





# Climate action concept 2050 for municipal buildings

Requirements – profitability – financing –  
framework conditions

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## Project information

 [Support programme](#)

Innovative climate action projects

 [Project duration](#)

1 October 2013 to 31 August 2015

 [Project leader](#)

Europa-Universität Flensburg

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112,395 euros

[Project contact](#)

[www.uni-flensburg.de](http://www.uni-flensburg.de)

## Shaping the present with a view to the future

Municipalities are faced with difficult decisions every day, with increasingly tighter budgets. As part of that, they have to weigh the costs and benefits of urgently needed but often costly investments in energy retrofits of municipal buildings.

### At a glance

The Center for Sustainable Energy Systems at the Europa-Universität Flensburg tried to help local authorities find a way out of this predicament. Based on a survey of ten municipalities, the researchers formulated concrete recommendations for solving this problem and developed a software for strategising the retrofitting of municipal buildings over the long term – the so-called FinSa-Tool. Once the program is supplied with data on the building stock in question, it calculates three scenarios – a business-as-usual scenario, a climate action scenario and an individual scenario considering the goals of the municipality – which can then be compared with one another.



Cover picture of the final report of the project



## Between ideal and budget restraints

Public buildings are expected to serve as an example, especially when it comes to renewable energies, building efficiency and energy retrofits. Yet at the same time, municipalities have to cope with scarce financial resources, are often indebted and thus struggle with limited financing options. The conservation and energy retrofitting of their properties costs money which they do not have. To date, instruments such as contracting, financial subsidies or discounted loans have not been able to resolve this dilemma.

### What were the project goals?

The project intended to develop a tool to assist municipalities in developing a long-term strategy for going through with the deep energy retrofitting of their building stock. The tool was expected to enable municipalities to estimate the financing requirements for these retrofits. A survey of municipalities and an analysis of completed retrofit projects were to serve as a basis for this tool.

## Analysis of retrofitted municipal buildings

The ten municipalities of Chemnitz, Flensburg, Frankfurt, Heidelberg, Münster, Neumünster, Oberhausen, Stuttgart, Wuppertal and the district of Steinfurt supplied data on retrofits already carried out at their schools, kindergartens and administrative buildings. A total of 57 completed retrofit projects were analysed. None of these went back more than five years, and at least two achieved a high level of energy efficiency, and met at least the standards of Germany's 2009 Energy Saving Ordinance (EnEV). The surveyed building portfolio covered an area of 150,000 square metres. The estimated total cost of all retrofits, achieving an energy standard that was no more than ten percent below Germany's standard for new buildings, averaged at 1,100 euros per square metre of gross floor area. The analysis showed that the energy-related components of retrofits account for only 10

percent to 25 percent of their overall costs, with the remainder consumed by measures that would need to be done in any event as part of basic building upkeep. Thus, financing the energy-related parts of the retrofits turned out to be the smaller problem compared to a municipality's inability to finance a retrofit. Often, the municipalities were generally unable to finance the basic conservation of their building stock.

### What did the project achieve?

On the basis of a survey of ten municipalities and the analysis of 57 municipal retrofit projects, the Europa-Universität Flensburg developed the FinSa-Tool, which enables municipalities to calculate the funds needed for realising deep energy retrofits of their properties.

## Retrofit scenarios with the FinSa-Tool

The FinSa-Tool developed by the Europa-Universität Flensburg is an Excel-based software that can calculate the costs of realising energy retrofits of municipal building stocks up until the year 2050. Its cost function allows to assess the retrofit costs as well as the energy-related part of the costs depending on the intended scope of the retrofit and level of building energy efficiency.

The FinSa-Tool will generate the following three scenarios when performing a calculation for a given municipality:

- Business-as-usual: continuation of current level of maintenance and upkeep activities;
- Climate action: with additional measures, in line with the climate targets of the German federal government, and retrofitting of the buildings to 30 percent below Germany's EnEV 2009 standards by the year 2050;
- Individual: allows customising the calculation based on individual parameters regarding, for example, energy price scenarios or retrofit target values.



The scenarios set the investment costs in relation to the avoided energy costs. The costs of avoiding carbon emissions can likewise be calculated. Unlike other tools – which are typically limited to either very general sectoral comparison, or to a focus on individual buildings and retrofit projects – this long-term scenario analysis with the FinSa-Tool allows for long-term planning of the management of the total building stock.

**What happened next?**

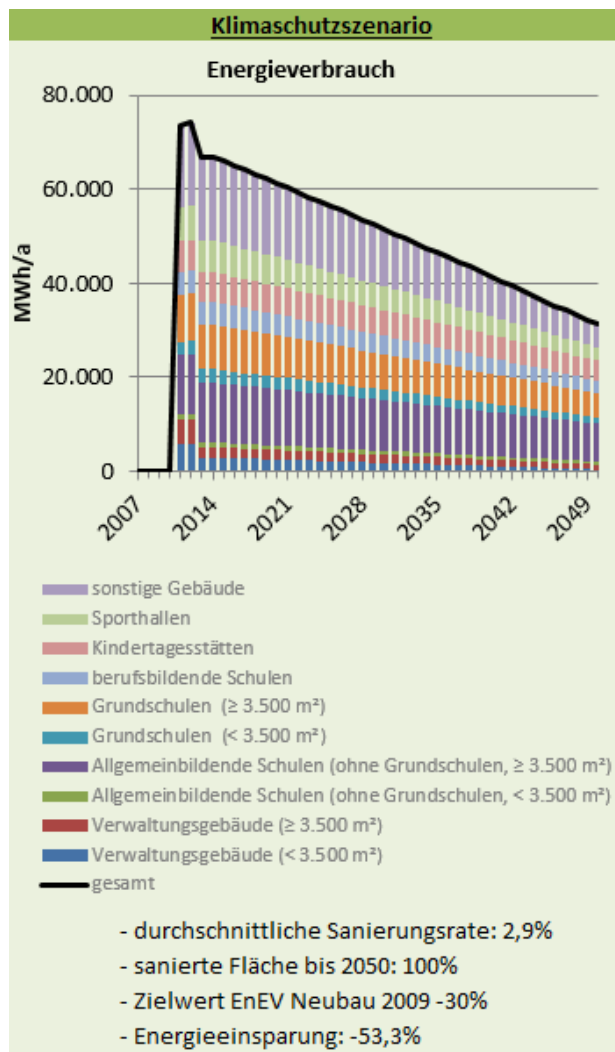
The FinSa-Tool is still available, and is still free of charge. It can be downloaded together with the manual and the final report: [www.uni-flensburg.de/eum/forschung/abgeschlossene-projekte/klimaschutzkonzept-2050-kommunale-gebaeude-k-2050-kg/](http://www.uni-flensburg.de/eum/forschung/abgeschlossene-projekte/klimaschutzkonzept-2050-kommunale-gebaeude-k-2050-kg/).

**Entering data into the FinSa-Tool**

The data for the municipalities’ building stocks must first be entered into the tool. The tool works with data on the type of building, heat consumption of the last three years and the energy sources used. Further assumptions, which are relevant primarily for the individual scenario, concern the following questions: How little heating energy should be used in retrofitted buildings compared to EnEV 2009? By what date should buildings be retrofitted? With these data, the tool then calculates the three scenarios.

**Financing models from the perspective of practitioners**

For the study, the ten municipalities were also consulted about their experiences with the different funding programmes. They expressed a preference for non-repayable grants compared to soft loans at sub-market interest rates. The municipalities also would like a simplified application procedure that would reduce the associated effort.



Example of a climate action scenario generated by the FinSa-Tool

**Contribution to climate action**

The savings potential in the municipal building sector is enormous. Although the project did not trigger direct climate protection effects, it can indirectly lead to savings if the tool is integrated into municipal planning processes.



## Lessons learned

In the course of the project, the Center for Sustainable Energy Systems formulated recommendations to municipalities and political decision-makers.

### Raise retrofit standards

The project leaders advocate that the retrofit standard of the EnEV be tightened on a continuous basis. The target proposed by the project –retrofits should be 30 percent below the 2009 EnEV standard for new buildings – would yield energy savings of 63 percent compared to 2010, and thus would meet the climate action targets of the federal government.

#### Checklist for success

- Support exchange between municipalities about harmonized methods for the collection of data on the retrofitting of municipal buildings;
- Provide financial resources for the retrofitting of buildings through special budgets.

### Systematic data collection

Further analyses and the design of associated funding measures will require the systematic capturing of data on retrofit projects with regard to the building's make-up and structure, the scope of the retrofit (differentiating between its energy- and non-energy-related components); and the cost calculation, likewise differentiating between the energy- and non-energy-related components.

### Municipal financing combined with separate assets

The project team recommends setting up a separate budget 'municipal property' that would be funded with 2.6 billion euros annually and could support 50 percent of the costs of municipal retrofit measures.

The other half would be financed by the municipality as its own contribution. Using the FinSa-Tool, a municipality can demonstrate that it has thoroughly considered the long-term management of its building stock. A cross-municipal comparison can only be meaningful when applying harmonized assumptions and tools for the cost and benefit assessment.

### Think long-term!

Municipalities would do well to adopt a long-term retrofit strategy when planning the conservation of an existing building stock and the necessary energy-related retrofits. The FinSa-Tool is well suited to help municipalities with this task.

#### Climate action needs your initiative

Since its launch in 2008, the National Climate Initiative (NCI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) has been supporting numerous projects that contribute to the reduction of greenhouse gas emissions. Funding has been given to a broad range of activities, from developing long-term strategies to providing practical assistance and investment aid. With a focus on advancing climate action on the ground, the Initiative benefits consumers, municipalities, businesses and educational institutions.

#### Legal information

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