

## Energy use in buildings – Case study Lerums municipality

### *Impact of the framework for low energy buildings*

#### Background

To reach the EU targets on reducing the carbon emissions in society, the Directive on the energy performance of buildings (EPBD) was launched in 2002. Following the enforcement of the directive in 2006, the Energy Performance Certificate (EPC) were introduced in Sweden in October 2006. The first energy experts qualified for issuing the EPCs were certified in the summer of 2007 and the first EPC was registered in September 2007. Up till June, 2014, there are 507 263 EPCs registered in the national database. Contrary to most countries in the EU, the Swedish EPCs are based on the measured energy use.

When a building permit is issued, the forecasted energy use should be calculated. The calculated energy use should then be verified by measurements of the energy use which are performed during at least 12 and up to 24 consecutive months after commissioning. The measured data should also be corrected to a reference year and for normal usage in the building. Depending on the level of the energy use that is target, different measures have to be utilized in the building, e.g. heat pumps, solar panels.

#### Case study

The municipality of Lerum aims to become the leading environmentally friendly municipality before 2025. One way to reach the goal is to reduce the fee for obtaining a building permit when building on the grounds owned by the municipality. For instance, the fee is halved if the energy use is lower than 75% of the BBR demand and there is no fee if the energy use is 50% of the BBR demand.

#### Aim

The aim is to evaluate the effectivity of the framework initiated by Lerum municipality. The aim is also to investigate which methods that were chosen by the contractor to obtain an energy use below the BBR demand to propose improvements in the framework.

#### Methods

The thesis project incorporates different research methods

- literature study of energy performance certificates in different countries,
- literature study of low energy building frameworks in Sweden and elsewhere,
- questionnaire/interviews with house owners in Lerum,
- calculations of energy use with different heating/renewable energy systems,
- study visits to buildings to follow up the energy efficiency measures

#### Expected results

The thesis should evaluate the efficiency of the framework used by Lerum municipality in comparison to other frameworks.

#### Required qualifications

Good knowledge of building technology and heat transfer in buildings. Good analytical and numerical modelling skills in Matlab and Comsol.

### Relation to the research

The thesis will contribute to the on-going research project QUALICheck “Towards improved compliance and quality of the works for better performing buildings” which is co-funded by the Intelligent Energy Europe Programme of the European Union.

### Potentials for expanding the thesis work

The project could be expanded to other municipalities or building types.

### Number of students in the project

This project is for two students

### Time plan

School year 2014-2015

### Supervisor and examiner

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### Co-supervisor

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### Industry partners

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