

## Storage and Solar Finance: Programs for the Rising Behind-the-meter Markets in the US, EU

*There's a clear uptick in distributed energy resources, so where are these markets finding the financing to expand?*

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Moixa Smart Battery for the home. Credit: Moixa.



The global energy storage industry will expand rapidly in the next few years, as it moves to support solar and other infrastructure that is growing more and more complex.

Utility-scale storage will be a significant part of the energy storage market's expansion, but, according to a March report by Navigant Research, recent market developments include an uptick in projects in the distributed sector, particularly for solar + storage microgrids and the commercial and industrial segment. Navigant expects global annual deployments of residential energy storage to increase by about 3.7 GW by 2025.

With interest in energy storage growing within the commercial and residential segments, how are markets moving to assist customers as they look for financial options to install these next-generation energy systems?

### Storage Costs Declining But Still Higher than PV Costs

Behind-the-meter energy storage prices are declining, but they are not so low that it's an easy buy for businesses and the general public.

A National Renewable Energy Laboratory (NREL) report released at the end of March found that the cost in 1Q16 for a 5.6-kW PV+storage system with a 3-kW/6-kWh AC-coupled battery was \$29,568. The PV modules accounted for about \$3,600 of that total and the battery \$3,000. The cost for a 5-kW/20-kWh battery on a similarly sized PV system was \$10,000 for the battery alone. The report puts total hardware costs in 2016 for a standard 3-kW/6-kWh residential storage system at between \$6,530 and \$8,560.

In the U.K., home battery provider Moixa was offering a solar+storage package last year for £4,995 (US\$6,240). That installed price includes a 2-kWh battery and a 2-kW solar system. Moixa also offers standalone home battery systems of 2 kWh and 3 kWh starting at £2,500.

### Incentives

Incentives for storage in the U.S. are mostly limited. The 30 percent federal solar investment tax credit applies to energy storage, and while a handful of states have incentive programs for non-residential behind-the-meter storage, even fewer have programs for residential storage.

Energy storage is included in Calif.'s self-generation incentive program, but residential installations have been limited under the program. According to NREL, Calif. regulators last year amended the program to reserve 15 percent of total storage allocations for projects < 10 kW, making about \$9M available annually for that segment through 2019.

In Vermont, Green Mountain Power last year started offering incentives for installation of Tesla's home battery. Leases are available for about \$40/month, and homeowners who purchase the system can earn a bill credit of about \$32 per month.

### Financing Expanding Beyond Solar to Include Storage

The options for financing storage in the U.S. are growing.

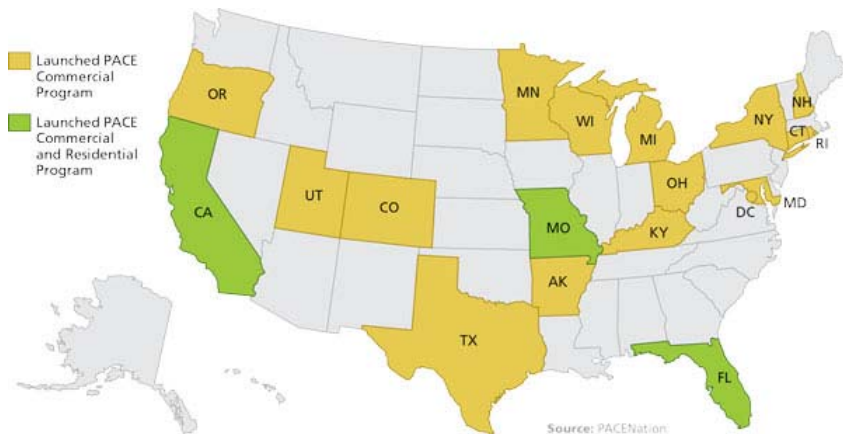
Solar loan provider Mosaic, for example, offers U.S. homeowners loans for storage systems and last November secured \$550 million of new loan funding capacity.

Homeowners also can access loans from storage providers. Adara Power in March said it now offers unsecured financing for its residential energy storage systems up to \$64,000 with terms up to 12 years. The company also said that it offers commercial businesses leases for facility upgrades on a term of up to seven years for between \$20,000 and \$1 million. Large commercial installation loans are available through Adara, with terms up to 10 years for up to \$5 million.

Adara said that it now qualifies for property assessed clean energy (PACE) financing through Renovate America's HERO program.

PACE financing has increased in popularity based on its support for energy efficiency and renewable energy upgrades that are financed through local property taxes, and it also can be applied to energy storage systems.

PACE in the U.S. currently is available for residential properties only in California, Missouri, and Florida, but commercial PACE has been much more successful. Programs for commercial properties now are operating in 19 states, according to PACE advocacy group PACENation.



*PACE Program Availability in the United States. Source: PACENation*

“Residential PACE has been challenged because when a property ends up in foreclosure and is sold, outstanding property taxes and assessments that were unpaid, come off the top - government always gets paid first,” PACENation Executive Director David Gabrielson said. “So, the mortgage lenders, particularly Fannie Mae and Freddie Mac, they looked at PACE as a threat. They agreed that it is legal, but they feel that it is an invalid use of this taxing power, and they have been very resistant.”

That resistance, he added, has limited the availability of PACE for residential projects.

According to Gabrielson, any successful expansion of residential PACE in the U.S. in years to come will lie in proving its worth in the market.

“Stakeholders need to be collecting data and analyzing data - it is either going to support our claims or it's not,” he said, adding that the theory is that PACE households should be healthier and stronger; their homes should be more valuable; and their ability to make their mortgage and property tax payments should be solid.

“This year will largely determine whether we're successful in changing the perception about PACE,” he said.

That goal took a blow in April when Republican senators introduced the Protecting Americans from Credit Exploitation (PACE) Act, which requires disclosure for PACE loans. In an April 5 statement, Sen. Tom Cotton (R-Ark.) called PACE loans “a scam.”

“Predatory green-energy lenders are changing state and local laws to trick seniors into taking out high-interest rate loans for 20 years, along with liens on their homes, for technology that could be obsolete in a few years,” he said.

Gabrielson issued a statement in response to the bill, saying “PACE supporters are deeply concerned by the incendiary attacks leveled against this innovative and successful policy...from some on Capitol Hill.” He said that the PACE industry supports strong consumer protections at the federal level to safeguard homeowners, but that the legislation introduced in Congress “is a thinly disguised effort to kill PACE.”

Gabrielson told *Renewable Energy World* that the future for commercial PACE programs is more positive.

“Commercial PACE is on much more stable and solid ground because in the commercial realm existing mortgage lenders give their consent to projects,” Gabrielson said. “That's an important option that's given to existing mortgage lenders. I see over the next five years a steady, slowly accelerating expansion in commercial PACE.”

### **Solar, Storage Finance in Europe**

While there are no existing PACE-like programs currently operating in Europe, there is interest in this type of financial mechanism in the European Union, said Gabrielson.

He said that a group of Europeans based in Spain have been seeking funding from the EU to develop a pilot program like PACE for certain TBD locations in Europe.

There are, however, other financial mechanisms that support energy storage investments in the EU.

“The European market is very diverse and the types of subsidy schemes vary widely,” Julian Jansen, senior analyst for U.K.-based research and consulting firm Delta-ee, said in an e-mail.

Jansen said that Delta-ee sees the greatest incentives and potential support for storage in Germany, through a mix of low-interest financing programs and state-based support programs.

“In our view, other countries currently lag behind regarding specific [energy storage] support programs especially for commercial customers,” he said. “However, we do not see this as a huge issue, in fact we believe that it is more important for regulatory barriers to be removed, rather than pushing for government-sponsored subsidy and financing programs.”

According to Jansen, Germany’s support program KfW 275 has been pivotal in initially kick-starting the German residential and small commercial battery storage market. It is applicable for storage systems that are combined with a solar PV system < 30 kW. The program provides customers with a combination of low-interest loans from the KfW Development Bank and an upfront rebate on the loan to reduce payback. Jansen said that this support provides customers with several thousand euros, which helps to reduce the upfront cost barrier significantly.

For the German commercial market, Jansen said, Delta-ee is not aware of any programs from KfW, but there are a number of regional support programs that support both residential and commercial energy storage systems.

In France, Jansen said, the current solar PV feed-in-tariff (FiT) discourages the self-consumption of PV generated electricity and takes away the main financial benefit that residential energy storage offers. However, recently a program to support self-consumption was introduced if customers forfeit the FiT, he said. Under the new rules, grid operators are obliged to support individuals and collectives with solar generation capacity of up to 100 kW.

Sweden last November announced that it will offer a support scheme that will cover 60 percent of the upfront investment in residential battery systems, Jansen said, adding that upfront investment support will cover batteries, installation and control systems, limited to SEK 50,000 (US \$5,545).

