP plant was installed to provide affordable heating and electricity to the school buildings.
- The village sells the excess electricity to the local energy company under the Farmivirta brand, which allows small energy producers to have control over their retail price.
- Key success factors were determination, collaboration with the technology supply, and local action group for the LEADER programme.
- Without a feed-in tariff or investment support for small-scale energy production and with very low energy prices is hard to reach profitability

Background information

Alpua is a small village in Northern Ostrobothnia, Finland, located 85 Km from the city of Oulu. The village has approximately 450 inhabitants and as witnessed by many other rural communities in Northern Finland, there has been a depopulation and withdrawal of public services. For example, in 2011 the city council decided to shut down the village school. Despite hardships, Alpua villagers have always had a strong community spirit and an entrepreneurial mentality. Moreover, they have been pioneers in local energy production for over a century as their village is one of the first established

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electric cooperatives in Finland. The cooperative operated until 1947 when it merged into the newly established municipal company Revon Sähkö, which it was sold to Vattenfall at the end of the 90's.

Brief description of what was done

Following the closure of the school, the villagers decided to establish a village development association to purchase the village school. In order to provide heating to the school buildings the villagers invested in a small Combined Heat and Power (CHP) plant to produce energy. The CHP plant was supplied by Volter Oy and has a thermal power of 100 kW and electrical power 40 kW. The power plant generates 200 MWh of heat and 70,000-80,000 Kwh of electricity. In order to run it requires about 600 m³ of woodchips per year. In the summer, the extra heat produced is used to dry the woodchips.

Project champions and motivations

The main project champions were three villagers who wanted to provide a new heating system to the school building in a way that would allow them to save costs and to generate some income for the local community. One of the three champions had a background in heat entrepreneurship, another had some experience with project management, and the other had been working as a controller in a local company. Even though the project champions were motivated by environmental concerns, their main motivation was to save money on heating costs of the school buildings.

Decision making process

The decision to invest in the CHP plant was taken by the village development association. The association gave the mandate to the board of directors to carry out the project. When they identified Volter Oy as a suitable provider for the CHP plant, the members of the association were invited to vote on whether or not to purchase the equipment from said company. The decision was in favour. The decision to invest in the power plant was influenced by two important factors: the decision of the town of Raahe to grant the building permit and the consent to build from the people living near the power plant.

Ownership model adopted

The CHP power plant is owned by the village development association which consists of approximately 100 villagers who paid a membership fee of 20 € to join the association. The Finnish legislation considers The Alpua village development association as a nonprofit organization (Yleishyödyllinen yhdistys) and is subject to pay taxes at least for its commercial activities.

Financing and economic viability

The CHP plant was financed by two different income streams. The initial 60% by a grant received from the LEADER programme which is a European Union funding initiative promoting rural development projects initiated by local actors, and the remaining 40% by a 15-year loan. The loan will be paid back after 10 years. A key financial player for the project was the local action group for the LEADER programme, Nouseva Rannikkoseutu.

The main goal of the project was not for profit generation, but was to keep the school buildings running and reduce the heating costs as much as possible. However, profitability has become somewhat of an issue especially in light of the costs for future maintenance of the CHP plant.

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Currently, the project generates income by feeding the excess electricity into the network of the local municipal energy company, Olun Energia.

The company sells electricity from small-scale energy producers under the Farmivirta (Farmer power) brand. In the Farmivirta scheme, each small-scale producer gets to decide the retail price of the electricity supplied. In the case of the Alpua village the retail price is 7,4 ¢/kwh minus a 10% commission fee. If a small energy producer is not able to sell its surplus electricity through the Farmivirta scheme, Oulun Energia buys back the surplus electricity at the normal market price (about 5 ¢/Kwh in Finland). The people in the village buy most of the electricity sold by the Alpua village to Oulun Energia through the Farmivirta scheme because it is produced in their neighborhood. However, the participation in the Farmivirta scheme does not represent a big source of income for the project. Therefore, the project was not generating profits but only covering the running costs. For this reason, the village development association was seeking alternative ways to generate extra income such as renting the school buildings or promoting events to attract local people.

Project implementation

The project implementation was relatively straightforward as Volter provided the CHP plant as a turnkey solution and without any delay. The only hurdle during the project implementation was the fact that the electricity cables needed to be much longer than what was initially anticipated. The power plant had originally one woodchip supplier but due to the high rate of moisture in woodchip fuel, the project leaders soon decided to work with more suppliers. Currently, there are approximately 10 woodchip suppliers who harvest the wood within a 10 Km radius of the village.

Project benefits

The project has generated numerous benefits. Firstly, it has reduced the energy costs of the school buildings because their CHP plant produces energy at a much more affordable price compared to purchasing electricity directly from the grid. Secondly, by purchasing the school the villagers were able to keep the local daycare running and keep families with children in the community. Thirdly, the project created two new jobs and a few more indirectly along the woodchip supply chain. Thanks to the CHP initiative, the Alpua village was awarded two times as the village of the year in Finland. This gave the village a lot of attention in the mass media and helped generate a sense of pride that reduced the depopulation of the village.

Barriers

The main barriers that the project faced included a lack of information/skills and profitability. When the project started there were very few small-scale CHP plants in Finland and therefore made it difficult for the project champions to obtain sufficient information on the technical and administrative aspects of the project. For instance, the project leaders did not know that the energy efficiency of the CHP plant would be strongly affected by the moisture content in the woodchip fuel and that a separate equipment for drying the woodchips would be needed. They had to build a woodchip drier themselves and learn how to deal with the moisture content to optimize energy efficiency. On the administrative side, a lack of clarity in the tax regulation for nonprofit organizations made them unable to determine how much of the expenses related to the purchase of the equipment were tax-deductible. It was only at a later stage where they found out that only part of the investment costs was tax-deductible and therefore were forced to take out a bigger loan. Although the main aim of the project was not to maximize the profits for the owners of the CHP power plant, the lack of a

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national support scheme for small-scale distributed energy production such as a feed-in tariff made the investment more uncertain. This was especially true regarding expected revenue. Profitability was also hindered by the relatively low energy price in Finland.

Main lessons learned

- Determination and a pinch of “creative madness” (i.e. do not be afraid to pursue ambitious visions) are key elements for success.
- An open and transparent dialogue with the rest of the community generates trust and support.
- Giving an opportunity to numerous woodchip suppliers to provide the woodchip fuel needed proved to be an effective way to increase the quality of the woodchips and reduce opposition in the local community.
- The collaboration with the technology provider and the local action group for the LEADER programme helped the project champions in overcoming numerous obstacles.

Project champions' recommendations to policy makers

- Create a support scheme to promote small-scale distributed energy generation, e.g. a feed-in tariff for small scale CHP power plant, loan guarantee program or low-interest loans.
- Modify the current electricity law that prevent small-scale energy producers to share their surplus energy with their neighbors.
- Create a level playing field between small energy producers and large energy companies.

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