



Photo: maxx-solar & energie

The winning entry came from Germany's Maxx-Solar Energy, which presented its innovative financing solutions for solar PV in Africa.

And the winner is ...

Installation Innovation Award – Europe: presented by **pv magazine** and Hanwha Q Cells, the Installation Innovation Award identified four nominees chosen for their fresh approaches in bringing solar power to a wider audience. But alas, there could only be one winner ...



At Intersolar Europe in June, four nominees chosen for the **pv magazine** and Hanwha Q Cells Installation Innovation Award – Europe presented their ideas to an enrapt audience.

Each nominee had a five-minute time slot in which to showcase how they had used solar technology, powered by Hanwha Q Cells, to solve a problem, meet demand, or simply provide a new way of thinking. The presentations were all well received by attendees at the show, and the videos of each pitch were hosted on the **pv magazine** website to give those unable

to attend Intersolar Europe the opportunity to have their say and vote on the most innovative solution.

After three weeks of intense voting, **pv magazine** was happy to declare Maxx-Solar Energy as the winner for its inventive project – delivering innovative financing solutions for solar PV in Africa.

Each of the four candidates exhibited refreshing amounts of creativity and a willingness to push the boundaries of what solar can bring to the world, and their messages deserve to be spread far and wide ...

Candidate One: Maxx-Solar Energy

Innovative financing solutions for PV in Africa: In 2011, Dieter Ortmann of Germany built a bridge to South Africa and founded a branch office there. “With the goal of bringing training through the newly-founded Solar Academy and becoming a supplier to the installers we train there,” says Ortmann, the founder and managing director of the Maxx-Solar Energy Group, which also recruited the Deutsche Gesellschaft für Sonnenenergie to help with training. Now Ortmann is



Photo: Bjarke Ingels Group

Bjarke Ingels Group is a Danish firm that pitched its smart urban living idea to the audience at Intersolar Europe. Powered by solar panels, converted shipping containers are turned into upcycled homes and then clustered together on 'urban riggers', creating a harmonious, sustainable community.

involved in a project that he is so proud of he threw his hat into the ring for the Innovation Installation Award organized by Hanwha Q Cells and **pv magazine**.

Ortmann arranged financing for a PV plant on the Dominican Grimley School; a school for the deaf attended by some 100 children. Ortmann thinks of the undertaking as an exemplary project that can act as a model for further PV installations. After all, even though many people are convinced of the benefits of solar energy, the requisite money is often lacking.

His partners at the school are nuns, some of them more than 70 years old. "I found it fascinating that people of an advanced age have an appreciation for the role of renewables and energy independence," says Ortmann. "Be more independent" is his motto for the project. At the Grimley School, the motto applies both to energy security and with regard to his helping people help themselves.

"Sure, there's plenty of sunshine; it is definitely worthwhile to go there," says

Ortmann. "But the financing is often a problem." Ortmann and his team have to link up potential operators with investors and develop a good solution for both. The school is now renting the PV system.

The conditions are right. The location gets approximately twice as much solar radiation as Germany, for example, which makes the power half as expensive. Amortization for off-grid systems therefore follows a similar track. Added to that is the aspect of self-sufficiency, he says, as the power supply is not as dependable as in Europe.

Maxx-Solar Energy implemented the project with a local installer. "All we're doing is helping people to do something for themselves, and we merely act in an advisory role," says Ortmann, explaining his motto. The rental model works much like similar schemes in Germany. The owners are from "our area," and comprise a tax adviser and a South African owner. The first thing to be done is to show how this can work. The school can purchase the system in 12 years for a low price, says

Ortmann, for a price of around €100/kW. This price point, however, is often a sticking point. The rental payments cannot be too high, and the purchase price at the end of the rental phase has to be reasonable so that the tenant gets something out of the system. This is the case in the Dominican Grimley School project. The monthly rent is approximately €2,700. At a 70% self-consumption rate, that is already below the cost the school would have paid for the electricity. But the system design is likely to generate a self-consumption rate closer to 100%.

That means that, even in the rental phase, the school will see significant savings month after month – using 90% of the power it produces should save the school some €800 a year according to the figures provided by Maxx-Solar.

It is a 20 kW system producing 33,000 kWh; the school needs 144,000 kWh. "In ten years the system will have paid for itself," says Ortmann. The only thing currently lacking is an emergency power supply. Ortmann is



This car dealership in Belgium has been fitted with a rooftop PV array by Intellisol, which won the contract by using intelligent modeling analysis to calculate the exact size of the solar system required.

currently exploring options for how to finance that.

Candidate Two: Bjarke Ingels Group

Living Tomorrow Sweden: Bjarke Ingels Group (BIG) is a Danish company that is working on creating a floating neighborhood in Gothenburg, Sweden, called Living Tomorrow Sweden. BIG has been building student housing in inner city areas for many years, and for this project hit upon the idea of placing housing on barges in the river that runs through the city of Gothenburg. One of the key factors for this project, explains BIG's Jakob Lange, was to use shipping containers, thus enabling owners to ship these 'homes' easily around the world.

The containers can be configured together in groups of nine homes – called urban riggers – boasting internal courtyard views and interconnected communities, right there on the water.

Individual riggers can be clustered together to create larger communities. As harbors across Europe and elsewhere become abandoned or fall out of favor, new uses for this type of space are being explored – from offices and retail projects

to community and shared spaces. Residential dwellings have long been seen as a desirable option for many post-industrial harbor locations, and BIG wanted to take the concept further – building not just student accommodation, but homes that were zero energy, made from upcycled materials and designed to embrace the opportunities offered by new renewable energy technologies such as solar PV panels.

The riggers produce more energy than they take from their surroundings, using hydrothermal heating that is driven by solar energy. This approach can heat up a complex comprising 16 apartments. The homes are well insulated and made from upcycled shipping containers – a production process that uses one-twentieth of the energy typically required to construct a similar dwelling, Lange said.

The Gothenburg project, once complete, will have a green garden route and also allow inhabitants to fully enjoy the space – including sailing and swimming on and in the water, maximizing the views offered by the harbor's open space, and developing an interconnected energy system whereby each urban rigger can feed or draw energy from their neighbors.

The project is expected to house more than 9,000 inhabitants once fully complete and generate many employment opportunities during the course of its creation. Shipping of a prototype urban rigger has already begun, Lange added.

Candidate 3: Solartechnik Mitteldeutschland

Cogeneration tenant project using PV and CHP: The energy transition is a huge challenge; a challenge that Chris Werner of Energy Consulting is convinced he is rising to in an exemplary, if small, way. With Daniel Zschuckelt of Daniel Zschuckelt Solartechnik (Solartechnik Mitteldeutschland), he is equipping not just a single multi-family dwelling in the Passendorfer Schloss residential development with combined renewable energy sources, but several such units, and integrating them into a microgrid. "We have implemented all the major trends needed for the energy transition," says Werner. This will reduce energy costs by 15% over what it would cost to supply the housing units through the local utility, according to his calculations.

The multi-family building comprising 14 apartments, 12 units in a row house,

and six additional residential units are currently under construction and will be supplied starting this fall by an 80 kW east-west PV plant and a 20 kW pellet-fired cogeneration plant. The housing complex also has a smart meter network from Discovery. “There is real-time consumption monitoring which opens up the black box of energy consumption,” says Werner. Some studies show that this kind of transparency makes a critical differ-

supplied, the system will deliver 85% of the residents’ total energy needs. The development could be even more self-sufficient were it not for the fact that the combined heat and power plant will be shut down during the summer to avoid higher costs for residents. To meet electricity demand not covered by the PV system, green power will be purchased.

Because the project not only saves money for those who live in the housing

had been looking to establish a new Mercedes car dealership in Belgium, but to do so in a smarter, more energy efficient way. Enter Intellisol.

“They asked us to design a PV installation for this dealership, but nobody knew how much energy this building was going to use, so that was the big difficulty,” said Daniels. As a completely new building, unused for one-third of the time, and with a low and decreasing feed-in tariff (FIT) for solar applications, the challenges were vast. “Revenues on the installation were poor, and so we had to stress as much as possible the importance of self-consumption, with storage not yet an option due to safety regulations.”

IAM, nevertheless, wanted to cover the entire roof with PV, and wanted a 10% discounted cash flow guarantee. To win the trust of the owner, as Daniels puts it, Intellisol made an in-depth energy profile analysis on IAM’s other showrooms, looking at how they used energy generally. The company then made a quarterly hour consumption analysis and projected this on to the new showroom, allied to NASA meteorological data to assess the types of conditions it would be subjected to.

Intellisol also designed an energy usage calculation tool to enable them to strike the perfect balance between energy production, consumption, storage and feed-in. This tool displayed to IAM how a typical dealership uses its electricity, when its peaks are during the day, every quarter hour, and over the course of the year. This intelligent approach to assessing energy usage patterns – and displaying it simply – meant that Intellisol was able to assess that the rooftop PV array needed to only be 81.4 kWp and not cover the entire roof. This system was sized to meet 32% of the plant’s energy needs (using 296 Hanwha Q Cells modules) – taking into account the various peaks and troughs of a typical dealership’s energy use patterns. Only 35.6% of the energy produced was sent back to the grid, which meant a payback time on paper of 9–9.5 years for IAM – with a discounted cash flow (DCF) of 10.2–11.4%.

If Intellisol had covered the entire roof with a PV array (requiring 761 modules), DCF would have been just 6.5–7.6%, with a payback time of up to 15 years. This is the where, why and how Intellisol won the project, ♦

Ian Clover & Michael Fuhs

Photo: pv magazine/YouTube



Solartechnik Mitteldeutschland presented at Intersolar Europe its cogeneration tenant project, which uses solar PV and CHP to reduce energy costs for local utility housing.

ence to energy savings and efficiency. In the U.S., successful start-ups like Opower and Bidgely base their business models precisely on that idea. In this case, the concept is being realized not in a single-family home but for residents of a multi-family dwelling.

In the project, the heat and power supplies are implemented together. In addition, there is a large thermal storage unit that makes use of excess solar power. “There is no need to feed unused solar power into the grid,” says Werner. The project is not optimized for electricity or heat, but rather optimized to the energy system as a whole. The PV system acts as the heart of the energy system. The cogeneration plant and heating with excess or unused solar power are controlled based on PV production.

The challenges are in the details. The same goes for regulatory issues, which are not always clear in Germany for new business models. Discussions with regional regulatory authorities preceded implementation of the project. The residents will now receive their own power supply agreement; according to the calculation, 75% of the electricity will be produced onsite and, added to the heat

units but also generates returns for its investors, the Passendorfer Schloss residential development could be a model concept for demonstrating how to master the challenges of the energy transition. For one thing, there is broad agreement that tenants in multi-family housing must have the opportunity to benefit from the energy transition and that there must be participation similar to self-consumption for owners of single-family homes. It is also clear that to achieve PV expansion targets, the roofs of multi-family dwellings will have to be used to a large extent for PV, an application for which business models have often been lacking. Werner even sees a possibility of his project serving as a template for a business model power utilities could use.

Candidate Four: Intellisol

Smart solar system for Belgian car dealership: Intellisol has recently connected a solar PV installation at a newly built Mercedes car dealership in Belgium. Herman Daniels explained at Intersolar Europe how Intellisol won the rights to develop a solar PV rooftop system for the group IAM, winning out against four other firms eager for the business. IAM