



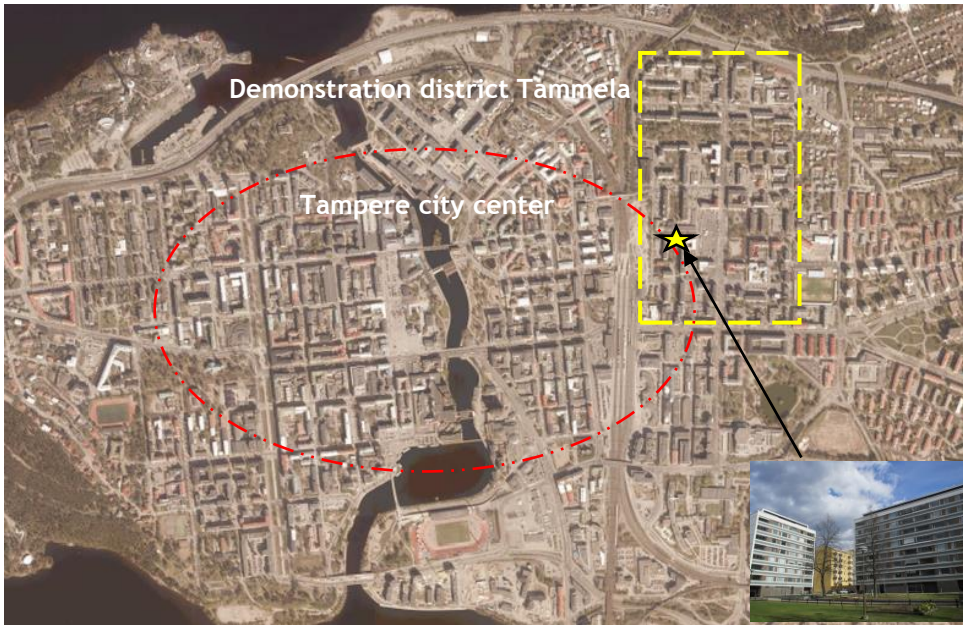
Factsheet

BEST 3 Limited liability housing company Tammelankulma

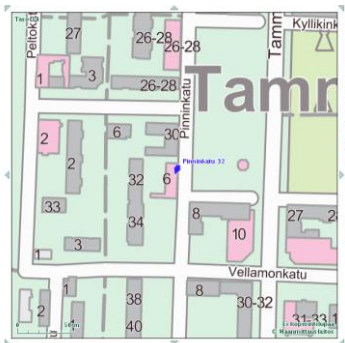
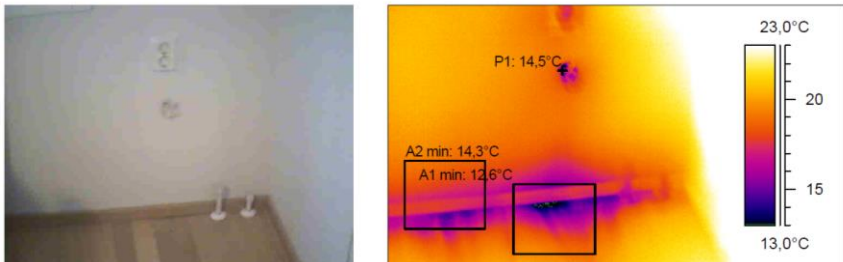


EU-GUGLE stands for “European cities serving as Green Urban Gate towards Leadership in sustainable Energy” and is funded under the 7th Framework Programme for Research and Technological Innovation.
It is co-ordinated by CENER, Spain’s National Centre for Renewable Energies.

PROFILE

Name and address	<i>Demonstration area Tammela district and DEMO 3 Limited liability housing company Tammelankulma</i>	
Map		
Description	<p><i>The Tammela district, where the renovations took place, has 6.337 inhabitants. The age distribution of Tammela is mostly elderly people, young couples and students. 94 % of the inhabitants are between 18 and 85 and only 6 % between 0 and 17. Decision making in the privately owned limited liability housing companies can be challenging because of the lack of interest in doing big renovations and the lack of funds. Tammela district is also a demonstration area for infill development. Additionally, there are several projects that are trying to help and encourage the limited liability housing companies in the area to use infill development as a means of funding renovations and improving the quality of living.</i></p>	
Ownership	<i>Owner occupied building</i>	
Gross surface	<i>5 395 m²</i>	
Number of dwellings	<i>67</i>	
Energy performance	<i>BEFORE</i>	<i>F</i>
	<i>TARGET/AFTER</i>	<i>D</i>

1 – Description before refurbishment

Detailed characteristics of building	This section should be a detailed overview of the building characteristics		
Plot map			
Building envelope	Pre-fabricated concrete building walls U value 0,8; windows 2,5		
Technical system	District heating; central heating; mechanical exhaust air Renewables in district heat production 17 % Renewables in grid electricity 13 %		
Thermal imaging before refurbishment	<p><i>Leaking walls</i></p> 		
Energy performance certificate ¹	-75	A	
	76-100	B	
	101-130	C	
	131-160	D	
	161-190	E	
	191-240	F	F
	241-	G	

¹Not based on the official energy certificate calculation. Calculation is based on the Finnish 2013 legislation regarding buildings' energy certificates 18.1.2013/50 and takes into account more precisely the technical values of the measures implemented in the building.

2 – Refurbishment concept

Concept	
Financing model	<i>Bank loan; EU grant</i>

Envelope details	
Ground to wall section (thermal bridge)	<i>Additional insulation to solid walls</i>
Wall to fenestration section (thermal bridge)	<i>New windows</i>

Technical system	
Technical system	<i>District heating; central heating; energy efficient lighting; new plumbing Renewables in district heat production 38 % Renewables in grid electricity 25 %</i>
Thermal renewable integration	<i>Heat recovery and exhaust air heat pump Recycled waste air to garages and corridors</i>
Electric renewable integration	<i>N/A</i>

3 - Implementation

Stakeholders involved	
Project manager	<i>Lara Oy</i>
Architect	<i>Arkion Oy</i>
Technical system designers	<i>Insinööritoimisto Mikko Ilvesmäki Oy Insinööritoimisto Raimo Vainonpää Oy</i>
Main contractor	<i>Pirkanmaan Mestari-Rakentajat Oy</i>
Sub contractors	<i>Sähköurakointi Sähköansio Oy LVI-Urakointi Lämpövirrat Oy</i>

Costs and financing ²		
Refurbishment	<i>Facade, windows, doors, balconies</i>	<i>477 000</i>

²Costs are based on different actual and calculated costs shifted to the comparison year 2014-2016 with the construction cost index.

costs	<i>Ventilation and heating incl. heatpump; monitoring system</i>	<i>113 500</i>
	<i>Lighting and electricity</i>	<i>102 400</i>
	<i>Faucets etc.</i>	<i>117 700</i>
	<i>Other renovation costs</i>	<i>35 900</i>
	<i>Planning, supervision, etc.</i>	<i>63 500</i>
	<i>VAT 24 %</i>	<i>421 800</i>
	<i>Total €</i>	<i>1 332 000</i>
	<i>Total €/m2</i>	<i>250</i>
Financial resources	<i>Bank loan (86 %); EU grant (14%) of total costs; National grant (1%)</i>	

Planning and implementation	
1 - Step one	2011-2012
<i>Design brief and selection of project leader</i>	
2 - Step two	2013
<i>Call for bids and selection of main contractor</i>	
3 - Step three	2014-2015
<i>Renovation and commissioning</i>	

Work progress

Façade after added insulation



Construction work in progress in the boiler room




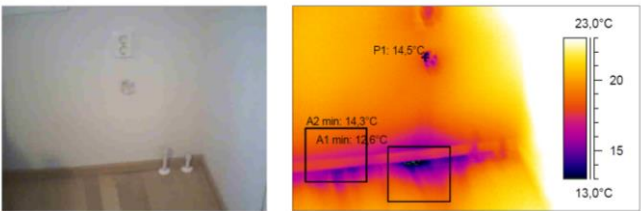
Building automation unit



Exhaust air heat pump



4 - Description after refurbishment

Photo to show architectonic concept	
A thermal imaging showing before	
Envelope characteristics	<i>Only solid facades have got additional insulation (+ 100 mm). New windows U value 1,4</i>
Technical system	<i>District heating; improvements within central heating; LED lighting; water saving faucets</i>
Renewable energy sources	<i>Exhaust air heat pump 40 kW Recycled waste air Renewables in district heat production 38 % Renewables in grid electricity 25 %</i>
Energy consumption (final)	<i>148 kWh/m²/a</i>

Energy efficiency certificate ³	-75	A	
	76-100	B	
	101-130	C	
	131-160	D	D
	161-190	E	
	191-240	F	
	241-	G	

5 - Performance monitoring

Monitoring System	Remote monitoring system. Smart metering by utility company
Monitored variable	District heat to space heating and DHW Heat created Water Electricity

Performances ⁴			
	Existing	Planned	Monitored
Electric consumption kWh/m ² /year	8	25	27
Thermal consumption kWh/m ² /year (HP electricity)	-	17	14
Thermal consumption kWh/m ² /year (DH)	212	105	98
Thermal consumption kWh/m ² /year (own production)	-	-45	-35
Gross energy consumption in final energy	220	85	90
Electric RES contribution kWh/m ² /year	1	6	7
Thermal RES contribution kWh/m ² /year	36	85	72
Operational costs €/m ² /year	12	6	6

³Not based on the official energy certificate calculation. Calculation is based on the Finnish 2013 legislation regarding buildings' energy certificates 18.1.2013/50 and takes into account more precisely the technical values of the measures implemented in the building.

⁴Comparison between the calculated original and planned status as well as monitored values for the completed building after at least one whole year of monitoring.