



MountEE: Energy efficient and sustainable building
in European municipalities in mountain regions

REGIONAL STRATEGY

Region / local area considered: Dalarna, Sweden

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1) Description of the context

Close-to-zero energy strategy for Dalarna

The Byggdialog network together with the County Administrative Board's steering group for Energy Intelligent Dalarna and with other relevant stakeholders in the areas of construction and property management have written this strategy proposal to promote an increase in the number of low-energy buildings in Dalarna. The targets and other pre-conditions of the strategy are that low-energy building in Dalarna should fulfill the national targets for close-to-zero energy buildings proposed by the Swedish Energy Agency.

The strategy document as presented is intended to give support and guidelines for property owners in Dalarna in planning and construction projects throughout the county. It is proposed that the document be adapted and updated as required to keep up with national developments. The Swedish government has stated that 2015 will be a key year for additional demands in legislation and building standards.

The purpose of establishing a regional strategy for low-energy building is for Dalarna as a pilot county to move together in, as a minimum, fulfilling energy and sustainability targets set by the government. Experience from previous projects in low-energy building will be built on and form models for broader application, both in new construction and in refurbishment projects.

2) Description of the objectives

The strategy provides a basis for:

- Guidelines for energy-efficient planning in municipalities.
- Targets for design and construction in different categories of buildings: dwellings, commercial and single-family homes.
- Action plan for energy-efficient management of buildings.
- Emphasis on the need for skills development in the sector.
- Areas of relevance for regional research.
- Opportunities for technology development

Target levels

The Swedish Energy Agency presents in Task 13 the levels proposed for Close-to-zero energy building from 2019 (public buildings) and 2021 (other buildings) and it is proposed that these should also apply to Dalarna:

Specific energy consumption of building, new buildings [kWh/m ² , Atemp, yr], excluding operational power,	
Dwellings, non-electric heating	65
Dwellings with electric heating	40
Premises, non-electric heating	60
Premises, with electric heating	40

Specific energy consumption of building, converted buildings [kWh/m ² , Atemp, yr], excluding operational power,	
Dwellings, non-electric heating	90

Dwellings with electric heating	40
Premises, non-electric heating	85
Premises, with electric heating	55

Table 4: Proposal for the specific energy consumption of Task 13, Zone 2 converted buildings.

The proposals adopted in this strategy are based on close-to-zero energy buildings but also on what is considered possible and reasonable with currently available technology. Consideration is also given to the slightly higher costs in the construction phase that more energy efficient building incurs.

Energy measures should be prioritized in the following order:

- Highly energy-efficient building shell
- Highly energy-efficient installations
- A high proportion of the energy needed should be renewable

By using this order of priority, three goals can be achieved: It ensures that the energy requirements of the buildings will be kept low. This in turn leads to the building's energy consumption being less affected by the choice of energy medium. This reduces the energy supply's importance for the building and thereby gives a greater degree of flexibility in the choice of technology employed. This also increases the flexibility and generality of future changes in the functions of a building and in energy system conversions. Finally, this order of priority results in an increase in the proportion of renewable energy.

Redevelopment

Gradually raising the standard of existing buildings is essential for a transition to a sustainable energy system. It is therefore proposed that target levels also be introduced for the renovation and rebuilding of existing property.

For existing buildings undergoing major reconstruction, a target can be formulated as energy consumption after renovation shall not exceed 90 kWh/sqm. A pragmatic target may otherwise be that energy consumption after rebuilding should be 50% of the level before rebuild. This is known as applying "Factor 2".

Property management

For property already being managed, there should also be a goal of reducing energy consumption by 2020, i.e. a reduction of 20 percent calculated from the current level (around 1.5-2% annually). This is already being done in some places in the country. For example, the "Skåne initiative" entails a reduction of 2 percent per year until 2016. Experience shows that the systematic optimization of existing installations in premises can reduce energy consumption by 20-30% and by 10-20% in dwellings.

An action plan for this area should be developed that may include:

- Information about the goals and plans
- Training of property owners and property managers
- Incentives to inventory the energy status of buildings.
- Supporting / encouraging energy efficiency.
- Possibly an order to remedy proposals in energy assessments, particularly for properties with extremely high energy consumption.
- Tools for reporting and monitoring energy use in buildings.

- Good examples. Local authorities should lead by example in training their staff and fixing their own properties.

3) Means to reach the objectives

3.1 - Integration in Local politics/ climate plan/Sustainable Energy action plan

The targets and other pre-conditions of this strategy are that low-energy building in Dalarna should fulfil the national targets for close-to-zero energy buildings as proposed by the Swedish Energy Agency. These will very probably be in line with the Government's future action plan.

- With this strategy Dalarna is ahead of national demands and focusing on the ambitions expressed by the Swedish government's plan of action for "A route towards close-to-zero energy buildings" that states that Sweden's implementation of the concept of close-to-zero energy buildings from the year 2021 should be the legally binding level for energy-lean consumption requirements in Sweden. These requirements, if enforced by law, would be stricter than those in current building regulations (BBR 19) applicable as of 2012. With this strategy the county of Dalarna is taking part in the discussion on proposed energy levels in the future and pushing the national level to higher ambitions.
- The strategy has been elaborated by the county's stakeholders in the building sector including municipalities, housing companies and construction companies. It gives signals to the construction sector which products and instruments that have to be elaborated and what energy standard should be considered "normal" in the future.
- The strategy is thought to be a guideline for municipalities and companies when elaborating internal documents, policies and working plans since it gives an indication on what levels are adapted by organisations and companies in the neighbourhood.
- The implementation of the strategy is done by the stakeholders of the Building Dialogue Dalarna who also elaborated the strategy. The mountEE project is supporting this process with workshops, seminars and best practice examples.

The following steps are needed to reach the objectives:

Development and use of tools and methods:

BELOK-methods: A toolbox of methods developed by the Swedish Energy Agency

-BELOK- totalmethod: Used in refurbishment of buildings.

-BELOK-LCC

-BELOK – effektiv operating systems

BeBo-experiences from national Housing company network on energy efficiency

SWEBY: Model on energy calculations and energy measurements

Västerås-model: System for municipalities to sell housing lots with energy requirements.

Development of energy declarations:

Suggested improvements to make energy declarations more accurate and building specific.

Developing an action plan for property management

- Information about the goals and plans

- Training of property owners and property managers
- Incentives to inventory the energy status of buildings.
- Supporting / encouraging energy efficiency.
- Possibly an order to remedy proposals in energy assessments, particularly for properties with extremely high energy consumption.
- Tools for reporting and monitoring energy use in buildings.
- Good examples. Local authorities should lead by example in training their staff and fixing their own properties.

Developing an action plan for the existing building stock

1. Inventory of the energy status of the properties. Energy Assessments can be used for this, where available. The entire building stock must be included to get an overview of the current situation.
2. Targets are set for the properties, both overall targets for the entire stock and specific for each property. Each property is given a designated energy manager.
3. Based on the inventory, a selection is made of properties that should be addressed in the first instance. An evaluation is drawn up showing if there are properties in the portfolio for which the measures selected can be coordinated
4. An energy plan for the property portfolio is drawn up. This specifies the properties to be addressed, with schedules for action. The energy plan must also contain check-points to ensure that the systematic tuning of the installation systems is carried out with continuous monitoring of ventilation, heating and cooling systems.
5. The energy performance of buildings must be monitored and measured each year to ensure the achievement of the set targets and monitor changes for all properties. In this connection it may be appropriate to hold joint workshops for operating staff to showcase best practices and increase levels of commitment.

For an individual property owner, one option is to make a forecast for energy use in 2020, divided into new buildings, refurbished buildings and those that are only being managed. Based on the forecast, owners can judge how much should be spent on the various parts of the property portfolio in the years leading up to 2020.

Roadmap for energy in construction and refurbishment

- In the proposal stage, the requirements applying to energy usage are to be specified, these are then monitored during all project phases.
- Customers and project managers control the project so that the targets are met by ensuring that the targets and guidelines of various subsystems are followed.
- Well-designed system solutions based on LCC analysis should be applied and reported in the proposal documents and tenders.
- Energy calculations should be carried out when selecting the system and at the appropriate project phases. The calculations should be adjusted during project design as a consequence of quality inspections and changes made.
- Verification of the building's performance is to be carried out using measurements when the building is completed. Normally 3-5 years are required to fine tune new systems.
- Handover to the management and operating organization should be done systematically during the warranty period, which is 2-5 years.
- Monitoring and feedback between property managers and the construction project organization should be done on a regular basis.

Training and competence development

In accordance with Section 8.3, Competences, in the Swedish National Energy Agency's Task 13, training in close-to-zero energy construction should start in upper secondary schools and

universities. For those already working, training should be aligned to groups of stakeholders as below:

- Architects, design engineers, HVAC designers, consultant electricians, site foremen, construction project managers.
- Planning administrators, climate and energy advisers.
- Construction workers and assembly workers.
- Operating and maintenance staff.
- Customers, Project Managers.
- Politicians / end users.

Cost reduction by larger amounts

Gather material on costs and benefits, LCC calculations, information.
Mainstream NZEB will lower costs

3.2 - Means within MountEE

Assist mountain municipalities to build and renovate buildings with sustainable and efficient solutions and renewable energy use

a. Advise and assistance services

The MountEE project is going to offer a series of courses, workshops and training sessions on the most important tools proposed in the strategy, including: LCC, SWEBY, Västerås modellen, BELOK-totalsystem. Different tools available in the regions will be promoted to accomplish a service package close to the system used in Vorarlberg

Step 1 Preliminary planning

- First contact with the municipality by the Building Dialogue
- Develop and implement local Energy- and climate strategies
- Implement the regional NZEB
- Dialog with municipalities about exploring and renovation of residential areas.
- Formulation of an « eco-program ».
- Decision on which system to use for choice of material (Basta, Sunda Hus, Miljöbygge etc.)
- Develop local wood construction strategies and stimulate the use of wood constructions.
- Introduction of Sveby modell. Implementation of module 1: Energy standards and specifications
- Implement regional and local Energy- and climate strategies

Step 2 Optimization, tendering

- Development of a material-, construction and energy concept using LCC-calculations
- Energy calculations using Sveby modul 2-4
- Environmental check of all call for tender documents using Sveby module 3

Step 3 Realization

- Craftsmen Information by workshops on in the pilot projects
- Approval of product declaration list

Step 4 Control of success

- Controlling the products at the building site with help of Sweby module 3
- Diverse measurements: blower door test, indoor air quality
- Control of tendering criteria in accordance to recommendation of Miljöstyrningsrådet (MSR).

Step 5 Management and maintenance

- Implementation of Sweby modell.
- Workshops for exchange of experiences

b. Adapted funding policies (describe shortly)

Since no funding subsidies exist in our county, the MountEE project is helping municipalities to apply systems that make it easier for politicians and housing responsible to grasp the economic impact of energy saving measures. The project will use and improve the following models:

LCC, BELOK, Västerås - modellen. Expert meetings on EPC will be held.

c. Cooperation committees to involve all actors of the building chain (describe shortly)

In continuing efforts to promote the number of low-energy buildings in Dalarna, the strategy proposes the Byggdialog Dalarna to function as the hub. The Byggdialog Dalarna is also the MountEE cooperation committee

The RCC will work for targets and sub-targets to be adopted and followed up, that targets are communicated to local authorities and other stakeholders in the construction and property sector, that tools to monitor work on improving energy efficiency are developed and that the strategy is reviewed annually and revised.

d. Pilot projects

5 pilot projects have been selected where the following methods and tools suggested in the strategy will be used and tested:

LCC, BELOK, SWEBY

3.3 – Time schedule and milestones

The NZEB-strategy Dalarna is in a review process.

The strategy will be adopted in may 2012 by the Building Dialogue and will after that be used as a policy document in all activities arranged by MountEE-project and Building Dialogue.

The core content of the strategy will be presented in all activities arranged by MountEE and Building Dialogue

Time schedule:

Adopted spring 2013.

Communication of targets and tools: Autumn 2013

Test and development of tools: 2013-2015

Training and competence activities: start June 2013

Follow up and adjustment: spring 2015

4) Medium and long term vision of the strategy (1/4 page)

In the next years and after MountEE project, what would be expected: generalization of sustainable public buildings ? Extension of the strategy to social housing or to private buildings ...

The Swedish Government will elaborate a national strategy for new NZEB buildings in 2015. The national targets will probably have great similarity to our strategy. So the existing strategy for Dalarna will hold over time but will need to be revised annually. The strategy includes private, social and public buildings and can be used by the whole building sector.

The big work and challenge is to establish action plans and a good follow up work that can be communicated.

5) Partnership, key actors

The Building Dialogue Dalarna (MountEE RCC), a partnership of the whole building chain, authorities and municipalities that developed during the recent 7 years has taken initiative to this strategy and will be responsible for implementation and follow up together with the County Administrative Board.