COMPANY
smartflower energy technology GmbH
smartflower.com

LOCATION
Güssing, Austria

SOFTWARE
Autodesk® Product Design Suite
Autodesk® Inventor®

Intelligent flowers for power generation

smartflower designs the world's first All-in-One Plug-and-Play photovoltaic system

Autodesk Inventor from the Autodesk Product Design Suite was an irreplaceable tool for us when it came to designing our system. With the software we got a better understanding for the interplay of the different assembly groups and with the digital model we were able to test whether the various components interact the way we imagined them to.

—**Tobias Legerer**
Head of Marketing
smartflower GmbH

The smartflower™ photovoltaic system. © smartflower GmbH

Why are photovoltaics generally rectangular, complicated and somewhat boring? Why can't this new type of renewable energy be simpler, more mobile and, at the same time, have a sophisticated look? Over four years ago, during a night out, the founders of smartflower asked themselves precisely these questions. A few months and several ideas later, an ambitious project had grown from the seed of the original idea. "We wanted to develop a photovoltaic system that could be operational for the everyday person without a lengthy installation process and, in addition, would imitate nature in form and function", explains Tobias Legerer, Head of Marketing at smartflower. "That's the reason why, when it came to the overall look of the system, we chose to focus on the sunflower. Just like the sunflower, our system constantly finds the optimal position to the sun, so that an optimum yield can be generated at all times. With the smartflower, the Vienna-based company of the same name, has created the world's first All-in-One Plug-and-Play system. The system is delivered to any home in its complete form, with everything necessary for the power generation. One must simply anchor it in the ground with a concrete or screw foundation and is then able to operate it immediately. In comparison to conventional photovoltaic systems there is no complicated installation or operation process, which usually needs to be done by a professional.

Top-quality software for a sophisticated design

It was smartflower's aim to package the complicated structure of a photovoltaic system in an attractive way, drawing the consumer's attention to the user-friendliness of the product. The company wanted to encourage people, who, in the past usually shied away from the technology or the optics, to use renewable energies with such an easy to handle system: the housing opens at the push of a button. The roughly 18 square meter solar flower unfolds and automatically moves into the optimal position for facing the sun. At sundown or, once again at the push of the button, the system completely disappears back into its robust housing. However, the simpler the system is for customers to operate, the more complicated is the design behind it all. Herein lay the challenge for the team, because the system was meant to move smoothly on all levels without having the various components collide with each other. Thanks to the support of the Clean Tech Partner Program from Autodesk®, the startup could afford top-quality design and construction software at a fraction of the normal price.

The Autodesk Clean Tech Partner Program supports clean technology innovators with design and engineering software they can use to accelerate their development of epic solutions to the world's most pressing environmental challenges. For more information, visit **autodesk.com/cleantech.**

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"Autodesk® Inventor from the Autodesk® Product Design Suite was an irreplaceable tool for us when it came to designing our system", Tobias Legerer reports. "With the software we got a better understanding for the interplay of the different assembly groups and with the digital model we were able to test whether the various components interact the way we imagined them to." The designers of smartflower used Autodesk Software to analyse a wide range of options to find the best solution in terms of static requirements and selection of material. "With Autodesk Inventor we created photorealistic illustrations (renderings) and simulations, which served us greatly from the creation of the model to the final production. Without the professional software the design in its entire complexity wouldn't have been possible," Legerer states.

Intelligent flower concept

In 2013, after three years of planning, constructing and reworking, Legerer and his colleagues presented the finalised smartflower for the first time at the Intersolar in Munich - with a consistent, positive response. The first systems are already at retailers and end customers. For 2014, the plan is to sell approximately 1,000 more models. Customers are particularly impressed by the easy handling of the smartflower, because it largely works autonomously: in the mornings, the up to 5,70 meter large solar system unfolds like a flower towards the sun and even on cloudy days it moves parallel to its respective state, thanks to a GPS-controlled, double-axis system. Thus, the smartflower always ensures the optimum yield. With a module output of 3,19 kWp (kilowatt peak), the annual yield is around 3,500 kilowatt hours, which covers the needs of an average three-to-four person household. In the evening, or at a defined wind strength transmitted by wind sensors, the system automatically moves into a safety position so that it doesn't get damaged. A self-cleaning mechanism makes sure the smartflower doesn't get polluted and no extra cleaning costs are added. Therefore, losses in power generation are minimised and the efficiency of the system maximised.

smartflower™ solar panel folded. © smartflower GmbH

smartflower for humanitarian efforts

Currently, home owners, municipalities and commercial enterprises are amongst the customers of the clean tech startup. Thanks to its mobility, the smartflower is also interesting to other target groups. Even tenants can install a system in their garden, as long as they have an approx. five times five square meter area available, and re-install it again when moving elsewhere. In more remote places like a mountain hut or developing countries, the smartflower is likewise suitable as a power generator, since it can be used as a stand-alone solution and, hence, doesn't rely on an available electricity network. Especially for the use in developing countries, the designers of smartflower are currently working on a favorable price, which still retains all advantages of the All-In-One Plug-and-Play concept. In addition, the team is researching a smartflower variation that is specifically aimed at humanitarian efforts in hard-to-reach areas. For this, the existing model with the current weight of 1,000 kilograms must be reduced to a maximum weight of 250 kilograms, so the smartflower can be packed in a box and dropped by parachute. For those projects, smartflower also relies on Autodesk solutions. Especially concerning the subject of lightweight construction or use of special materials like carbon. The software enables the designers to determine the best alternative and can therefore produce the optimal model.

For more information

To learn more about the Autodesk Clean Tech Partner Program, visit **autodesk.com/cleantech.**

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smartflower™ solar panel with open housing. © smartflower GmbH

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