



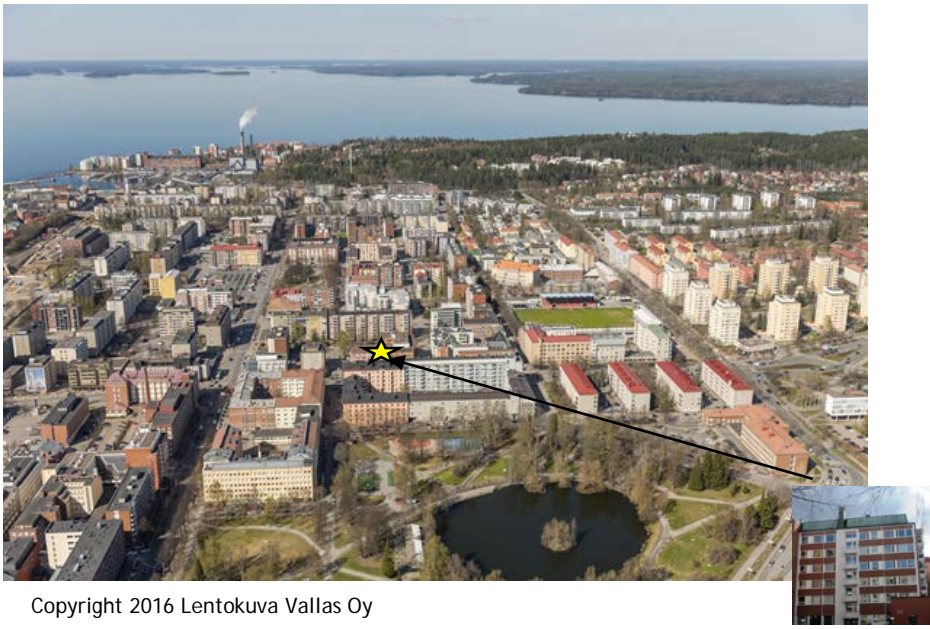
## Factsheet

BEST 1 Limited liability housing company  
Itsenäisyydenkatu 15

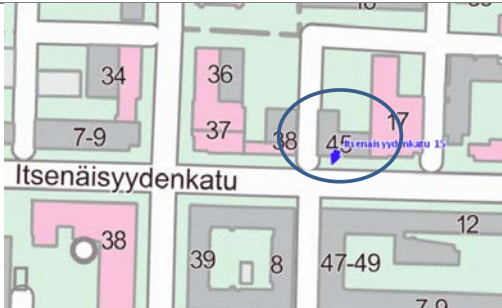
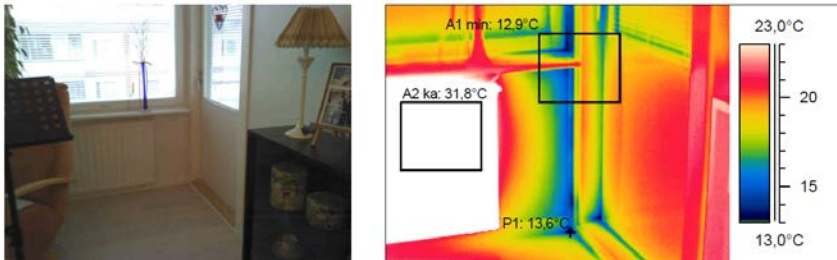


EU-GUGLE stands for “European cities serving as Green Urban Gate towards Leadership in sustainable Energy” and is funded under the 7<sup>th</sup> Framework Programme for Research and Technological Innovation.  
It is co-ordinated by CENER, Spain’s National Centre for Renewable Energies.

## PROFILE

Name and address	<i>The demonstration are Tammela district and DEMO 1 Limited liability housing company Itsenäisyydenkatu 15</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, students and young couples. 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	<i>1960</i>	
Number of dwellings	<i>20 dwellings, 4 store spaces</i>	
Energy performance	<i>BEFORE</i>	<i>G</i>
	<i>TARGET/AFTER</i>	<i>E</i>

## 1 – Description before refurbishment

Detailed characteristics of building			
Plot map			
Building envelope	Glass facade U value 0,8; windows U value 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			
Energy performance certificate*	-75	A	
	76-100	B	
	101-130	C	
	131-160	D	
	161-190	E	
	191-240	F	
	241-	G	G
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.



Concept	
Envelope	<i>Additional insulation and new facade; new windows; new roof</i>
Technical service systems	<i>District heating; central heating; energy efficient lighting Renewables in district heat production 38 % Renewables in grid electricity 25 %</i>
Mechanical ventilation	<i>Mechanical exhaust air</i>
Thermal renewable integration	<i>Exhaust air heat recovery and heat pump</i>
Electric renewable integration	<i>No</i>
Financing model	<i>National subsidy, EU Grant, Bank loan</i>

### 3 - Implementation

Stakeholders involved	
Project manager	<i>Lara Oy</i>
Design (structures)	<i>Huura Oy</i>
Design (building service system)	<i>Tervo Group OyOy</i>
Windows	<i>Skaala Oy</i>
Installer HVAC	<i>Vesinieminen Oy</i>
Installer electricity	<i>WSK sähkö Oy</i>
Remote monitoring system	<i>Enermix Oy</i>

Costs and financing**			
Refurbishment costs (€)	<i>Facades, windows, doors</i>	<i>234 000</i>	
	<i>Heating and ventilation</i>	<i>92 300</i>	
	<i>Lighting; electricity</i>	<i>10 700</i>	
	<i>Other measures</i>	<i>83 400</i>	
	<i>Planning, supervision, etc.</i>	<i>21 000</i>	
	<i>VAT (24 %)</i>	<i>106 000</i>	
	<i>Total (€)</i>	<i>547 400</i>	<i>280 € / m<sup>2</sup></i>
Financial resources	<i>Applied EU grant</i>	<i>67 500</i>	<i>12 %</i>
	<i>National subsidy</i>	<i>37 000</i>	<i>7 %</i>
	<i>Bank loan</i>	<i>442 900</i>	<i>81 %</i>

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

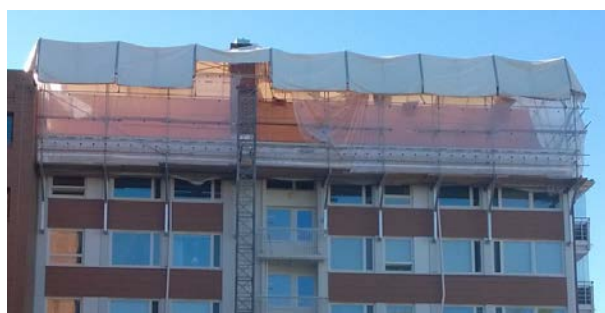
Planning and implementation	
<b>1 - step one</b>	<b>2009</b>
<i>Condition assessment</i>	
<b>2 - step two</b>	<b>2011-2013</b>
<i>Design brief, detailed planning and implementation (facades and windows)</i>	
<b>3 - step three</b>	<b>2014-2015</b>
<i>Design brief, detailed planning and implementation (building service systems; roof)</i>	

## Work progress

New façade and windows




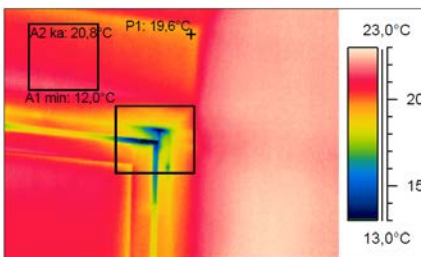

Roof and ventilation renovation



Heat exchanger



## 4 - Description after refurbishment

Photo to show architectonic concept																															
A thermal imaging showing before insulation	<div></div>																														
Envelope characteristics	Facades U value 0,2 (additional insulation 200 mm) Windows U value 1																														
Technical system	District heating; central heating; LED lighting with presence control																														
Renewable energy sources	Heat recovery and exhaust air heat pump, 17 kW Renewables in district heat production 38 % Renewables in grid electricity 25 %																														
Energy consumption (final)	154 kWh/m²/a																														
Energy efficiency certificate*	<table><tr><td>-75</td><td><div><div></div></div></td><td></td><td></td></tr><tr><td>76-100</td><td><div><div></div></div></td><td></td><td></td></tr><tr><td>101-130</td><td><div><div></div></div></td><td></td><td></td></tr><tr><td>131-160</td><td><div><div></div></div></td><td></td><td></td></tr><tr><td>161-190</td><td><div><div></div></div></td><td><div><div></div></div></td><td></td></tr><tr><td>191-240</td><td><div><div></div></div></td><td></td><td></td></tr><tr><td>241-</td><td><div><div></div></div></td><td></td><td></td></tr></table>			-75	<div><div></div></div>			76-100	<div><div></div></div>			101-130	<div><div></div></div>			131-160	<div><div></div></div>			161-190	<div><div></div></div>	<div><div></div></div>		191-240	<div><div></div></div>			241-	<div><div></div></div>		
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Note: weighted by energy form factor																															

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## 5 - Performance monitoring

Monitoring system	<i>Remote monitoring system Talotohtori<sup>®</sup> and smart metering by utility company</i>
Monitored variables	<i>District heat to space and DWH heating Harvested heat Water Electricity</i>

Performances***			
	Existing	Planned	Monitored
Electric consumption kWh/m <sup>2</sup> /year	15	37	N/A
Thermal consumption kWh/m <sup>2</sup> /year (HP electricity)	-	22	N/A
Thermal consumption kWh/m <sup>2</sup> /year (DH)	276	145	N/A
Thermal consumption kWh/m <sup>2</sup> /year (Own production)	-	-62	N/A
Gross energy consumption in final energy	291	120	N/A
Electric RES contribution kWh/m <sup>2</sup> /year	2	9	N/A
Thermal RES contribution kWh/m <sup>2</sup> /year	47	117	N/A
Operational costs €/m <sup>2</sup> /year	16	8	N/A

\*\*\*The first monitored year available 12/2016. 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.