“Projects with Heat Pump excellence” online workshop 20th Oct 2020

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Apartment building housing company As Oy Tampereen Pohjolankatu 18-20

● Location: Tampere, Finland
● Construction year 1980, 55 apartments (1 commercial), 80 habitants
● Goals of the housing company: provide affordable, comfortable and safe residency with low carbon footprint
Energy solutions

- Exhaust air heat pump
- Ground source heat pump, 5 x 300 m boreholes
- Waste water heat recovery
- Solar energy
- Cooling
- 2-way district heating
- Smart control system Talotohtori 2.0
Results

District heat production started 4/2018, after that purchase 10 MWh and sales 377 MWh

Carbon positive!!!
Highlights

- Energy renovation made 2014-2017 with the help and partly funded by EU-GUGLE program
- Forerunner: 1st and still the only apartment building in Finland producing heat to district heating network
  - more than 100 media events held, more than 1000 onsite visitors
  - several awards, e.g. “Heat Pump City of The Year 2019”, Carbon neutral municipalities Hinku-action award, etc.
- Housing company’s monthly maintenance cost 2,60 €/m2 decreased to 1,82 €/m2 in 2020!!!
Fossil fuel use in the heating and traffic cause the most GHG emissions.
Clean electrification is the sustainable way to reduce emissions in the heating, transport and industry sectors.
Towards carbon neutral Finland
- what is the role of heat pumps?

<table>
<thead>
<tr>
<th>Primary energy sources</th>
<th>Primary energy consumption in Finland 2017* / 2018</th>
<th>Primary energy consumption in fossil-fuel free scenario</th>
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</thead>
<tbody>
<tr>
<td>Wind power</td>
<td>6 TWh</td>
<td>60 TWh + 40 TWh more for 16 TWh synthetic fuels</td>
</tr>
<tr>
<td>Solar energy</td>
<td>0,1 TWh*</td>
<td>3 TWh</td>
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<tr>
<td>Nuclear fuels, uranium</td>
<td>66 TWh</td>
<td>106 TWh (36 TWh electricity)</td>
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<tr>
<td>Biomass</td>
<td>104 TWh</td>
<td>110 TWh</td>
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<tr>
<td>Ambient and excess heat (heat pumps)</td>
<td>6,4 TWh*</td>
<td>38 TWh</td>
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<tr>
<td>Hydropower</td>
<td>13 TWh</td>
<td>15 TWh</td>
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<tr>
<td>Fossil fuels</td>
<td>Natural Gas 20 TWh, oil 85 TWh, coal 32 TWh and peat 17 TWh</td>
<td>0 TWh</td>
</tr>
</tbody>
</table>

Source: Rinne Samuli, Auvinen Karoliina, Reda Francesco, Ruggiero Salvatore & Temmes Armi. **Clean district heating - how can it work?** Fossil-fuel free scenario for Finland. Available: [https://aaltodoc.aalto.fi/handle/123456789/40756](https://aaltodoc.aalto.fi/handle/123456789/40756)
Office buildings, data centers etc.
with solar PV, EVs, heat pumps
and boreholes

School with solar PV

Old residential buildings with solar PV, EVs, heat pumps and hot water storage tanks

New residential buildings with solar PV and EVs and hot water storage tanks

Heat distribution network

Flexible back-up heat and power

Solar heat collectors

Wind turbines

Industrial heat pumps using air, water, ground source, geothermal and excess heat sources

Thermal storages

Clean district heating & cooling system

Electrification of the district heating is a systemic change
Challenge: the disruption of the district heating companies’ business model
Policy ideas and recommendations

● How to open the district heating networks for small scale heat producers?
  ○ Currently district heating companies in Finland are regional monopolies
  ○ In 1995 electricity production and sales were separated from electricity transmission and distribution. Should the same happen in the heating markets in larger cities?

● Common rules are needed for district heating companies to connect buildings with exhaust air heat pumps to the heating and cooling grids

● New contract and pricing models are elemental - the change needs to come from policy makers and regulation?
Thank you! Questions?
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