A method for economic optimization of energy performance and indoor environment in the design of sustainable buildings

Future tightening of the energy requirements increases focus on design of new and better performing buildings with good indoor environment and only limited extra cost compared to new buildings today. This paper presents a method for economic optimization of the design of new low energy dwellings that takes into account the indoor thermal environment. By use of the criterion of cost of conserved energy implemented in a Microsoft Excel sheet, a cost optimal design according to a targeted energy frame can be found. The resulting indoor thermal environment is then evaluated based on parametric analysis in the dynamic simulation tool WinDesign. If any changes have to be made to ensure a good indoor thermal environment, iteration between the two programs must be performed. An example is used to illustrate this process. It indicates that the method can be used from the early design phases to ensure that an economic design solution with good indoor environment can be identified.

The example also shows that in order to ensure that buildings have low energy consumption, at minimum extra cost, more appropriate products and solutions will have to become available on the market at a competitive price.

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