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HERZO BASE

HOMES AS ENERGY STORES – CONCEIVING THE ENERGY-FLEXIBLE BUILDINGS OF TOMORROW

DURATION: 3 YEARS

RAAB
Aus Freude am Bauen

EVONIK INDUSTRIES

SCHLAGMANN PORORON

ENERGIE CAMPUS NÜRNBERG

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Current developments and global debates on the impact of climate change show that climate protection in general and especially at the local level is becoming increasingly important. The demands on modern buildings in terms of energy efficiency, CO2 emissions, and quality of use are moving more towards center stage. The German government's aim of reducing the demand for heating in residential properties by 20% by 2020 and increasing the use of renewable energies in the building sector continues to be a major challenge. The requirements stated can only be met with a coordinated concept that harmonises the building envelope and the building and systems technology. THN's "Herzo Base" project, which is being conducted by the Energie Campus Nürnberg and in collaboration with multiple industrial partners and the municipality of Herzogenaurach, will therefore look into the further development and optimisation of passive and active building technology components and how they can be integrated within a building's systems.

Components and system integration

The aim of the project is to establish a complex of terraced houses made up exclusively of houses that act as energy stores, with positive annual energy balances. The overall concept therefore pursues the use of environmentally friendly parts and construction materials, with the specific feature that they can be easily recycled and returned to the material flow at the end of their period of use. Within the scope of the project, a row of eight terraced houses will be planned and built, with the engineering and innovation concept designed in such a way that it can be transferred to any type of housing or residential area.
In order to achieve the individual aims of the project, the focus is on the further development and optimisation of the passive and active components, and their integration into the building's systems. More specifically, in terms of the passive elements, highly insulating bricks with integrated thermal insulation will be used. In order to reduce thermal bridge losses, a new generation of thermal insulation material made of non-combustible silica with a thermal conductivity of A = 0.019 W/(mK) will be filled into the cavities of the thermal bridge products for the first time. In addition, newly developed mortar pads, thermal insulation plaster, and solar paint will be used in the new-build houses. The innovative passive components will be compared against traditional building materials in terms of their potential.

The active components encompass the system integration of energy generation and storage in the form of geothermal heat pumps, a thermal and electrical storage unit, and a central photovoltaic system and DC sub-grid. In terms of the systems, a predictive operational management strategy will be developed for the optimal charging and discharging of components and thermal storage in the building cores, in order to take advantage of the benefits of central storage technologies in an energy network involving multiple building units.

Project aims

In terms of passive components, the "Herzo Base" project focuses on the further development and testing of new types of highly insulating wall construction materials. For the first time, these newly developed products will be used in the project and compared with traditional products. As far as active components are concerned, the project focuses on the incorporation of a central thermal and electrical storage unit with a predictive operational management strategy and its system integration into a building energy network. In order to verify the expected results, the first part of the project includes intensive monitoring with the optimisation of operational energy use. A second part of the project will analyse the efficiency of the project over a three-year long-term monitoring phase.