



MountEE - mountEE: Energy efficient and sustainable building
in European municipalities in mountain regions
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GOOD PRACTICE SUSTAINABLE BUILDINGS

CATEGORY: SUSTAINABLE BUILDINGS

Passive houses Tavleliden

Region / local area considered: Sweden	Good practice submitted by Nenet Energy Agency
1) Short description of the action/strategy/project Passive houses Tavleliden The first environmentally certified single family in passive house standard in Northern Sweden. This project is part of Dragon School's building programme in Umeå, in which students together with consult company Sweco are building 3 passive houses in phase 1; 6 more are planned in a phase 2.	
2) Background <ul style="list-style-type: none"> • In 2020, Umeå region aims at being world leading in sustainable building in cold climate. So far, there are few examples for use of natural building materials and on highly energy efficient buildings in Northern Sweden, and there were no single-family passive houses. • In 2008, the "Network for Sustainable Building and Administration in Cold Climate" was founded in Umeå. It included companies, organizations and the public sector in a joint effort for sustainable building in Northern Sweden. • The City of Umeå, Dragon School's building programme and consult company Sweco are partner in the "Network for Sustainable Building in Cold Climate". This was the starting point for collaboration. Existing plans to let students of Dragon School's building programme build low-energy-houses on existing grounds changed after consultations with Sweco's passive house architect to building certified passive houses. 	
3) Detailed project/program description Targets of the project: <ul style="list-style-type: none"> • Implementing an adapted passive-house concept for single-family for Northern Sweden with a focus on healthy and renewable building components; • Realize model buildings: 3 passive houses in phase 1, 6 more in phase 2; • Teaching students on forward-looking building concepts; • Environmental certification and passive house certification of buildings. Expected long term and indirect benefits: <ul style="list-style-type: none"> • Improved competence and capacity on sustainable buildings, not at least for the students; • Realizing concrete model projects to show that passive house concept are working even in Northern Sweden and by that being a push for further projects to be realized. Target group(s): <ul style="list-style-type: none"> • Students of Dragon School building programme and Dragon School's teachers; • Indirectly: building companies; 	

- Indirectly: buyers or lenders of buildings;
- Indirectly: Umeå municipality.

Technical description of project:

- Building owner: Umeå municipality; Dragon School building programme
- Project lead: Swecon Umeå
- Number of buildings: 3 single family houses in phase 1, 6 more in phase 2
- Use of renewable building components, e.g. wood
- Net dwelling area: 158 m²
- Glass front towards south-west with automatic clouding system
- Energy source: geothermal heat pump/ borehole heat exchanger
- Floor heating system
- Heating demand per year and m² calculated according to PHPP): 11 kWh
- Average U value for windows: < 0,72 incl. installation
- Demand-driven ventilation incl. heat recovering system with preheating linked to heat pump

Documentation and evaluation after building period: Umeå University

4) Funding/financing/costs

Costs:

- about 10-12% higher building costs than for a standard single-family house
- certification costs about 3-5% of total costs

Estimated selling price: about 400.000 Euro

5) Main results

Results are:

- 3 passive houses in phase 1, technical description s. above;
- Use of renewable primary products as building components for a healthy and comfortable interior climate;
- Passive-house and environmental certification for buildings;
- Teaching and training for future house builder
- Show-and-tell model project as starting point for further projects
- Awareness raising on energy and sustainable buildings
- Improved knowledge for Dragon School's project leader/teacher

6) Analysis – lessons learnt and success factors

Have you encountered difficulties?

- There is a need to increase the understanding of the *principles* of passive-houses concepts to make it possible to consequently adapt technical solution to Northern Sweden's climate (e.g. the fact that there is only very few hours daylight/sun during winter).
- In general high building costs in Sweden and a monopolized market for building components.
- The municipal energy company decided not to build district heating in the area, so

an alternative solution (heat pump) were necessary.

- As students are building the houses, the demand for controlling and for adjustment was relatively high.
- There is a need to further develop the market for high-quality building components, e.g. windows, to reasonable prices. Otherwise, the European passive houses certification standards cannot be fulfilled without high costs, which only few people can afford. This is true for some regions with really harsh climate, e.g. in the mountain regions in Northern Sweden or generally north of the Polar Circle.

Drivers and success factors

- Commitment of Umeå municipality for sustainable / energy efficient building;
- Collaboration within "Network for Sustainable Building in Cold Climate";
- Commitment of Dragon school's building programme;
- Dedication of Dragon School's project leader to the project;
- Commitment and high competence of project leaders (Sweco, Dragon School).

Recommendations for transferring the funding instrument:

- Start with an evaluation of existing projects, and make use of existing experience.
- Use of life-cycle-analysis to get the full picture of environmental impacts.
- Give regard to comfort and to a healthy interior climate.

Innovative potential

Combination of an innovative and comprehensive building concept with teaching and training of future house builder.

Main strength/quality of this initiative:

- Combination of environmental certification with passive house certification;
- Cooperation with and education of future house builders;
- Use of renewable building materials and a focus on a healthy interior climate.

7) Time frame

Start date: 2010

End date: 2013, event. continued by 6 more houses

8) Contact project leader

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