

Prize-winning energy-plus building at Vienna TU

In October 2015, Vienna Technical University was awarded the Austrian State Prize for Environmental and Energy Technology. The prize-winning energy-plus building on the university campus is the first high-rise office building in the world to produce more energy than it consumes. Close scientific involvement and the green building expertise of SAUTER played key roles in the office tower achieving this all-round positive energy balance.



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In the centre of Vienna, amidst a group of older buildings, an office building of the Technical University (TU) rises into the air. Built in the 1960s, both the energy balance and infrastructure of this building on the Getreidemarkt campus were far behind the times. The building's owner, the Federal Real Estate Company – Bundesimmobiliengesellschaft or "BIG" – and its tenant, the university, therefore decided on a complete renovation as part of the "TU University 2015" modernisation project.

Scientists at the TU were closely involved with the planning and conversion phases and used their findings for research purposes. The university wasn't intent on just a huge reduction in energy consumption. It aimed to go further still, converting the old high-rise into an energy-plus building.

Operating on 88 per cent less energy

To achieve a massive decrease in energy consumed by the building, the clients turned to an innovative concept from the R & D team. The idea was to install extremely powerful automation technology that, whenever possible, sources energy locally and continuously improves the efficiency of the whole system. So, before building work began, the project team analysed more than 9,300 devices and components, recorded their precise energy consumption and selected the most efficient for this development.

One result of this evaluation, for example, is that only energy-efficient computers and coffee-makers are available to staff and students. With savings such as these, and by employing both a dedicated energy management system and SAUTER's intelligent building management software (novaPro Open), the outcome was remarkable – the building's energy consumption was reduced by up to 88%.



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Using local sources efficiently

To meet the energyplus standard, the BIG and the university combined technical solutions with construction measures and local sources of energy. The waste heat from the IT servers, for instance, helps to heat the building and energy is recovered from the lift system. The modern glass façade has state-of-the-art heating, sunshading and lighting which keeps the temperature down in the building.

Particular reference should be made to the vast photovoltaic system on the roof and in the façade of the building – the section installed within the façade is the largest of its kind in Austria. The electricity produced by the high-rise fulfils its entire primary energy requirement. The surplus is available to the neighbouring buildings on the campus.

Ideal conditions for working and learning

Every day, around 800 employees and up to 1,800 students go in and out of the eleven-storey tower and the front building housing the main lecture hall. Along with individual offices and seminar rooms, the energyplus high-rise also has library and student areas. SAUTER room automation stations (ecos500), that provide heat and ventilation exactly when needed, save energy and create the optimum climate. This means that even if rooms are full, students remain comfortable which aids their concentration.

SAUTER's management and visualisation software – novaPro Open – ensures the entire building automation system runs smoothly. Energy consumption is monitored constantly. If staff want to alter the climate conditions in a room, they simply use the SAUTER room operating unit (ecoUnit 3) to adjust the temperature, lighting or window blinds.

Groundbreaking energy-plus building

Vienna University of Technology wants to continue developing the innovative solutions born of this project, and the knowledge gained along the way, for use in future undertakings. "We are making technology tangible for people here with this extra innovation. We are seeing for ourselves what happens if you combine basic scientific principles, application-orientated research and concrete implementation. We're then able to pass on this added value to society," says TU Rector Sabine Seidler, summing up her objectives.

The award of the 2015 State Prize for Environmental and Energy Technology (category Research & Innovation) to this project demonstrates quite impressively that when science, research and innovative techniques work hand in hand, refurbishment can turn existing buildings into showcases of energy efficiency.

Facts & figures: Energy-plus office building of Vienna TU

Net floor area:	13,500 m ² over 11 storeys
Usage:	Approx. 800 workplaces, capacity up to 1,800 persons
Energy generation:	Photovoltaic system with area of 2,199 m ² ; waste heat from servers used for heating building; energy recovered from the lift system
Construction:	Further development of passive house construction for high-rise office buildings
General planner:	Working group of architects Hiesmayr-Gallister-Kratochwil
Further info:	www.university2015.at/plusenergiehochhaus (German and English)