

Härmälä EID strategy

Background information

City of Tampere has set an ambitious goal to be carbon neutral by 2030. The city is in the process of creating a road map for reaching this goal. More than one third of greenhouse gas emissions in the city of Tampere come from heating of buildings. The building stock is mostly privately owned, which makes it very challenging to achieve big changes in energy consumption within a short period of time. AREA 21 project in Tampere aims to tackle this challenge. The pilot area of the project, or Energy Improvement District (EID), in Tampere is Härmälä.

The AREA 21 project in Tampere is developing new approaches to promote energy efficiency in residential buildings. To achieve this, the project involves building owners in energy planning, develops new cooperation formats for SMEs, authorities and research institutes, takes energy efficiency thinking to a district level and promotes new technologies for energy monitoring. The focus is on supporting building owners in making cost-effective energy efficiency actions. This should lead to new collaboration opportunities on the district-level that benefit all stakeholders and reduced carbon emissions from the building stock.

Taking energy efficiency thinking to a district level brings many opportunities in engaging building users and finding synergies in energy efficiency actions. Also new technologies in energy consumption visualization and energy renovation simulation offer a good opportunity to engage end-users in energy saving.

Building owners and end-users of energy have a big role in achieving the carbon-neutrality target. While the local energy utility strives to switch to renewable sources in energy production, it is important to optimize and reduce consumption, since potential for renewable energy production is very limited. AREA 21 is fostering this development by producing a new tool for monitoring energy consumption and testing it in Tampere.

Local context

Description of pilot area

The pilot area, Härmälä, is situated three kilometers south of the city center of Tampere. Härmälä can be considered as a “miniature version” of the whole building stock of the city of Tampere with regard to ownership structures and the share of different functions. It comprises areas with newly constructed and older multi-family blocks, areas with older detached houses as well as industrial use. Each part of the district is characterized by specific functions and needs when it comes to energy efficiency planning. Territorial coverage of the EID is approximately 2,5 km² and it is home to 8000 inhabitants.

There are 760 residential buildings in EID Härmälä area. 194 of the buildings are apartment blocks and the rest are detached houses. About half of the apartment blocks are privately owned limited liability housing companies and the rest are owned by rental housing companies. All the detached houses are privately owned.

Almost all of the blocks of flats are heated by district heating. Detached houses are largely heated using electricity but there is also a significant number of houses that have oil or geothermal heating.

About half of the apartment blocks are old - built in the 60's or earlier. But also almost half of the buildings are quite new - built in the 2000's. Over half of the detached houses are very old - built in 40's or earlier. The rest of the detached houses are built in 50's, 60's, 70's and 80's and there are only few very new detached houses.

To aid in the district-level cooperation, existing discussion Forums were identified. The city of Tampere is divided into 5 service districts, each of which collects stakeholders from the area to meetings and workshops where topics of local interest are discussed and planned. Härmälä is part of the southern service district. Also some associations form discussion forums for subjects related to energy efficiency including Union of Property Owners (detached houses) and The Real Estate Federation of Tampere Region.

The Most important local stakeholders in the point of view of energy efficiency of residential buildings are Tampere Power Utility, Tampere University, VTT Technical Research Center, The Real Estate Federation of Tampere, Union of Property Owners, City Council and City Board of Tampere, financial institutions and local companies providing energy efficiency services. Most important national stakeholders are Ministry of Environment, Energy authority and Motiva Ltd. The complete stakeholder map can be found in figure 1 along with assessment of how much each group can influence and how much it is in their interests to influence the energy efficiency and climate emissions of Härmälä.

Local climate, energy, environmental and spatial policies

In local climate policy, the most important goal of the local climate policy is carbon neutral Tampere 2030. This goal is included in the current city strategy, where it is also closely connected to sustainable growth and managing impacts. The city started a program called Sustainable Tampere 2030 to fulfill the carbon-neutrality goal and to create a road map of climate action. The Tampere region, which includes Tampere and it's neighboring municipalities, has a common climate and energy strategy that aims for carbon neutrality in regional scale. The Council of The Tampere City Region approved the Climate Strategy of the Tampere City Region in 8.1.2019. The Climate Strategy of the Tampere City Region sets the larger scope for regional climate work and every city in the region (Tampere, Nokia, Pirkkala, Ylöjärvi, Kangasala, Orivesi, Vesilahti, Lempäälä) can make their own plans accordingly.

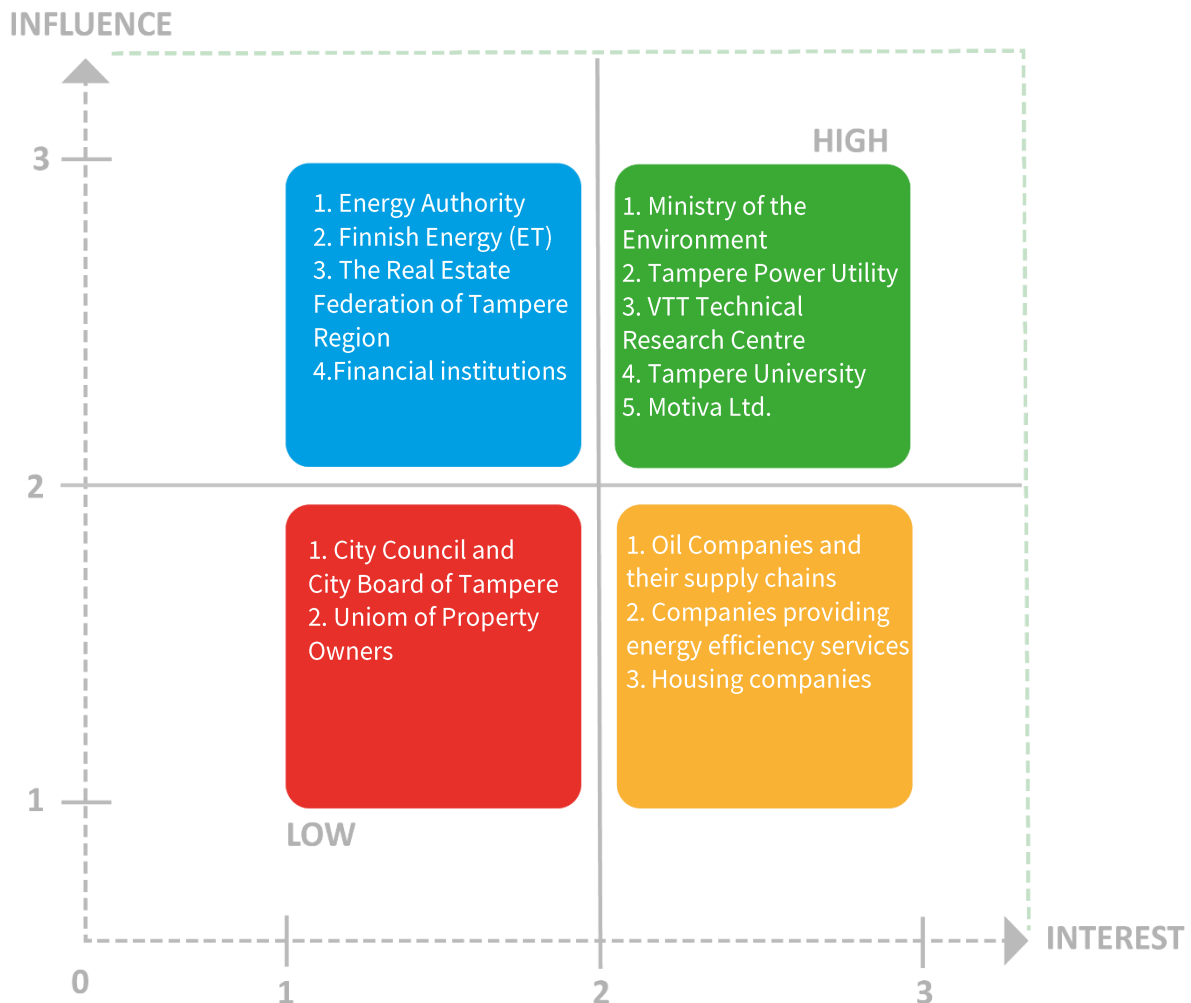


Figure 1. Stakeholder map of Energy Improvement District Härmälä

Most important local energy policies are visioned in the Sustainable Tampere 2030 -towards a carbon neutral city - guidelines accepted by the city council 18.6.2018. Tampere is also committed to the national municipal sector energy efficiency agreement with the national government. Concrete goals for achieving targets are improved energy efficiency, low-emission energy production, more efficient use of solar energy and stopping the use of oil heating in buildings. For every goal there will be their own implementation plan or plans made by the Sustainable Tampere 2030 -program team in cooperation with different city units and stakeholders.

In urban planning, the most important goals come from the city strategy. Since Tampere is a growing city, the focus is on densifying the community structure along the public transport gateways and improving public transport quality and walking and cycling conditions. There is also a Regional Structure Plan 2040 that includes long term regional public transportation plans (pedestrian and cycling, trams, busses, regional trains). According to the regional plan, an investment in a tram should be made in the Härmälä district while city structure should be densified along the tram route.

The most important relevant legal instruments, rules and regulations for energy governance include energy taxes, energy efficiency requirements for buildings and emissions trading. In financial framework, the most important incentive for companies is energy aid, which supports investments made in energy efficiency and renewable energy. For single-family houses there is a tax deduction option for work done when refurbishing a permanent residence or a summer house, including energy efficiency or renewable energy measures. The deduction is up to 2400 euros per person a year.

Energy efficiency potentials

In EID Härmälä the biggest renewable energy potential is in the use of solar energy and heat pumps. Almost all of the buildings in Härmälä could cut their purchased electricity consumption by 15 percent by producing electricity with integrated solar panels. All of the oil-heated detached houses could produce their heat easily with ground-source heat pumps, which would also have a significant effect in greenhouse gas emissions, and all the detached houses heated with electricity could use air-to-air heat pumps to reduce electricity consumption. Also, a big share of the older apartment blocks could implement exhaust-air heat pumps.

Biggest energy efficiency potential lies in combining many energy efficiency measures. The most cost-efficient actions are often the cheapest ones. For example adjusting of ventilation and heating, using demand response services, sealing of windows and doors, enhancing the lighting systems and water consumption management are very cheap and easy ways to cut energy consumption. Also bigger energy efficiency actions such as adding insulation of envelope are profitable investments if they are connected to other necessary refurbishment measures.

Key priority areas in EID Härmälä are stopping oil heating and getting a wide range of energy actions done in the residential building stock.

Key challenges

Key challenge in EID Härmälä is how to encourage building owners to make energy efficiency actions. New technical solutions are often very complicated to understand and some of them require big loans. In limited liability housing companies and in detached houses the owners of the buildings and building managers are not experts in energy efficiency and they need a lot of information and examples for making investment decisions. In addition, there are no significant financial incentives for making energy efficiency investments. They often encourage the final decisions of private people in refurbishing their homes even though the measures are often profitable also without such incentives.

SWOT analysis

Strengths

- Many energy renovations are profitable for the home owners
- High value of buildings
- Strong general support for the EID work and wide cooperation between authorities, enterprises, research institutes and building owners

Weaknesses

- No significant financial help or incentives for building owners to make refurbishments
- Most of the buildings' owners are private people, so the ownership is fragmented
- Private building owners' poor investment capability and difficulties in making decisions
- Open building data is of poor quality for developing services for building owners
- Wide area and a wide range of buildings
- New technology for saving energy is hard to understand and building owners are not aware of the possibilities

Opportunities

- Improving open data and new technical possibilities in developing services for building owners
 - group renovations
 - artificial intelligence based renovation need estimations
 - energy renovation simulation
 - energy consumption visualization
- Building owners are interested in getting support to decrease energy bills and carbon emissions
- The price of energy seems to be rising

Threats

- Contractors and planners providing energy-efficiency services are competing against each other
- Public funding challenges

Vision

Residential energy use in Härmälä will be carbon neutral 2030. All cost-effective potential for energy efficiency, demand response and renewable production will be realized in residential building stock through collaboration between local stakeholders.

Goals to achieve vision

Theme 1: Energy efficiency improvements in the residential building stock

- Goal 1: 10% reduction of carbon emissions from residential buildings by improved energy efficiency (from 2020 to 2030)

Theme 2: Optimization of district heating networks

- Goal 2: Limiting heat demand peaks in district heating networks

Theme 3: Optimization of heating systems in residential buildings

- Goal 3: Replacement of all oil-based heating systems in residential buildings until 2030

Definition of EID specific objectives

Objective 1.1 - Encourage and support housing companies to conduct energy efficiency measures

Objective 1.2 - Limit energy consumption by energy-saving resident behavior

Objective 1.3 - Promote better energy efficiency of detached houses heated by electricity

Objective 2.1 - Promote usage of demand response services

Objective 3.1 - Encourage and support the owners of the buildings in replacing heating systems