Sustainable solar and storage

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The Sustainable and Holistic Integration of Energy Storage and Solar PV (SHINES) program develops and demonstrates integrated photovoltaic (PV) and energy storage solutions that are scalable, secure, reliable, and cost-effective.

The widespread adoption of storage solutions will be a transformative influence on the current state-of-the-art of solar grid integration and will significantly contribute to an economically viable pathway toward energy efficient and sustainable integration of solar generation at much higher penetration levels than currently possible today. These solutions will enable widespread sustainable deployment of reliable PV generation and provide for successful integration of PV power plants with the electric grid at the system levelized cost of energy (LCOE) of less than 14 cent per KWh.

Location: Pittsburgh, PennsylvaniaSunShot Award Amount: $1,036,963Awardee Cost Share: $1,038,083Project Description: This project will develop and demonstrate a distributed, agent based control system to integrate smart inverters, energy storage, and commercial off-the-shelf home automation controllers and smart thermostats. The system will optimize PV generation, storage, and load consumption behaviors using high-performance, distributed algorithms.

Location: Oakbrook Terrace, IllinoisSunShot Award Amount: $4,000,000Awardee Cost Share: $4,000,000Project Description: This project will address availability and variability issues inherent in the solar PV technology by utilizing smart inverters for solar PV/battery storage and working synergistically with other components within a microgrid community. This project leverages on the DOE-funded microgrid cluster controller and is connected to the existing DOE-funded 12 megawatt IIT microgrid.

Location: Knoxville, TennesseeSunShot Award Amount: $3,124,685Awardee Cost Share: $3,240,262Project Description: In this project, EPRI will work with five utilities to design, develop and demonstrate technology for end-to-end grid integration of energy storage and load management with photovoltaic generation. The technology is a simple, two-level, and optimized control architecture. This technology will be demonstrated and its effectiveness verified at three field locations.

Location: Boston, MassachusettsSunShot Award Amount: $3,493,921Awardee Cost Share: $3,560,744Project Description: This project will develop and demonstrate a highly scalable, integrated PV, storage, and facility load management solution. Through the SunDial Global Scheduler, the system tightly integrates PV, energy storage, and aggregated facility load management to actively manage net system power flows to and from the feeder, regardless of whether these individual components are co-located at the same site, or distributed at different sites.

Location: Honolulu, HawaiiSunShot Award Amount: $2,437,500Awardee Cost Share: $2,437,500Project

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Description: This project will demonstrate successful SHINES deployments and will show the system-level benefits of enhanced utility visibility and control of distribution system/edge-of-network electricity resources. This project will enable proliferation of a reliable base of PV and storage distributed technologies that offer more plug-and-play customer options for grid participation, and provide cost-effective "grid response" capabilities to system operators.

There is a major push for sustainable technology to help the world transition to alternative energy. Among the well-known energy storage and sustainable technologies are the up-and-coming resources making a strong push.

According to the International Energy Forum, solar technology must increase by 20% annually until 2030 to meet net-zero targets. While the world aims to hit that target, it needs new solar technology. So, how do self-dusting solar panels sound? Companies are popping up that develop this kind of technology, like the startup Dustoss. You may ask why, but dust mites are a growing issue for solar panels. Studies show that solar panels lose nearly 22% of their energy output because of dust.

Automated self-cleaning services for solar panels don’t use water or electricity, which keeps it sustainable. The services are cost-effective and can be controlled by your phone through an app.

Many products are exposed to harmful chemicals that slow the push for sustainability. Spray polyurethane foam is one of those products. Unfortunately, it’s a common insulation material. The spray releases blowing agents such as hydrofluorocarbons, contributing to high greenhouse gas emissions.

There is a push to use recycled materials to replace common insulation materials that cause harmful side effects. For example, cork is a 100% recyclable, natural, and ec-friendly insulation. The material comes from the outer bark of oak trees. In addition, the material has a negative carbon footprint and is resistant to dampness.

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