Calculating and comparing refurbishment costs

Maintaining and refurbishing municipal properties to improve their energy efficiency costs money that in many cases is lacking. A new software program now makes it possible to calculate different refurbishment scenarios for existing municipal buildings and to compare them in detail. This helps to strategically plan the investment in cities and local communities.

Public buildings serve as a model for energy efficiently refurbishing and operating properties and the incorporation of renewable energies. At the same time, however, most cities and communities are facing financial difficulties combined with increasing responsibilities. Nevertheless, local authorities urgently need to adopt a strategic approach for dealing with their existing building stock, firstly because of the threat of global warming and, secondly, because this building stock forms an inherent part of their public services.

These challenges were addressed by the “Climate Protection Concept 2050 for Municipal Buildings” research project conducted by the Europa-Universität Flensburg. In cooperation with ten German local authorities, the researchers identified and evaluated funding options for improving the energy efficiency of municipal buildings. The aim in refurbishment terms was to undercut the 2009 German Energy Saving Ordinance (EnEV) values for new-build schemes by 30 per cent. This target is conservative and only corresponds to an average heating requirement of around 50 kWh/m² p.a. for all buildings within a local authority. In practice, there are many local municipalities that are pursuing more ambitious goals – but there are also local authorities that for a variety of reasons are struggling to meet the applicable EnEV requirements. Based on the data collected in the project, the researchers developed a three-dimensional cost function. This makes it possible to estimate the refurbishment costs, including the additional costs for improving the energy efficiency, in accordance with the required refurbishment standard and scope.
Recommendations for supporting local authorities
The project also focussed on the energy and funding policy frameworks for municipalities. Among other aspects, recommendations were developed for improving their financial resources. This is because the researchers have come to the conclusion that the funding dilemma facing municipalities cannot be solved with either known financial models from business, such as contracting or PPP, or with existing funding programmes or credit support. Simply increasing the municipal share of the tax revenue would also not be effective. According to survey findings, the additional funds would merely be used to meet general deficits. Instead the project partners advocate a special “municipal property” asset fund that would provide around 2.5 billion euros a year for refurbishing municipal buildings, and would thus allow a subsidy quota of 50 per cent. The researchers calculate that it would cost approximately 5 billion euros a year to refurbish Germany’s entire municipal building stock by 2050 at an energy efficiency level that undercuts the EnEV for new-build schemes by 30 per cent. At the same time, municipalities would have to increase their refurbishment rate to almost 3 per cent in order to renovate all buildings by 2050. Together with practitioners from different local authorities, the Flensburg researchers have developed possible criteria for allocating funding as part of the management of such a special asset fund.

Calculation program for climate-oriented refurbishment strategies
The FinSa software program was developed to help local authorities draw up long-term building refurbishment strategies. It enables decision-makers to estimate the costs for energy efficiently refurbishing their properties by 2050. With just a small amount of information on the total building stock, it enables the comparison of three scenarios relating to the energy requirement, resulting CO₂ emissions as well as the energy and refurbishment costs. A business-as-usual scenario depicts current, ongoing refurbishment activities, while a climate protection scenario depicts the refurbishment work required to achieve the national climate protection targets. Another scenario corresponds to goals that are individually definable by the local authorities. The scenarios comparison over a prolonged period distinguishes the FinSa tool from other available programs that either allow only a rough classification with comparison values or are very detailed with regard to individual buildings and renovation projects.

The free FinSa tool (open source) is now available to local authorities as a decision aid. You can find information to download as well as details about the “Climate Protection Concept 2050 for Municipal Buildings” research project here (in German only).

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