



## Low energy buildings - Case Study: **Kuopas Apartment Building**



Category / year of construction or renovation

New construction: nearly zero energy building or better / 2010



Address of the building

Finland, Kuopio, Suokatu 14



Pictures





## Description of the building

### **Type of building:**

Large residential (multi-family house)

### **Detailed description:**

5 story apartment building with 47 accessible apartments for students.

*Building gross volume:* 6 900 m<sup>3</sup>, heated gross area 2 125 m<sup>2</sup> 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.



## Energy consumption

### **Energy values:**

*Heating demand:* 10.6 KWh/m<sup>2</sup>/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/m<sup>2</sup>/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)



## Links

### Website illustrating the building:

<http://www.nollaenergia.fi/mediapankki.html>

### Promotional material online:

[www.nollaenergia.fi](http://www.nollaenergia.fi)



## Contact details

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### For further questions:

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