Luukku House – a wooden house that only Finns can build

Luukku – ein Holzhaus, wie es nur Finnen bauen können

Luukku – une maison en bois comme seuls les finlandais savent construire

Luukku – una casa in legno come solo i finlandesi sanno costruire

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Glenn Murcutt, Madrid 2010

The Luukku House is a home optimised for both cold Finnish winter months, and for a hot Spanish summer. The energy simulations show that the Luukku House is a zero energy house in Finnish climate and a plus energy building in Spain.

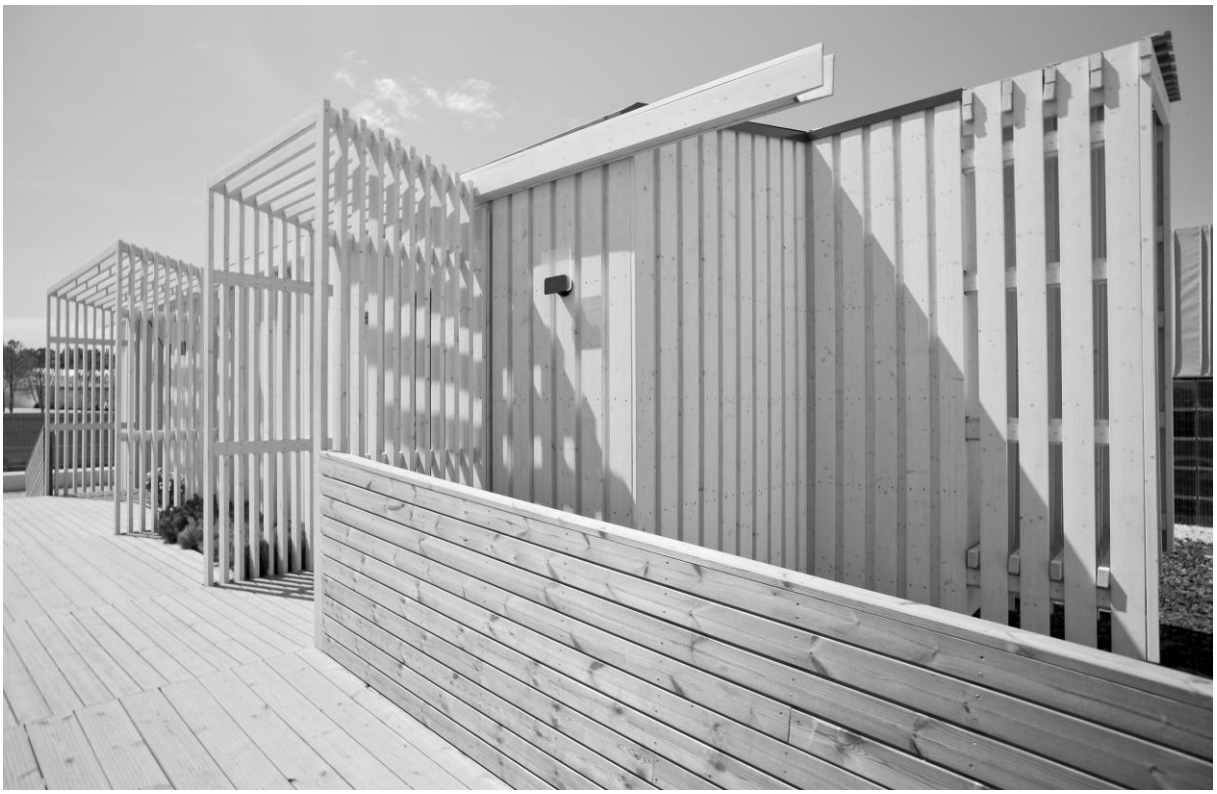


Figure 1: Luukku House in Madrid

1. Renewable Materials and Sustainable Design

The design of the Luukku house is based on the concept of a traditional Finnish house with a light touch to the nature. The choice of building materials is based on sustainability aiming at a low carbon footprint. As an end result, the LCA shows a total carbon footprint for the house of 15000 kg and carbon storage of -26000 kg.

In the Luukku house timber and timber based materials are used in a variety of applications from structure, insulation, cladding and interior. The design incorporates innovative uses of existing products and results of active product development.

Figures 2A, 2B: Luukku House Kerto LVL frame

2. Saving energy and natural solutions

The building envelope is designed as to prevent heat losses during the cold Nordic winter. This is achieved through good air tightness of the core, thermal-cut exterior elements, thick insulation and careful detailing. The windows are optimised using a frameless solution and a quadruple glass unit fixed directly to the frame. The solution results in excellent thermal insulation with no cold bridges.

Energy saving solutions include the use of interior materials for moisture and thermal buffering, enhancing the indoor air quality. The wooden interior panels can absorb and release humidity as required. The profiled interior panelling maximizes moisture buffering surface on the backside of the panels.

Figures 3: Luukku House Sun shading

3. Compact Technology and easy Useability

The energy production of the Luukku house is based on the use of solar photovoltaic panels and thermal panels.
The energy balance of the Luukku house has been monitored throughout the project as part of an interactive design process, where design solutions have been done based on energy simulation results. The aim has been as energy efficient solution as possible without compromising the homelike, light atmosphere of the interiors.

Energy consumption and production, weather station information and functioning of appliances as well as information on structural moisture of the finished building are monitored using constant, real time metering. All information is available through one interface, on the screen and internet.

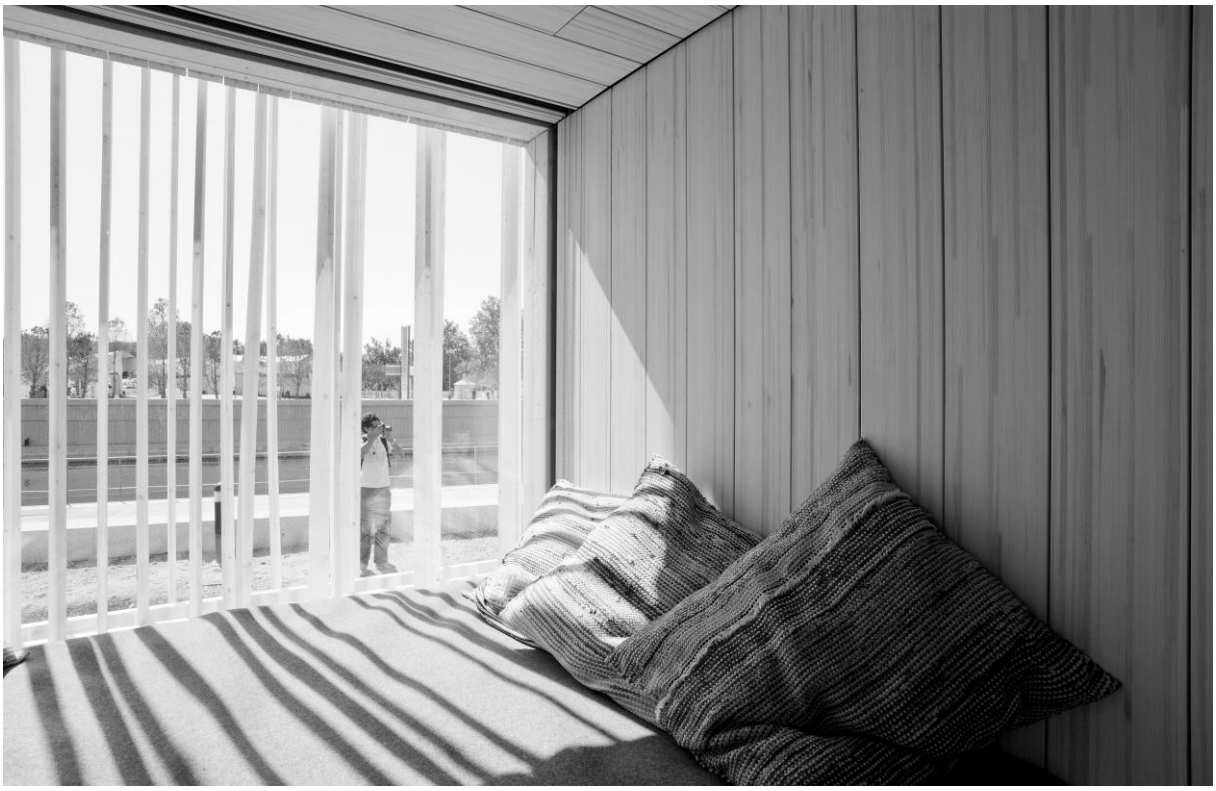
4. Partnering within Aalto University

The Luukku House is the result of inter-disciplinary collaboration under the Aalto University which combines the School of Science and Technology, School of Art and Design and the School of Economics. Finnish industries have supported the project by providing knowledge and expertise on most recent technologies. From design to construction there have been about 100 members from the collaborating schools and enterprise partners involved. The project has served both education and research & development.

The main funding partner is SITRA the Finnish Innovation Fund, Energy Programme. The Finnish Minister of housing, mr. Jan Vapaavuori, is the patron to the project.

5. Luukku House in Solar Decathlon 2010

Luukku House participated the Solar Decathlon Europe competition in Madrid in the summer 2010. It won the first award in architecture and was in the fifth position in the overall competition.



Figures 5A, 5B: Luukku House Interior