Fully integrating solar power into building design

October 28 2014

The SMARTFLEX project will help architects to fully integrate solar panelling into their building designs in a cost-effective and highly innovative manner.

The EU SMARTFLEX project is developing an architecturally pleasing solution to the growing demand for solar power. A production line for manufacturing individually designed solar panels of virtually any shape or colour has just been completed, which could open the door to the cost-effective customisation of buildings with in-built solar power capabilities.

These panels will be designed to meet the technical requirements of architects and engineers, and be safely and easily integrated into virtually any building design. This process is being developed by SMARTFLEX, which is due for completion in 2016. The system will be capable of meeting any number of architectural requests, ranging from design and size to colour, shape and material at the industrial scale.

Located in Vilnius, Lithuania, the recently completed factory has a production capacity of 50 megawatts (MW) and is powered using 100 % renewable energy. Highly innovative production methods have been incorporated including thermo sealing, which ensures that the crystalline modules have a long life. A total of EUR 37 million has been invested in building the PV cell and module production line.

Photovoltaics generate power by converting sunlight into electricity

using semiconducting materials. A photovoltaic system uses solar panels composed of a number of solar cells to supply usable solar power. This technology is increasingly being incorporated into building designs, in part to meet European targets for renewable energy.

Photovoltaic cells and modules can be part of the building structure, which means they can replace conventional building materials rather than being installed at a later stage. Equipped with solar elements, a building can produce renewable energy and pave the way towards sustainability.

SMARTFLEX is an important milestone along this road. Once fully complete, architects will be able to use the intuitive planning software developed by the project team, which designs solar modules in shapes and colours that fit perfectly into a particular building. This information will then be sent directly to the industrial production line. This simple procedure is likely to appeal to architects, who often find their designs for solar façade elements either technically impossible to realise or simply too expensive to implement.

Several photovoltaic building elements have already been installed and are being monitored on a project test building in Lithuania. Between 100 and 150 modules of different sizes have been used, making up a total solar façade of around 200 m^2. The building will be connected to the grid by the end of 2015.

The future of solar power is bright. Solar panels have the potential to meet up to 15 % of the EU electricity demand by 2030, and based on current market trends, photovoltaics could meet 7 % of the EU's electricity demand in 2020. Furthermore, photovoltaic modules can be recycled and the materials reused. SMARTFLEX is in the process of demonstrating that building-integrated photovoltaics (BIPV) can be achieved in a cost-effective and design-sensitive manner.

Provided by CORDIS