

Lower Energy Bills due to Additional Insulation of Buildings

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Additional insulation and covering of façades with new cladding is a building method which has become more popular in recent years. The main reasons for this have been to decrease energy consumption and, at the same time, to improve damaged façades. In some cases the main motivation has been on the improvement of the external appearance of an old building to blend it in with its surroundings.

Additional façade insulation can be achieved by a number of different methods; plaster, metal sheets or sheets of other materials. In all cases, the possibility to make mistakes which results in decreased lifespan and reduced thermal insulation is very high if the construction principles or working methods are unfamiliar.

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Recommendations for Additional External Insulation of Façades

Thermal insulation of a façade can be improved by installing mineral wool or plastic insulation on the external surface. A façade with external insulation requires cladding. With additional insulation of a façade, a construction is made by applying new thermal insulation and cladding material to an old wall.

There are two cladding methods. Mineral wool is rendered, and

There are also other ways of lowering a building's energy bill. These should be carried out either before cladding or, at the latest, at the same time as cladding. These other methods are, for example, installation of thermostat radiator valves, regulation of radiator networks, and packing of windows, amongst others. A façade will only be insulated if a full-scale renovation is also needed.

Figure 1. Mineral wool counts for the most common material used.



plastic insulation is cladded to look like a rendered material surface. The other method is to cover the insulation with sheets or thin masonry.

Cladding comprises several working phases and is very cost effective. Additional insulation of a façade costs about FIM 500 (US\$125) per square metre, even though the price for a square meter of mineral wool is no higher than approximately FIM 50 (US\$12.50) per square metre.

It is very important to look after walls or wall surfaces. Cleaning of the façade, and maintenance of the roof, eaves, gutters and rainwater pipes should be part of the regular basic maintenance of a building. The façade should be painted at regular intervals of 10 to 20 years. Small repairs should be carried out in conjunction with this. A heavily damaged wall construction must be renovated. At this phase it is always advisable to consider additional insulation of the wall.

Even though the energy prices are currently not very high, they are likely to rise considerably during the period of use of the building. Even now the costs for so-called peak energy produced during cold seasons are two or three times higher than the average consumer energy price. With increasing electric heating it will become inevitable to increase the price of peak energy sooner or later. The houseowner will have to bear the burden of paying the bill. In practice it is difficult to follow the effects of reduced energy consumption as tenants change their behaviour - for example, one tenant may like fresh air more than another. In connection with additional insulation, often other measures like reducing the energy consumption of the building are carried out. In theory, additional insulation of façades will bring thermal insulation of buildings up to the level required by present norms.

The façades of rendered buildings originating from the beginning of the 19th Century are often so rich in detail that additional external insulation is difficult and expensive. In these buildings it is worth trying to decrease the energy bill by other means, even though rendering should be renewed. Straight-line gable walls without windows can be furnished with additional insulation. This measure will balance the temperature inside the building. In the 40's and 60's there was a great deal of hasty building. Houses built during that period are often cold and their façades can be in very poor condition. Architecture was straight-lined, even monotonous, and thus additional external insulation is possible, sometimes even recommendable. Houses with frames of lightweight concrete or prefabricated sandwich units are even now furnished to a large extent with additional insulations.

Additional wall insulation will always alter the exterior of the building. It should either improve or at least maintain the appearance of the building if planning is carried out by a professional - an architect. Planning of additional external insulation comprises several phases, the first of which is an estimate of the condition of the façade. Special attention has to be paid to the choice of the construction solution. There are a good dozen alternatives available. The choice is affected by the appearance, technical functionality of the structure and terms of delivery. Easy maintenance and long durability i.e. how to clean and repair the surface, are of great importance, and must not be forgotten when making the decision.

The constructor of additional external insulation should always be a professional. Works are carried out by painting, masonry and building contractors. A successful final result is ensured if the constructor has access to detailed structural drawings of the building. The choice of the contractor will be made after the decision to insulate the external wall has been made, not vice versa. The skills of tenderers are easiest to evaluate by referring to buildings with corresponding external additional insulation made approximately five years ago. After five years a true evaluation of the quality can be made. Part of additional insulation solutions can be bought as a total delivery, including everything from materials to the labour.

A contract supervisor needs to be nominated. A promoter who has implicit confidence in the contractor must blame himself if the final result is poor or unsatisfactory. A supervisor familiar with the additional insulation solution is also able to advise the contractor.

Information for this study was compiled in 1988. Most of the reports were finished at the beginning of 1989. As a result of the research part of the cladding methods of additional insulation presented here were developed and modified.

The ETRR report (Energy Economical Buildings and Structures), financed by the energy department of the Ministry of Trade and Industry, deals with internal insulation of outer walls and evaluates the energy economy of the outside of the building. The corresponding report will be completed in April 1990.



Figure 2. Mineral wool used for additional insulation of this tower block