Fraunhofer IVI

AMSEL and Telewerk

Self-sufficient micro settlement for an energy-conscious lifestyle and living lab for future workspaces in rural Mittweida

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Constructing buildings in a resource-friendly way and operating them sustainably is a challenging technical task. People will happily accept these innovations only if we succeed in casting simple and functional features into an aesthetically pleasing shape.«

Prof. Dr. Matthias Klingner,
Fraunhofer IVI

Idea and concept

Within two related research projects, AMSEL and Telewerk, an experimental platform is being built inMittweida that will become a networked microsettlement together with the existing WERKBANK32 building.

Together, Hochschule Mittweida, TeleskopEffekt GmbH, Volksbank Mittweida and Fraunhofer IVI carry out joint research into how modern living and working in rural areas can be realized while at the same time promoting the region.

Through integrated and shared storage systems, the settlement's supply infrastructure is demands-based and largely self-sufficient. The construction work is carried out by medium-sized trade companies and industrial enterprises from Saxony.

The consortium receives funding from the Saxon State Ministry for Regional Development (SMR) within its simul+ initiative for realizing the project.

Solar-optimized building shapes

In terms of their architecture, the two newly constructed buildings are designed for maximum energy yield in the winter months. Their solar panel surfaces are oriented strictly towards the south and the winter sun's zenith. The PV modules are installed both as part of the building shell and in the form of a glass skylight.

The AMSEL tiny house is built by erecting three pre-fabricated timber modules. The Telewerk building is realized as a timber frame construction with pre-fabricated components for walls and ceilings.

Fraunhofer IVI provided both the basic design and the specific shapes of the buildings, deliberately carrying forward the autartec® design principle. The detailed design and planning was carried out by an architecture firm.

Smart living within the settlement

After the micro-settlement's launch, aspects of energy generation, consumption and provision will be studied within the ensemble. For this purpose, the buildings' roofs and exterior walls bear photovoltaic surfaces, and the interiors contain energy storage units, switchable consumers and thermally activated components.

The smart living approach pursues the aim of user-dependent control. The integrated flexible energy management system will optimize the energy consumption of the individual buildings and will be capable of reacting to signals from the power grid, thus ensuring the demands-based operation of both the building and the overall settlement.

Facts and Figures

AMSEL Tiny House

Living space:	21 m²
electricity generated:	6,4 kWp
electricity storage system:	10,2 kWh

heat supply: local heat network & electric
heat storage system: thermally activated building components

Telewerk Smart Working

floor space:	312 m²
electricity generated:	15,6 kWp
electricity storage system:	16,6 kWh

heat supply: local heat network
heat storage system: thermally activated base plate

WERKBANK32 existing building

heat provided via 56-82 kW heat pump

Smart working with cybersecurity

The simul+ Telewerk living lab combines modern work spaces with a unique settlement concept that make remote work outside of metropolitan areas in climate-neutral digital environments possible while at the same time guaranteeing requirements of data security.

Telewerk sees itself as part of an innovation ecosystem and as a regional pioneer in important fields of the modern work landscape: topics range from cybersecure digital infrastructure to IoT networking in building and facilities technology, minimizing the carbon footprint of building and operating structures by using timber as a sustainable material and by providing regenerative energy, as well as questions from the field of social sciences on remote work and sustainable lifestyles in rural areas.

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