

## U.S. Japan Introducing Solar Array and Battery Storage Systems<sup>1</sup>

New and Renewable Energy Group  
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Mainly the United States has growingly installed rooftop solar photovoltaic systems with battery storage that can reduce electricity charges by storing electricity during the daytime for consumption in the evening and night. In the United States and Japan, meanwhile, power utilities are moving to introduce a combination of utility-scale solar array systems with storage batteries that can supply surplus electricity generated during the daytime to the grid during the nighttime and mitigate short-term frequency changes.

In July 2015, Kauai Island Utility Cooperative (KIUC), which provides electricity to 33,000 households on Kauai Island of Hawaii, signed an agreement to purchase electricity from a 13-megawatt solar array system combined with a 52 megawatt-hour lithium-ion battery to be built by SolarCity<sup>2</sup>. This is being called the first U.S. utility-scale solar array and battery storage system. KIUC<sup>3</sup> can reduce fossil power plant operation using higher-cost oil by dispatching electricity generated during the daytime to the grid in the evening and night when electricity demand peaks.

KIUC had considered a battery and a pumped storage power plant for storing electricity generated by solar PV systems for several years and failed to adopt either because of the high cost for the battery and constraints on the location of any pumped storage power plant. But lithium-ion battery prices have fallen over recent years to give economy to the battery option, allowing KIUC to conclude the agreement with SolarCity. The electricity price for the deal is lower than for oil-fueled power plants and slightly higher than for conventional solar array systems. SolarCity is expected to use Panasonic's lithium-ion battery that has been adopted by Tesla Motors.

Similar moves are seen in Japan as well. In March 2015, Green Power Development Corporation of Japan<sup>4</sup> announced that it would build mega solar plants with battery storage in Tomakomai city and Akkeshi town of Hokkaido. The capacity is planned at 38 MW for Tomakomai and 27 MW for Akkeshi. Lithium-ion batteries (whose capacity has yet to be announced) for these plants will be made by South Korea's LG Chem. In May, Japan's first mega solar plant (2 MW) with a large battery (780 KWh) launched operation on Tokunoshima Island. The lithium-ion battery is made by Samsung SDI.

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<sup>2</sup> See <http://kiuc.coopwebbuilder2.com/sites/kiuc/files/PDF/pr/pr2015-0909-solar.pdf>

<sup>3</sup> Oil power plants account for 62% of electricity supply for KIUC and renewable energy plants for 38% (17% for solar PV, 12% for biomass and 9% for hydro). Renewable energy power generation capacity totals 42.5 MW.

See <http://kiuc.coopwebbuilder2.com/sites/kiuc/files/PDF/presentations/2015annualmeetingfinal.pdf>

<sup>4</sup> <http://www.gpdj.jp/>

Lithium-ion battery prices are expected to drop substantially in line with growing demand for such batteries for electric vehicles. According to a report released by the Australian Renewable Energy Agency in July<sup>5</sup>, the installation cost for a lithium-ion battery stands at US\$1.00-1.80/W, representing the lowest cost among batteries depending on some conditions. Lithium-ion battery prices are expected to fall by 60% over the next five years.

Large batteries are indispensable for diffusing volatile solar and wind power generators further. China, South Korea, Germany and the United Kingdom as well are proceeding with research on such batteries. The year 2015 may be the first year for the introduction of large batteries.

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<sup>5</sup> See <http://arena.gov.au/files/2015/07/AECOM-Energy-Storage-Study.pdf>