

Abstract

These days, builders and building contractors are trying to create solutions for energy efficient housing in many ways. A solution that has gained notice is the passive house. The concept is based on using only the passive energy that people, electrical appliances and the sun renders. One prerequisite is unusually large quantities of insulation in the walls and well insulated windows.

Skanska in Örebro are interested in a passive house in Frillesås, outside Kungsbacka, which houses four apartments. By comparing and evaluating the house to three other passive houses, this study searches for an optimised technical solution for building the house in Örebro. The comparison also provides a basis for optimizing the house financially against the heat load standards, 10 Watt per square metre, given by the National energy authority. Life cycle cost analysis is used as a tool for the economic evaluation of various criteria. Another option, not following the heat load standards, is to only seek to financially optimize the house from Frillesås, once it is placed in Örebro.

The proposed technical solution is building with studs of steel and only using three layers of insulation in the walls. New standards from The National board of housing, building and planning has influenced the proposal of steel studs. The disadvantage is that the technique of building with steel studs is often new to carpenters and thus requires more time. The passive house concept is also new. As follows, two new aspects concurrently come into play. Consequently, it is necessary to project well in order to succeed.

The study shows that effect requirements cannot be reached when the house is moved up north to Örebro, even though the house has been additionally dimensioned in several aspects. The explanation is that Örebro is located in the northern most part of the climate zone which determines effect requirements. One hundred kilometers northwards the next climate zone begins and there higher effect needs are allowed. Up there the house would easily meet the requirements, without any added dimensioning.

Regardless of the requirements for passive houses, the study shows that it pays off to buy energy-efficient windows and using Ground source heat pumps for heating hot water. Solar collectors are not profitable. Other changes in the climate shell shows that the house from Frillesås, in a life cycle economic way, can retain the dimensions of insulations to floor, wall and roof.