




Factsheet

BEST 6 Limited liability housing company Torinnaapuri


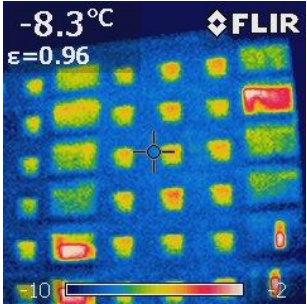










EU-GUGLE stands for “European cities serving as Green Urban Gate towards Leadership in sustainable Energy” and is funded under the 7th Framework Programme for Research and Technological Innovation. It is co-ordinated by CENER, Spain’s National Centre for Renewable Energies.

PROFILE

Name and address	<i>Demonstration area Tammela district and DEMO 6 Limited liability housing company Torinnaapuri</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>3 024 m²</i>	
Number of dwellings	<i>42</i>	
Energy performance	BEFORE	<i>E</i>
	TARGET/AFTER	<i>C</i>

1 – Description before refurbishment

Detailed characteristics of building			
Building envelope	<i>Pre-fabricated concrete building U value 0,4 Windows U value 2,1</i>		
Technical system	<i>District heating; central heating Mechanical exhaust air Renewables in district heat production 17 % Renewables in grid electricity 13 %</i>		
Thermal imaging before refurbishment			
Energy performance certificate ¹	-75	A 	
	76-100	B 	
	101-130	C 	
	131-160	D 	
	161-190	E 	E 
	191-240	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 and EU grant</i>

Envelope details

Ground to wall section (thermal bridge)	<i>Additional insulation and rendering</i>
Wall to fenestration section (thermal bridge)	<i>New windows and doors</i>

Technical system

Technical system	<i>District heating; energy efficiency improvement of central heating, ventilation, lighting and water system Renewables in district heat production 38 % Renewables in grid electricity 25 %</i>
Mechanical ventilation	<i>Supply air windows</i>
Thermal renewable integration	<i>Heat recovery and exhaust air heat pumps</i>
Electric renewable integration	<i>N/A</i>

3 - Implementation

Stakeholders involved	
Project manager	<i>A-insinöörit Rakennuttaminen Oy</i>
Designer (structures)	<i>A-Insinöörit Suunnittelu Oy</i>
Designer (building service system)	<i>Rejlers Oy</i>
Main Contractor	<i>Pirkanmaan mestarirakentajat Oy</i>
Windows	<i>Fenestra Oy (Fenestra As since 2014)</i>
Installer	<i>Rakennus J. Pirhonen Oy</i>
Heating and ventilation remote monitoring	<i>Enermix Oy</i>
Safety supervisor	<i>A-insinöörit Rakennuttaminen Oy</i>

Costs and financing ²			
Refurbishment costs	<i>Facade, windows and doors</i>		<i>232 500 €</i>
	<i>Ventilation and heating</i>		<i>73 500 €</i>
	<i>Lighting and electricity</i>		<i>6 000 €</i>
	<i>Other building services</i>		<i>71 200 €</i>
	<i>Planning, supervision, etc</i>		<i>19 160 €</i>
	<i>VAT 24 %</i>		<i>97 000 €</i>
	<i>Total €</i>		<i>499 000 €</i>
	<i>Total €/m2</i>		<i>165 €</i>
Financial resources	<i>EU Grant</i>	<i>151 200 €</i>	<i>30 %</i>
	<i>Bank loan</i>	<i>347 800 €</i>	<i>70 %</i>

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

Implementation planning	
1 - Step one	Autumn 2011
Design brief and decision of the general meeting to continue the deep renovation project	
2 - Step two	Autumn 2012 - summer 2013
Detailed façade upgrading planning, tendering process and implementation of the measures	
3 - Step three	Autumn 2013- autumn 2014
Detailed planning for the upgrading of the building service system and the tendering process and implementation of the measures	

Work progress

Outer skin has been removed.
Additional insulation + rendering
are under construction



Supply air window








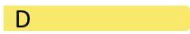







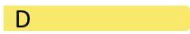







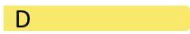



New heat water tanks and
insulated pipelines



Real time control and monitoring
unit



4 - Description after refurbishment

<p>Photo to show architectonic concept</p>																							
<p>A thermal imaging showing before/after insulation</p>	<p>N/A</p>																						
<p>Envelope characteristics</p>	<p><i>Additional insulation U value 0,23 and rendering Windows U value 0,8</i></p>																						
<p>Technical system</p>	<p><i>District heating; central heating; real time remote monitoring</i></p>																						
<p>Renewable energy sources</p>	<p><i>Exhaust air heat pumps 40 kW District heat production 38 % Grid electricity 25 %</i></p>																						
<p>Energy consumption (final and primary)</p>	<p>108 kWh/m²/a</p>																						
<p>Energy efficiency certificate³</p> <p><i>Note: weighted by energy form factors</i></p>	<table border="1"> <tbody> <tr> <td>-75</td> <td></td> <td></td> </tr> <tr> <td>76-100</td> <td></td> <td></td> </tr> <tr> <td>101-130</td> <td></td> <td></td> </tr> <tr> <td>131-160</td> <td></td> <td></td> </tr> <tr> <td>161-190</td> <td></td> <td></td> </tr> <tr> <td>191-240</td> <td></td> <td></td> </tr> <tr> <td>241-</td> <td></td> <td></td> </tr> </tbody> </table>		-75			76-100			101-130			131-160			161-190			191-240			241-		
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5 - Performance monitoring

Monitoring System	<i>Remote monitoring system Talotohtori ® Smart metering by utility company (district heat and electricity)</i>
Monitored variable	<i>District heat to space and water heating Heat created for space and water heating Water Electricity</i>

Performances⁴			
	Existing	Planned	Monitored
Electric consumption kWh/m ² /year	8	8	8
Thermal consumption kWh/m ² /year (HP electricity)	-	15	15
Thermal consumption kWh/m ² /year (DH)	158	93	67
Thermal consumption kWh/m ² /year (own production)	-	-40	-12
Gross energy consumption in final energy	166	76	78
Electric RES contribution kWh/m ² /year	1	6	6
Thermal RES contribution kWh/m ² /year	27	76	38
Operational costs €/m ² /year	9	5	5

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.