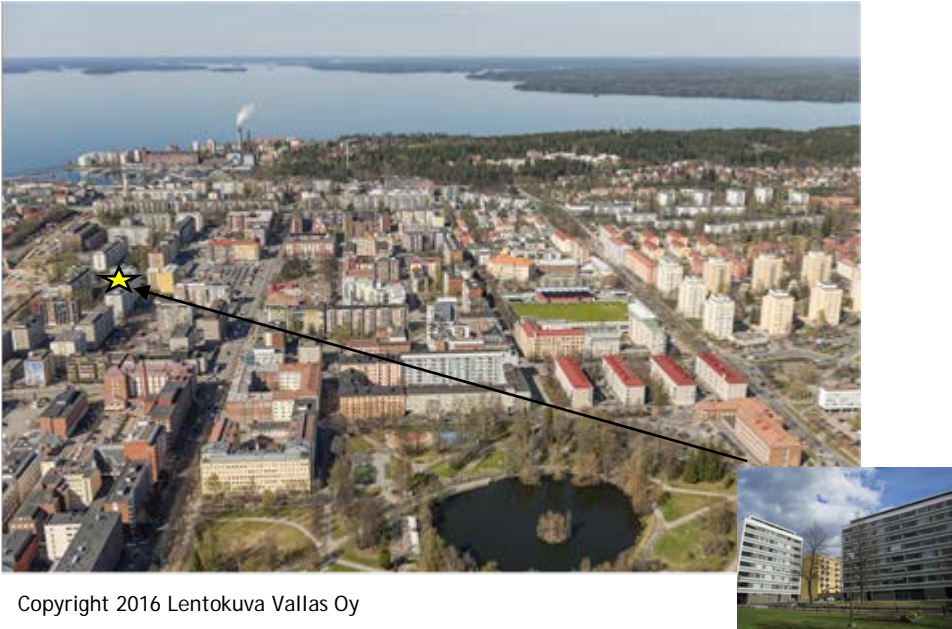




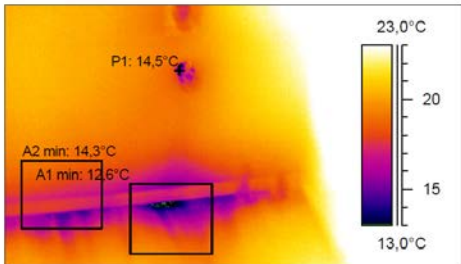

Factsheet

BEST 3 Limited liability housing company Tammelankulma

PROFILE

Name and address	<i>The demonstration area Tammela district and DEMO 3 Limited liability housing company Tammelankulma</i>	
Map	 <p>Copyright 2016 Lentokuva Vallas Oy</p>	
Description	<p><i>Tammela district, where the renovations take place, has around 7000 inhabitants. The age distribution of Tammela is one-sidedly mostly elderly people, young couples and students. 94 % of the inhabitants are between ages 18-over 85 and only 6 % between the ages 0-17. Decision making in the privately owned limited liability housing companies can be challenging because of lack of interest to do big renovations and lack of funds. Tammela district is also demonstration area for infill development. And 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 improve quality of living.</i></p>	
Ownership	<i>Owner occupied building</i>	
Gross volume	5395 m ²	
Number of dwellings	67	
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	<div>Leaking walls</div> <div></div>																							
Energy performance certificate*	<table><tr><td>-75</td><td><div>A</div></td><td></td></tr><tr><td>76-100</td><td><div>B</div></td><td></td></tr><tr><td>101-130</td><td><div>C</div></td><td></td></tr><tr><td>131-160</td><td><div>D</div></td><td></td></tr><tr><td>161-190</td><td><div>E</div></td><td></td></tr><tr><td>191-240</td><td><div>F</div></td><td><div>F</div></td></tr><tr><td>241-</td><td><div>G</div></td><td></td></tr></table>			-75	<div>A</div>		76-100	<div>B</div>		101-130	<div>C</div>		131-160	<div>D</div>		161-190	<div>E</div>		191-240	<div>F</div>	<div>F</div>	241-	<div>G</div>	
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191-240	<div>F</div>	<div>F</div>																						
241-	<div>G</div>																							
Other relevant technical aspects																								

*Not the official energy certificate calculation. Calculation is based on the Finnish 2013 legislation of the buildings' energy certificate 18.1.2013/50 but it takes into account more precisely the technical values of the measures done in the building.

2 – Refurbishment concept

	
Envelope	<i>Additional insulation to solid walls; new windows</i>
Building service 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	-
Financing model	<i>Bank loan; EU grant</i>

3 - Implementation

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

Costs and financing**		
Refurbishment costs	<i>Ventilation and heating incl. heatpump; monitoring system</i>	<i>201 600</i>
	<i>Lighting and electricity</i>	<i>124 100</i>
	<i>Faucets etc.</i>	<i>100 200</i>
	<i>Other renovation costs</i>	<i>1 509 600</i>
	<i>Planning, supervision, etc.</i>	<i>96 800</i>
	<i>VAT 24 %</i>	<i>487 800</i>
	<i>Total €</i>	<i>2 520 000</i>
	<i>Total €/m2</i>	<i>465</i>
Financial resources	<i>Bank loan (92 %); EU grant (7%) of total costs; National grant (1%)</i>	

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

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




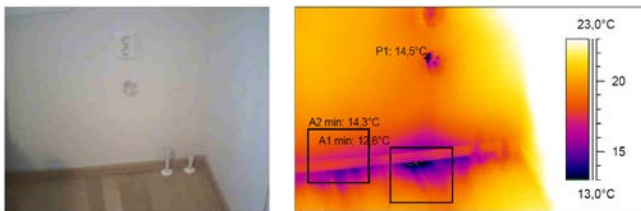
Building automation unit



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

*Not the official energy certificate calculation. Calculation is based on the Finnish 2013 legislation of the buildings' energy certificate 18.1.2013/50 but it takes into account more precisely the technical values of the measures done in the building.

5 - Performance monitoring

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

Performances ***			
	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

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