

SUSTAINABLE RENOVATION CONCEPTS FOR SINGLE-FAMILY HOUSES

Abstract

Due to the introduction of low energy standards for new houses as minimum requirements, rising energy prices and generally more focus on energy performance, there is a need for far-reaching energy efficiency improvements in connection with renovation if existing single-family houses in the Nordic countries are to have competitive power compared to new houses on the future housing market. If the market is able to explain this to the homeowners there is an open market with undreamt-of possibilities. Good technical solutions exist but need to be combined based on the full range of (standard) solutions in order to reach the low primary energy level of new houses.

The typical single-family houses identified to have large primary energy saving potential almost descend from the same time period in each Nordic country. A complete energy efficient renovation of a typical house include post-insulation and sealing of the buildings envelope - roof/ceiling, façade, windows/doors and foundation and maybe slab on ground - installation of a mechanical ventilation system with high efficiency heat recovery and low electricity use and possibly an energy efficient heating system based on district heating, heat pump etc. This package of technical solutions can be carried out during an overall or step wise planned renovation dependent on the condition of the house, the financial possibilities of the homeowner etc.

Calculation of packages of energy efficient renovation solutions targeted the three segments of houses show that primary energy use and heating bill can be reduced with up to about 75% or a factor 4 corresponding to the level of a new house or better. It seems that the passive house level can not quite be reached with standard solutions. They require that more ambitious measures are applied. The total investment needed to reduce the heating bill by a factor 4 including replacement of e.g. roof and windows is up to EUR 100,000. It is generally difficult to obtain an economy in balance in the sense that the annual payment on a cheap loan, e.g. mortgage refinancing, to finance the investment is not fully offset by the expected annual energy savings. Since, the cost of energy measures today may not correspond to the increased market value of the house, it is important to find mechanisms so that the total cost of the energy investments in the future is reflected as an increased value of the house. But with due regard to all the non-energy benefits, such as better and healthier indoor environment and comfort, and less dependence on expected future higher energy prices, energy efficient renovation will probably still be attractive for the average homeowner.

One-stop-shops in the form of full-service providers of energy efficient renovation of single-family house are missing in the Nordic countries. This service is vital to open up the market. A one-stop-shop could be seen as a possibility to make it easy for the homeowner to comply with possible future requirements to realize far-reaching energy savings in connection with extensive renovations, provided that the building sector offers the solutions. Homeowners need someone to take care of all relevant steps necessary for the renovation of the house including quotation for the work, financing and management of the contract work. An ideal full-service concept in five phases is proposed, going from initial evaluation of the house, to extensive analyses, proposal for package solutions, coordinated execution and operation and finally management of the house after renovation.