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MUNICIPAL ENERGY EFFICIENCY MEASURES

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Abstract

Global greenhouse gas emission reduction targets are being translated on to EU level and further to national level targets. Finland aims to be a forerunner in actions, knowhow and goals to reduce greenhouse gas emissions. As a part of updating Satakunta Climate and Energy Strategy a survey on municipal energy efficiency measures was sent to city mayors, technical directors and environmental engineers/environmental inspectors. The survey focused on centralized energy production, transport development plans, renewable energy production plans, industrial plants, emission offsets (compensations), circular economy measures, municipal construction plans and use of buildings, food services and municipal planning. 12 municipalities of 17 in the region answered the survey. Because municipalities in Satakunta vary in sizes from 1 500 to 84 500 people, there are also energy efficiency measures in very different size ranges. This is important to take into consideration while making conclusions about the municipalities. The survey showed that municipalities are more committed to energy efficiency measures than increasing the use of renewable energy. Energy efficiency measures usually save the municipality money at least in a long run, as increasing renewables may need a lot of resources and investment in the early stage in the investment process. This makes energy efficiency measures so much more appealing and approachable to municipalities.

1. Introduction

Global greenhouse gas emission reduction targets are being translated on to EU level and further to national level targets. Finland aims to be a forerunner in actions, knowhow and goals to reduce greenhouse gas emissions. As part of this, a national research project is performed on seven provinces in Finland. The goal is to create roadmaps and action plans for the regions to reach carbon neutrality (Hiilineutraalisuomi, 2019).

A study performed in multiple communities in Canada showed that communities see improvements in energy efficiency and energy conservation as a way to meet their energy efficiency objectives. Also based on the study, the main driving goal in creating community energy plans was to reduce greenhouse gas emissions with more ambitious targets set to municipal operations compared to the targets set for the broader community. It is important to involve the municipalities in strategy work not only because they know what they need and are able to do, but also to engage them to the work at an early stage (St. Denis and Parker, 2009).

Nair et al. studied factors influencing energy efficiency investments in existing Swedish residential buildings. Their study showed that reduction of household energy use and adoption of measured for this purpose was considered important. The study also showed that most measures undertaken were non-investment measures. Investment measures were more likely to be done by those, who considered their energy cost to be high. For municipal actors, the study showed that Effective communication to increase awareness of energy efficiency measures may improve the rate of adaptation. Also, economic incentives and information about cost savings was suggested as a tool to induce homeowners to adopt investment measures for energy efficiency. Nair et. al found that contacting municipal energy advisers made homeowners to be more likely to be aware of government support, but only few ever contacted such advisers. (Nair, Gustavsson and Mahapatra, 2010)

Nilsson and Mårtensson studied municipal energy planning and development of local energy systems. Swedish law has required municipalities to develop an energy plan since 1977. The study shows that the role of national policies is important in municipal energy planning as the contents of the plans follow national energy-policies with respect to reduction of oil use, improved energy efficiency, and increased use of renewable energy. The study showed that national energy policy has had an effect on how the municipal energy systems have evolved and therefor emphasizes the meaning of national targets in municipal level also. However, in addition to the positives, the study also showed that goals are quite vague for municipalities and leave room for new ambitious energy policies. (Nilsson and Mårtensson, 2003)

2. Objectives of the study

Satakunta is a province in Finland with 17 municipalities and cities and a total population of 219 000 in year 2018 (Satamittari 2019). As a part of updating Satakunta Climate and Energy Strategy a survey on municipal energy efficiency measures was sent to city mayors, technical directors and environmental engineers/environmental inspectors. The survey focused on centralized energy production, transport development plans, renewable energy production plans, industrial plants, emission offsets (compensations), circular economy measures, municipal construction plans and use of buildings, food services and municipal planning. The goal was to have regional views on what has been done to move towards carbon neutral municipalities, what is planned and what type of actions interest municipal actors. 12 municipalities of 17 is Satakunta region answered to the survey and eight out of these 12 were visited for further discussions about their answers. A draft of the updated version of the Satakunta Climate and Energy Strategy was done based by the answers and discussions about the survey.

Besides the provincial strategy, there are many other things in Finland leading municipalities towards carbon neutrality. Energy efficiency actions are a significant way to reduce emissions and usually pleasing to municipalities because they can save them money as well. Other things encouraging for climate acts are for example Government Programme (Objective 1: Finland will achieve carbon neutrality by 2035), Medium-term Climate Change Plan to 2030 (by Ministry of the Environment), Energy and Climate Strategy (by Ministry of Economic Affairs and Employment of Finland), municipalities' own strategies, energy efficiency agreements and HINKU (Towards Carbon Neutral Municipalities)-network. HINKU-network has over 50 municipalities involved and their target is to reduce their emissions 80% by 2030 from 2007 levels, which makes them quite active with their energy efficiency measures. In Satakunta region there are four HINKU-municipalities; Pori, Rauma, Eurajoki and Harjavalta.

3. Results of the survey

12 municipalities of 17 in the region answered the survey. The survey had nine main themes (centralized energy production, transport development plans, renewable energy production plans, industrial plants, emission offsets (compensations), circular economy measures, municipal construction plans and use of buildings, food services and municipal planning) and each theme had few questions. Some municipalities had distributed the survey to different employees so that they

could answer in detail. Some municipalities had one person (for example their environmental engineer or technical director) answer all the questions and then the answers were not quite as detailed. However, many useful contacts were received for further research.

3.1. Transport development plans

Transport-theme had a question “Does your municipality plan to release their cars for communal use outside the office hours?” and every municipality answered that with “no”. Some municipalities explained that with not having any cars at all, but the rest told that they found it difficult with all the responsibility issues and everything. Even though shared cars are becoming more common in housing companies for example, the municipalities do not seem to be ready for them yet.

3.2. Renewable energy production plans

When the municipalities were asked if they have plans for biogas plants, solar power, wind power or heat pump solutions, solar power was the most answered option by seven municipalities. Solar power clearly interests municipalities since they are contemplating possibilities and viabilities to install solar power to every new building (schools, playschools, sports halls etc.).

3.3. Municipal construction plans and use of buildings

None of the municipalities intends to obligate new or refurbished buildings to meet higher energy efficiency requirements that is required by legislation. This was not a surprise as there are many small municipalities suffering from negative development in population. They do not want to scare people away with too strict construction regulations. In addition, the legislation with new buildings is quite strict in Finland already.

Half of the municipalities that answered the survey said that they are planning intelligent optimization and additional insulation to their properties and over a half (7 municipalities) told that they are planning to do energy renovations as shown in Figure 1.

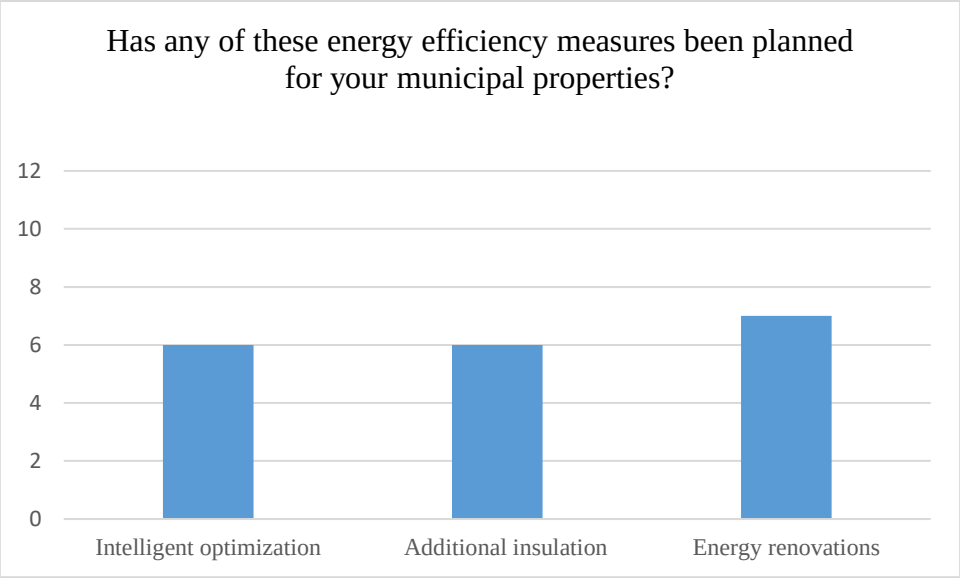

Figure 1. Plans on energy efficiency measures

3.4. Emission offsets

Only one of the municipalities told that they are planning to strengthen their carbon sinks and two said that they have plans for afforestation (Figure 2.). None of the respondents told that they would have plans for emission charges, which was not surprising, as it would probably not get the best reception from the residents.

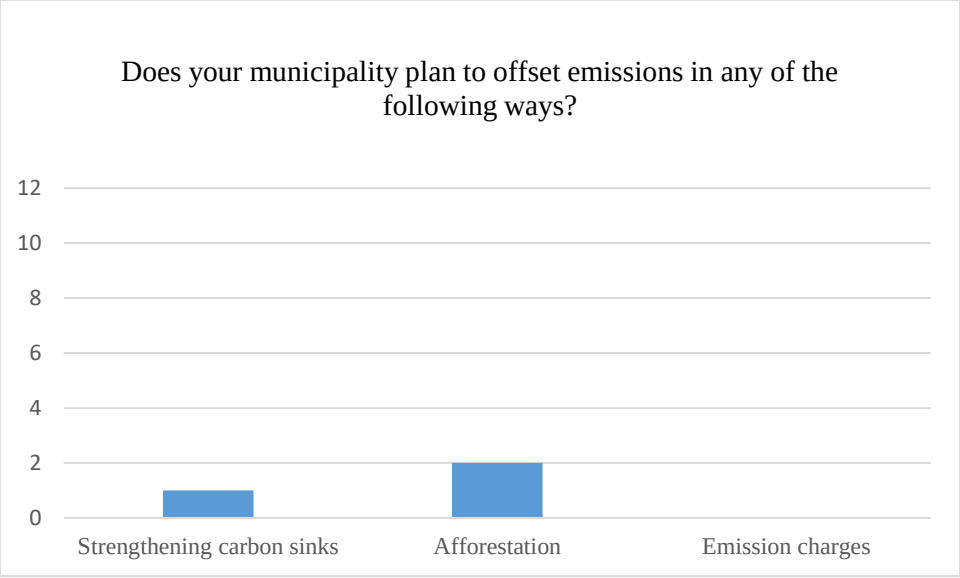

Figure 2. Plans on emission offsets

3.5. Visits and discussions

Because municipalities in Satakunta vary in sizes (from 1 500 to 84 500 people), there are also energy efficiency measures in very different size ranges. This is important to take into consideration while making conclusions about the municipalities. Some energy efficiency measures may be a lot more difficult to execute for smaller municipalities than for the bigger ones. Some municipalities have their own climate programs which shows interest in climate actions, makes it easier to carry out energy efficiency measures (because they may be already planned in the program) and it shows that some resources are available for climate work. One city was just setting up new targets for their divisions (group administration division, education division, civil engineering division, environment and permit services division and social and health care division) and they had decided to add one climate target to each division's targets. This brings the climate work closer to everyone working in the city divisions and makes the targets more achievable as they are individually designed for each division.

In addition to the climate goals, there are other good practices in Satakunta too. There are very successful experiments with serving vegetarian food in schools and minimizing the food waste. Also, there are great examples of replacing oil-fired boilers with wood chip boilers and heating with local wood. The use of sensors to monitor energy usage has increased and this has improved energy efficiency notably. These good practices should be disseminated to the province through Satakunta Climate and Energy Strategy.

4. Satakunta Climate and Energy Strategy update

An update proposal for the Satakunta Climate and Energy Strategy was made based by the survey and discussions. The update has three targets and each target has their own focuses. The targets and focuses are:

1. Sustainable energy solutions in Satakunta
- Promoting the use and production of zero emission energy in Satakunta
- Reducing energy consumption and increasing energy efficiency in Satakunta

2. Carbon neutral Satakunta
- Reducing emissions in Satakunta
- Increasing carbon sinks

3. Climate wise Satakunta

- Towards a climate wise everyday life
- Preparing for and adapting to the effects of climate change in Satakunta

The proposal requires more detailed studies on the willingness and abilities of different regional and municipal actors' ability to commit into energy efficiency and greenhouse gas emission reduction measures.

5. Conclusions

The survey showed that municipalities are more committed to energy efficiency measures than increasing the use of renewable energy. Energy efficiency measures usually save the municipality money at least in a long run, as increasing renewables may need a lot of resources and investments in the early stage of the investment process. This makes energy efficiency measures so much more appealing and approachable to municipalities. In addition, the study showed that planning locally helps influencing the implementation of measures better than controlling from above. For this reason, the regional will is being scanned.

The survey showed that sizes and resources of municipalities has a significant impact on their ability to invest into actions towards carbon neutrality. In addition, as a province that has a significant amount of industrial operations, activating only municipalities is not enough. Industries need to be involved in the actions in order to reach sufficient reductions in greenhouse gas emissions and move towards carbon neutrality.

Further research needs to be done about how municipalities and provinces can influence homeowners and industries and their interests and goals in emission reductions and in broader perspective than only energy efficiency measures.

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