1.7 SWEDEN: CASE STUDY 1. DISTRICT HEATING PLANT JOKKMOKK MUNICIPALITY

JOKKMOKKS KOMMUN
JÅHKÅMÅHKE KOMMUVNNA
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Case study report for Sweden: Community owned energy project from initiation to completion
District heating energy plant, Jokkmokk municipality

1 Introduction

Jokkmokk municipality has about 5,000 inhabitants on an area of 19,334 km² and is situated in the inland of Norrbotten, Northern Sweden, at the Arctic Circle.

Jokkmokk is a Swedish Eco-Municipality and a signatory of the EU Covenant of Mayors. It has developed its Sustainable Energy Action Plan and is committed to reduce its greenhouse gas emissions by at least 20% until 2020, compared to 2005.

2 Description of community

Jokkmokk district heating supplies public buildings in Jokkmokk settlement as well as private households and companies, in total 522 buildings. In 2017, 34 GWh of heat were delivered. A 17 MW wood chip boiler is used during the main part of the year. A pellet boiler of 3 MW is used end of May to mid-September. The district heating company currently has eight employees.

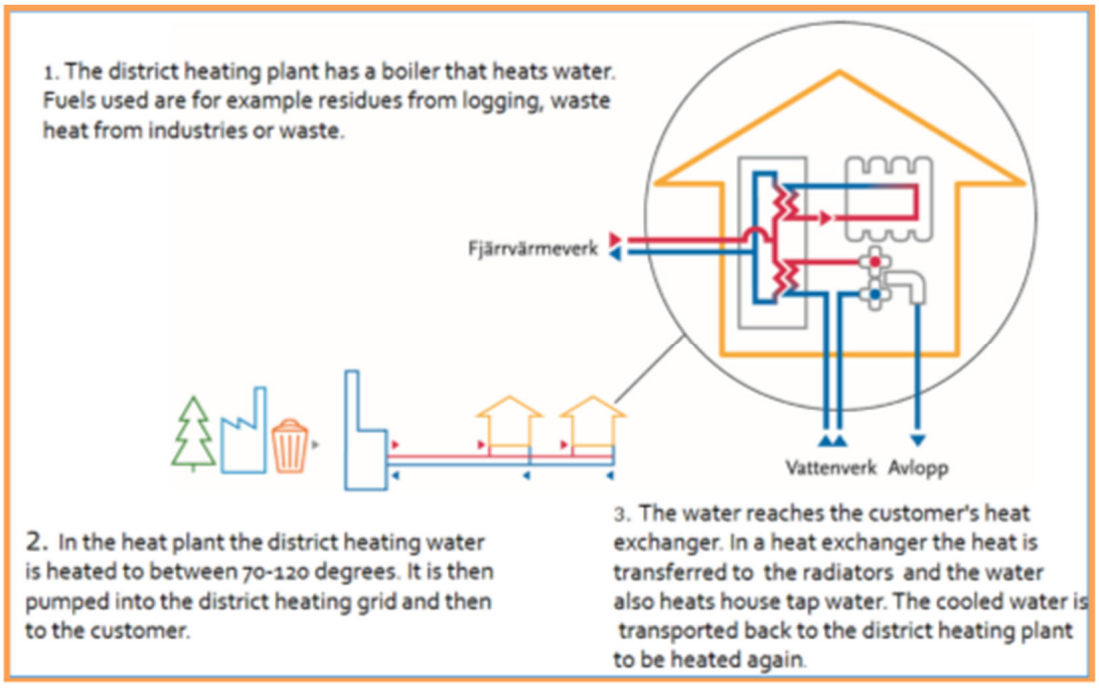
Up to 99% of the delivered energy is produced by bioenergy; however, successfully energy efficiency is important both economically and ecologically.

3 Energy efficiency and renewable project

Jokkmokk district heating company successfully works with increasing the cooling performance in district heating sub-stations. A sub-station with poor cooling extracts less energy per unit volume of water. That means an overconsumption of flow to meet the consumers' heat demand. The positive effects of increased cooling are particularly reduced heat losses in the district heating network and efficiency increase for flue gas condensation. The energy efficiency campaign focuses on the return temperature of the water coming back from the customers. This is a key indicator of heat network efficiency.

Low return temperature results in a larger delta T, which means lower flow rates are required for the same kW delivered. In this way, pumps and pipes will work safer and more efficiently. A cooler return pipe also lowers heat losses. An important economic factor is the need to use reserve capacities for winter time's peak load. Those use oil an electricity, which makes it very expensive. There are significant economic savings to be made if the need for reserve heat production reduces. By installing new meter at the customer's facility will enable to find out where problems exist and to fix the problems, often by adjusting the customer's heat exchanger.

In Jokkmokk's case the fuel demand has decreased by about 435 MWh due to efficiency increase in flue gas condensation. The pipeline losses have been reduced by about 570 MWh, but more energy for pumping was needed, approximately 6 MWh.



4 Ownership structure and financial model used

Jokkmokk district heating is to 100 % owned by Jokkmokk municipality. The investment costs for material were about 1200 € and labour costs about 9000 €, while the cost saving is about 14 815 €/year. However, it is important to notice that the most economic projects for maintenance of sub-stations have been done now, next projects will most likely be less profitable.

5 Implementation Process

The first step in this and similar projects on energy efficiency is to measure, control and analyse how much energy is used in which facility and how much energy is needed to produce the final energy. In analysing the data it becomes obvious that some substations were not working properly. These needed to be checked, overhauled or possibly changed. An important next step is to review whether the taken steps were successfully. In the long run, a proper and continuously working controlling system and a strategic efficiency plan are needed.

6 Project results: Lessons learnt & post- project benefits

Energy efficiency projects are considered as most attractive projects for the municipalities because of their short payback period and economic, environmental and social benefits. In addition, the project will develop and maintain the current pipeline infrastructure leading to fewer maintenance needs and easily monitored network. A great challenge for small northern communities is the recruiting of educated staff capable of developing and implementing this type of projects successfully. The higher efficiency will lead to lower fuel costs and will save forests which is important as forests are essential, e.g. for preserving biodiversity and as Co2 storage.

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