

Press Release, Graz, Austria, 25 October 2017 11:54:40
Innovation/ Energy / Environment

The world's first energy glass tower building

The 60 metre high, SFL technologies Science Tower building, with its pioneering green technologies, acts as a flagship for the Smart City Graz throughout the world. As a world first, the façade uses large surface area energy glass made from organic Grätzel cells and special thin glass, combined with additional innovations in energy and building technology. The tower is a landmark in the "Green Tech Valley", and houses research facilities and innovative businesses and technology start-ups that are developing the green technologies of the future. Amongst them is the Green Tech Cluster, which brings together more than 200 energy and environmental technology companies under a common platform.

The Science Tower is 60 metres high and cost around €16m to build. It is designed as a "living lab", making it a hotbed for emerging green building technologies. "The Science Tower is not just a building" comments Mario J. Müller (SFL technologies). "It is an ambassador for an urban future that is worth living, exhibiting disruptive innovation such as energy glass based Grätzel cells, but also acting as a source of synergy for scientific and technology research and business". Prof. Michael Grätzel, inventor of the technology named after him and the latest winner of the Global Energy Prize, is convinced that the Science Tower acts as a magnet for green technology and business, not just in Europe but throughout the world, and is a demonstrator for the successful collaboration of R&D with industry. As a representative for these synergies, the first tenant in the Science Tower is the Green Tech Cluster, which together with its 200 partner companies promotes and initiates new innovation projects.

Energy glass - next generation photovoltaics

The outer façade of the Science Tower consists of transparent energy glazing using Grätzel cell technology. The energy glass has been manufactured for the first time on an industrial scale, for large surface area application in the façade, by SFL in Styria, Austria, together with its subsidiary, h.glass, in Switzerland. The energy glass uses a bionic model of plant photosynthesis, which is three times more efficient in the weak light range than conventional PV, and in this transparent system, the first to be installed worldwide, it is able to harvest light from both sides for decentralised power generation. The next generation of the Grätzel technology is already being developed, and achieves a solar conversion efficiency of almost 30% in diffuse light.

The new sundial tower

One of the special features of the tower building is the moving sun shade of ultra-light photovoltaic modules on the façade, which rotates around the tower once every 24 hours. While shading the office space, this also provides optimum output of solar power, and indicates the time of day, like a large sundial. In combination with the large solar system at the SFL company headquarters in Stallhofen (SFL energrid), together with heat storage under the building and heat pumps, 100% of the energy requirement for the tower can be covered by solar energy.

The first use of thin glass for façades

A further innovation is the use of a special thin glass, more commonly used in smartphones and tablets, in a large size format suitable for building applications. The revolutionary glass is produced in the SFL Glass Technology Centre in St. Marein. In the process, the less than 3mm thick glass is toughened by ionic exchange in a liquid salt bath at 450 °C, which allows the glass to be used for completely novel architectural solutions. Furthermore, it gives a saving in materials and resources of up to two thirds in comparison to conventional glazing.

Intelligent technologies for the future

The overall energy concept of the Science Tower includes a mobile energy storage system through integration of ELI, the first Austrian developed electric commercial vehicle with type approval for European roads. The high-tech tower building is topped off by a viewing platform that contains a smart, urban garden section with a usable area of 300 m². Due to its in-built microclimate, the garden area can be used for growing fresh fruit and vegetables that can be harvested at skyline level.

Where the green innovations of tomorrow are incubated

Housed over a gross floor space of 4500 m², research is being conducted by the concentrated mass of green innovators from the scientific and business communities: renowned research facilities such as JOANNEUM RESEARCH, Graz University of Technology, the Joanneum University of Applied Sciences and the ESA (European Space Agency) branch office together with commercial partners such as the Green Tech Cluster and the crowd investment platform Rocket Holding. In addition, a “Green Tech Hub” is also being offered; a new start-up concept with a focus on strengthening the collaboration between established companies and start-ups for incubating green innovation. The Science Tower is, quite literally, a “beacon for innovation” that radiates far beyond the borders of Austria.



Image: (left): The Science Tower is a harbinger for some of the world's latest technology innovations and a standard bearer for the Smart City Graz, Austria. (right): Prof. Michael Grätzel and Bernhard Puttinger (CEO of the Green Tech Cluster) during a visit of the leading scientist to the Science Tower.

About the Green Tech Cluster

The Green Tech Cluster is instrumental in the green innovation and consequent growth of approximately 200 companies and research institutions. Situated in Styria, the green heart of Austria, it forms a hotspot for green technology with 20 global leaders within an hour's drive away. Companies located here grow almost twice as fast as world market averages. The cluster provides support for R & D project development, assessment of technology trends and market opportunities and establishing global contacts. The cluster has repeatedly been ranked the world's no. 1 Environmental Technology Cluster.

The Science Tower, in Graz, is a core element of the “Smart City Graz” technology transfer and realisation project, which is supported through the Climate and Energy Fund, by funding of up to €4.2m from the Austrian Ministry of Transport , Innovation and Technology (bmvit) as part of its [Smart Cities Initiative](http://www.smartcities.at). www.smartcities.at and www.klimafonds.gv.at

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