

Sustainable and economical



Projects are where the rubber hits the road for photovoltaics. As governments and companies across the globe seek out low-emission ways of doing business, innovative PV projects demonstrate that the path to net-zero isn't just sustainable – it can also be profitable.

Winner

Solar Cooling Engineering, PV Cool Kenya

German company Solar Cooling Engineering (SCE) has taken an innovative approach to refrigeration with its PV Cool Kenya project. SCE has developed solar-powered cooling technology that is based on a sustainable refrigerant (R600a) and insulation materials.

Unlike other cold rooms that rely on traditional grid-tied cooling methods, the SelfChill system uses modular thermal storage to balance cooling peaks. Water is chilled and frozen, and stored in a water chiller that provides cold water to a fan coil inside the cold room. In this way, energy fluctuations can be balanced by energy stored in the form of ice.

Battery storage can be added if required, but it is not a necessary component of the system. The cooling unit itself was designed in-house, with SCE opting to create a DC unit that is powered by PV modules. The PV-Cool Kenya project has been used by farmers in Kenya to store perishable goods and has reportedly reduced

post-harvest losses to zero. A scalable design means there's scope to replicate SelfChill in other countries and for different sectors.

Jury comments

Nicolas Chouleur: What I liked was the simplicity of the design. Making things robust and simple is generally not an easy thing to do. I think there was a lot of good engineering in this approach.

Florian Mayr: It's a simple solution with a potentially high impact, while still taking a holistic approach using locally produced components. I think it could potentially have a huge impact for the local farmers and the local market and could act as a blueprint for other areas with the same challenges.

Vinay Rustagi: It's a clever solution and we've not seen such a solution in India. DC cooling and it doesn't have to have storage – I think the embedded storage system that allows it to work 24/7 without any batteries is really cool.



Photos: Solar Cooling Engineering GmbH

The Jury

Nicolas Chouleur is a partner at Everoze, an energy consultancy specializing in renewables, energy storage, and flexibility. Chouleur has been working on designing, engineering, and operating all kinds of PV systems worldwide since 2006, from residential arrays through to large, utility-scale power plants.



Florian Mayr is a partner and the head of Apricum's energy storage, digital energy, and green mobility practices. He is an expert on strategy, business development, and transactions in global renewable energy markets, and advises clean-tech companies on corporate and project financing, including M&A, fundraising, and due diligence.



Vinay Rustagi is senior director – renewables at Crisil, an S&P Global group company. He advises project developers, investors, equipment suppliers, technology companies, and policymakers on wide-ranging issues related to business strategy, market environment, policy frameworks, and finance.



Highly commended

Alternate Energy Innovations, Wilandra Farms

A dramatic reduction in electricity costs during irrigation season serves as tangible proof of concept for this Alternative Energy Innovations (AEI) project. The focus at Wilandra Farms was to automate irrigation pumping on the dairy farm to maximize the self-consumption of solar power on site. Using the AEI SmartBox system, Wilandra Farms can set a schedule for irrigation three days in advance. The AEI system then steps up to maximize the use of solar power, leading to significant cost savings.

In year one, Wilandra farms saved AUD 80,000 (\$51,000) in electricity costs. The automated system also reduced labor hours by around 15 to 20 hours per week, thanks to remote monitoring and management capabilities. The project saw Wilandra Farms invest in infrastructure updates, including the installation of 200 kW of solar power and 56 kWh of batteries, as well as four 5 kW wind turbines.

It should be noted that AEI's technology does not require energy storage and most

savings are achieved through the automation of irrigation loads to run on solar power.

Jury comments

Vinay Rustagi: Like the Kenya project, it really showcases the potential and possibility of renewable energy solutions, which is directly providing energy to consumers, not reliant on the grid, helping with maximum social and environmental impact.

Nicolas Chouleur: It's taking the benefit of what solar should be used for in many places, grabbing the energy when you get it. This project is robust and has a direct impact.

Florian Mayr: Finding clever ways to maximize self-consumption of solar power and the economic savings that followed were extremely impressive. To make the energy transition happen, we need solutions that not only make sense from a sustainability perspective, but also have hard and substantial economic advantages.



Photo: Alternate Energy Innovations