

Facade integrated HVAC systems for the renovation of residential buildings – results from Austrian research projects

D. Venus, B. Nocke, C. Fink, K. Höfler

AEE - Institute for Sustainable Technologies

Feldgasse 19, 8200 Gleisdorf, Austria

Tel. +43 (0) 3112 - 5886 -319

E-Mail: d.venus@aee.at

Web: www.aee-intec.at

At the moment hardly prefabricated façade modules with integrated building services are used for the thermal renovation of residential buildings. Within the frame of the national research project “Prefabricated façade elements with maximum integrated HVAC components and systems for the renovation of existing buildings” the potential for the intelligent renovation of existing buildings should be shown and new solutions should be developed. A highest possible level of prefabrication should minimize the required renovation time and avoid vacancy. In particular, the aim is also to find solutions which allow a direct interaction of the HVAC components in the building façade with the room behind.

In a first step a reference building was defined which should have high potentials for high performance renovation on the one hand and for the use of prefabricated façade elements on the other hand. For this reference building a portfolio of preliminary supply concepts for heating, domestic hot water preparation and ventilation were developed including the building envelope. These concepts include technologies like solar heat, component activation (by solar thermal energy), photovoltaic and heat pump. With the help of a quantitative and qualitative pre-assessment a number of solutions were chosen, which are investigated in detail using for example TRNSYS simulations. The focus of the analyses lies on ecological aspects (primary energy demand) and in further consequence also on economic aspects (Life Cycle Costs).

For the most promising solutions, functional construction concepts to integrate the HVAC components in the highly insulated timber façade will be developed. These concepts will be evaluated and optimized regarding the architectural, building physical and functional requirements. Finally, two of the potential solutions will be manufactured and investigated on a test bed. The measured data can be used to analyze the functionality of the modules and also to develop possible improvements.

In the presentation results of the dynamic simulations and of the LCC calculations will be shown as well as constructive approaches for the evaluation of the test façade.