<table>
<thead>
<tr>
<th>Category / year of construction or renovation</th>
<th>New construction: nearly zero energy building or better / 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address of the building</td>
<td>Finland, Kuopio, Suokatu 14</td>
</tr>
</tbody>
</table>

Low energy buildings - Case Study: **Kuopas Apartment Building**
<table>
<thead>
<tr>
<th>Description of the building</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of building:</strong> Large residential (multi-family house)</td>
</tr>
</tbody>
</table>
| **Detailed description:** 5 story apartment building with 47 accessible apartments for students.  
  *Building gross volume:* 6 900 m³, heated gross area 2 125 m² without garage  
  *Walls:* Polyurethane insulation (300 mm), concrete sandwich elements (U-value 0.08)  
  *Roof:* Hollow slab, Polyurethane insulation (270 mm) + 90-160 mm light gravel and 100 mm concrete  
  *Total energy consumption of the building:* 107 100 KWh/a  
  *Total renewable energy production* (solarheated water and solar electricity, geothermal heating and thermal energy created by use of the building): 85 600 KWh/a.  
  *Heating energy purchased from district heating grid:* 17 335 KWh/a.  
  *Electricity purchased from grid:* 4 230 KWh/a.  
  *Heating energy and electricity sold to district heating system and electricity grid:* 19 273 kWh/a.  

*Total energy balance* = -2 292 KWh/a (energy to be purchased from external sources).  
The example shows that zero energy buildings are feasible even in regions with harsh climatic conditions and low solar radiation.

<table>
<thead>
<tr>
<th>Energy consumption</th>
</tr>
</thead>
</table>
| **Energy values:**  
  *Heating demand:* 10.6 KWh/m²/a  
  *Cooling demand:* 12.9 KWh/a, cooling is completely produced by geocool i.e. the only energy consumed is the electricity for pumps  
  *Final energy demand including onsite solar energy production:* 1.4 KWh/m²/a  
  *Total energy balance* = -2 292 KWh/a (electricity purchased from external sources)  

**Use of renewables:**  
Renewables of heating demand 100 %  
Renewables of cooling demand 100 %  
Renewables of total energy demand 98 % total annual balance (building feeds energy to district heating grid as well as electricity grid)
### Contact details

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### Links

**Website illustrating the building:**
http://www.nollaenergia.fi/mediapankki.html

**Promotional material online:**
www.nollaenergia.fi