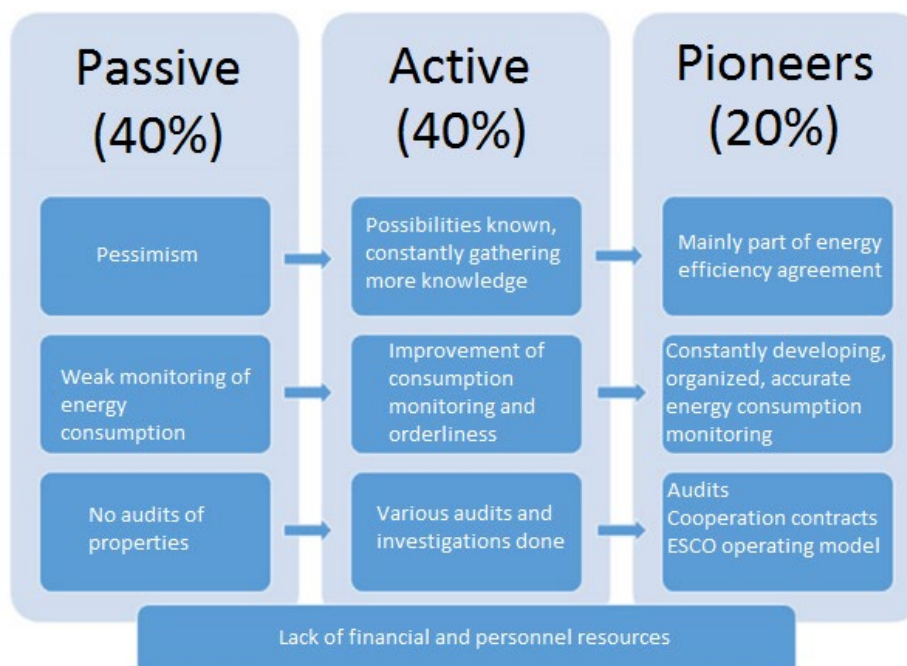


Current state study of energy efficiency knowledge in Lapland's municipalities

This is translated summary of interview study for LEAP project, conducted in Lapland University of Applied Sciences. Original, Finnish version is written by Leena Parkkila and Antti Sirkka, and has broader view towards energy efficiency, green energy and the actual interview study process. This summary focuses only on current state of energy efficiency and knowledge in Lapland's municipalities. Translation and summary was done by Niko Pernu.

Current state of energy efficiency

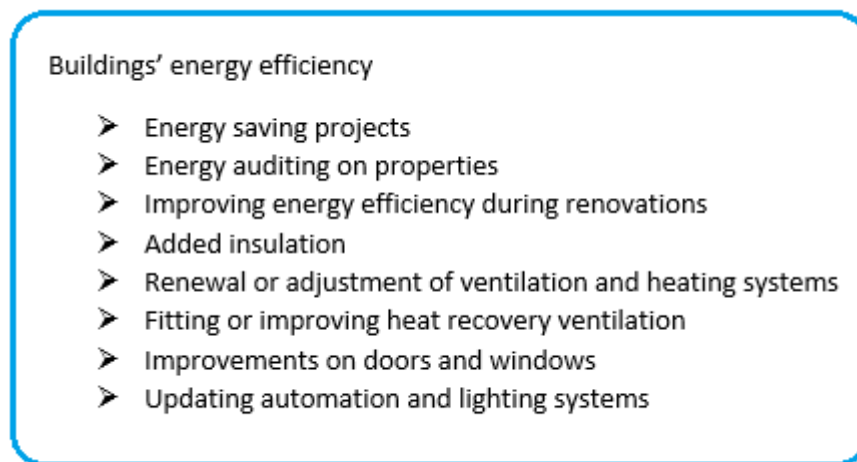
According to the study, large and mainly old real estate base is conjunctive factor in municipalities. All municipalities have buildings with similar purposes: offices, schools, rental apartments, hospitals and health centers. Field study examined how municipalities monitor, plan and improve energy efficiency. Interviews were carried out to examine municipalities energy efficiency strategies, energy consumption monitoring, cooperation partners, plans to improve energy efficiency in buildings and processes, implemented measures and effects of those measures. Field study revealed varying level of energy efficiency operations in municipalities. In the picture 1, all municipalities have been categorized based on energy efficiency actions. Categorization allows development planning to municipalities based on their needs.



Picture 1. Current state of energy efficiency in built environment in Lapland's municipalities (Sirkka 2016)

Pioneering municipalities carry out mainly energy efficiency projects, which focus on the most important building and achieve good results. Those municipalities are actively involved in developing provincially important energy industry. Active municipalities improve their own actions in the long run and seek actively operating models suitable to their needs. Passive municipalities carry out the most necessary renovations, mainly due to lack of resources. Communal sector has some level of insecurity regarding continuity of some services, which results passivity in building maintenance. Services are centralized in municipal centers, and remote properties are disposed.

Half of the municipalities in Lapland had done energy audits, mostly on their largest buildings. Energia Group Oy and Corbel Oy mainly carried out audits. Some of those audits were done with Motiva template, some carried out in different manner. The other half of the municipalities had potential locations for performing energy audits.



Picture 2. Operations carried out by municipalities to improve energy efficiency

Current state operations for building energy efficiency were energy saving projects, energy auditing buildings, improving energy efficiency during renovation, adding insulation, replacing or adjusting ventilation and heating systems, updating lighting and automation systems. Half of the municipalities had reached their goals in these operations, main goal being energy- and resource savings between 25 – 70 %. There was also noticeable improvements in living comfort and indoor air quality. Half of the municipalities had not calculated repayment period of operation(s), since they were conducted from property maintenance's viewpoint.

Challenges were faced in various levels of operations. First and most influencing problem is lack of resources. The complexity of ESCO financing is a major problem in financing energy efficiency projects, and knowledge about other financing and supporting organizations is limited. In addition, limited personnel resources limit the municipalities' capability to carry out anything but necessary actions. Old building base with large maintenance backlog is hard to maintain up to date in current economic situation. There has been difficulties to assure municipalities' decision makers to approve planned action, and negative atmosphere towards tightening regulations certainly does not help it. Smaller scale problems found in conducted operations are finding unbiased information about improving energy efficiency, repayment periods, adjusting heating and ventilation systems and geothermal heating.

Ideal state of energy efficiency

Ideal state of energy efficiency in municipalities was not easy to define, but interviewees could point out the factors limiting energy efficiency improvements and some ideas to achieve ideal situation. Common development needs identified in the field study were organization of energy efficiency activity, improvement of digital energy consumption monitoring, education of property maintenance crew and property users, education regarding use of electronic property information software and energy auditing to achieve broad improvements in energy efficiency. In addition, resources for renovations should be investigated and justified.

Possibility of extending adjustment- and small fix operations with small steps towards energy efficiency viewpoint should be evaluated. Municipalities' energy efficiency operations should be supported. In addition, it is worth considering arranging energy efficiency education for the actual users of buildings like in Kuopio, Finland. Kuopio is currently top cities in Finland when it comes to energy efficiency and acts against global warming.

Property maintenance crew need education in general and guidance towards more efficient use of electronic service manuals (Haahtela). Properties need various adjustments, maybe even automation regarding ventilation and heating. Municipalities are thinking about joining the energy efficiency agreement for the next period, and agreement itself is seen as a possibility to improve energy efficiency, but the actual, concrete advantages of agreement are not clear to all of the municipalities.

There is a clear need for information and knowledge among personnel and citizens of municipalities. Below, these specified needs are categorized by recipient.

Municipalities' personnel need information about:

- Energy guidance for properties' users and maintainers
- Development of information technology and automation knowledge
- More efficient use of electronic service manual (Haahtela)
- Energy efficiency agreement
- Financing models and channels (ESCO)
- Information model regarding energy efficiency potential
- Energy guidance, from planning to operations
- Energy audits, long term building maintenance plan
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Municipalities' citizens need information about:

- Financing channels
- Energy regulations in building and renovating (eg. additional insulation)
- New heating options and technology
- Comparison between different heating methods (costs, repayment periods)
 - o Possibility of conducting ESCO energy efficiency project

Future plans

Municipalities plan to improve energy efficiency by carrying out already planned renovations on their largest properties. Conducting energy audits and its suggested actions is another tool towards better energy efficiency in buildings. Signing in to the new semester of energy efficiency agreement is seen as a possibility. Directing energy guidance towards property maintenance personnel, users and citizens would solve the lack of knowledge and information.

Municipalities aging property base and large maintenance backlog are challenging factors during current economic situation. Lack of resources and financing are the biggest problems in municipalities when it comes to improving energy efficiency. Planned renovations focus mainly on indoor air problems, ventilation and heating systems, property automation updates and lighting in public buildings consisting health centers, hospitals, schools, swimming halls and sheltered housing units.

Summary

Interview study's goal was to answer the main question: what is the knowledge, current and ideal state of energy efficiency in Lapland's municipalities? Level of knowledge and current state go mainly hand in hand in each municipality, but differences between municipalities are significant. Representatives could not exactly define ideal state, but could name problems in energy efficiency development projects. In addition, some operations were planned and ideas introduced by these municipalities to improve energy efficiency and tackle problems mentioned above.

Main problems consisted of large renovation demands combined with major maintenance backlog and lack of resources. Second, significant problem is lack of information and education about energy efficiency in all its levels. Information is mainly needed for maintenance personnel, but also for citizens. In smaller scale, municipalities have more diverse and specific problems.

Most of the municipalities recognize what the main steps in development of energy efficiency are, but for the reasons above, are yet to take all those steps.