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Solar Energy in Alava Dairy Farm

North Karelia, Finland

20 October 2020 | 2nd Interregional Event

Alava dairy farm

Among the first farms in North Karelia to generate solar energy.

- Dairy farm with c. 60 cows.
- Annual electricity consumption 120,000 kWh.
 - Ventilation, milk machines, cooling of milk

Investment made in 2014

- 33 kW photovoltaic system (216 m², Green Energy Finland)
- Installed on a roof of a south-facing cowshed
- Investment cost: 45,000€
- Renewable energy investment aid (EAFRD), 30 %
- Estimated payback period: 9 years
- Covers ¼ of the farm's electricity needs (30,000 kWh)

Alava dairy farm

Evidence of success

- Decrease in electricity bills & farm operational costs.
- CO2 emissions have reduced by 4,750 kg /year.
- Easy to maintain, does not require building permits and has a long lifespan.
- Technology is suitable even for farms located in the northern part of Europe (but: Summer vs. Winter).



Challenges

- Surplus electricity can be fed into national electricity grid, but the compensation paid for it is low.



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CHP Plant in Kuittila Farm

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CHP plant in Kuittila farm

Annual electricity consumption
c. 340,000 kWh
Heat consumption 700,000 kWh



Investment in 2012

- 140 kW CHP plant that produces heat and electricity by gasification of wood.
- Generates c. 150,000 kWh of electricity and 375,000 kWh of heat per year.
- Total investment costs c. 350,000 €. 35 % investment support.
- Estimated payback period is 10 years.

CHP plant in Kuittila farm

- 700 loose cubics of wood chips per year.
- Biomass harvested from local forests and dried with excess heat.
- Wood chips with a moisture content of less than 18% are burned to gas (CO, H₂) and converted into electricity and heat in an internal combustion engine.
- Gasification temperature is 900-1,200 C

Evidence of success

- The farm is almost energy self-sufficient.
- Has become a small-scale CHP demonstration site.
- Cost and environmental benefits.
- System is not dependent on climate and weather conditions.

Difficulties

- Needs constant maintenance and repair costs are high.