



Going from **COAL** power to **SOLAR** power—and **STORAGE**

ENGIE North America has built the largest community solar project in Massachusetts on the site of a former coal-fired power station—and is now adding a storage component to the project.

By Paul
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If you were looking for a solid illustration of the move from fossil fuels to renewables for U.S. power generation, you could probably not find a better example than the Mt. Tom Solar Project in the Massachusetts City of Holyoke, about 90 minutes west of Boston.

On the site of its former coal-fired Mt. Tom Power Station, retired in 2014, an ENGIE North America subsidiary has built a 5.7-MW, 22-acre solar farm for the local municipal utility, Holyoke Gas & Electric. The \$10 million solar project, with its 17,000 solar panels, represents a clean power utilization of the site.

Under a power purchase agreement, Holyoke Gas & Electric is buying renewable electricity from the solar power facility—which is said to be the largest community solar project in Massachusetts.

The solar modules for the Mt. Tom solar project were provided by Trina Solar, with inverters from KACO and racking from GameChange Solar.

"For ENGIE, this project brings the concept of 'Reduce, Recycle, Reuse' to life," said ENGIE NA president and CEO Frank Demaille. "It's a unique opportunity to transform this property from a coal plant to a solar farm to serve the local community."

Added to that, the site is soon to host one of the largest utility-scale energy storage installations in the state. (See sidebar story on page 6.)

Patrick Smith, manager of business development at ENGIE NA, explained that the company had first looked at a solar project for the Mt. Tom site in 2010, while the power plant was still operating.

"We decided to re-examine the solar project at Mt. Tom again in 2015," explained Smith. "The City of Holyoke and Holyoke Gas & Electric were instrumental in helping us through the approval processes and were very strong stakeholders in the project."

While 5.7 MW is certainly a large solar project, ENGIE (formerly GDF SUEZ) had extensive experience in power plant construction and sufficient resources to ably develop and build the project.

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Energy storage system for Mt. Tom site

There is more to come, in terms of power, for the Mt. Tom site, which is the location of a decommissioned coal-fired power plant.

ENGIE North America and Holyoke Gas & Electric (HG&E) have announced plans to build the largest utility-scale energy storage installation in Massachusetts at Mt. Tom.

Green Charge, an ENGIE NA subsidiary, will operate the 3-megawatt energy storage system.

The energy storage system will provide services to reduce utility capacity costs for HG&E as well as stress on the HG&E distribution system. The project will contribute to rate stabilization for HG&E customers over the next 20 years.

Green Charge expects to complete installation in spring 2018, in time for the peak summer months when capacity prices are projected to be at their peak.

Green Charge is the number one energy storage company in the U.S., according to Navigant Research. It develops turnkey grid-scale energy storage projects and has a strong history of developing commercial and industrial projects. Green Charge systems are monitored, optimized, and controlled through its proprietary GridSynergy software platform and offsite operations center.

BYD will be supplying batteries to Green Charge for the project. BYD has installed more than 550 MWh of energy storage systems worldwide and has nearly a 50 percent market share of the frequency regulation energy storage market, or about 25 percent of the entire American energy storage market, says the company.

Electricity produced from the Mt. Tom 5.7-MW solar farm will be stored in the energy storage system isolated from, but interconnected to, HG&E's electricity grid. This stored power will be called upon during local and regional peak load periods to cost-effectively satisfy demand, while offsetting utility cost increases for customers.

"The Mt. Tom energy storage project will produce peak demand and asset management benefits that will help HG&E stabilize electric rates over the long term," said James Lavelle, HG&E's manager. "This project also adds a measure of resiliency to our local grid, helping us to better serve our customers."

Over a 20-year term, HG&E will also use energy storage to reduce the burden on its electrical distribution system, thus increasing overall asset life.

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"We're pretty well suited for executing large projects," said project manager Tom Pike. "That said, each project has its own specific challenges, and Mt. Tom Solar was no different."

In terms of cleaning up the site, the company dealt with removing remnants from an old coal incinerator that proved to be fairly straightforward.

"The land was basically flat, for the most part," says Pike, "but did require some cleanup."

The portion of the site selected for the solar farm was within a 100-year FEMA flood plain along the banks of the Connecticut River. This affected the support structures required for the project. "One of the decisions we made was to elevate the inverters above the flood plain," said Pike. "That meant installing piles and platforms, which was unique to this project."

ENGIE NA hired AECOM to provide electrical and structural engineering and design services for the solar project, and Tighe & Bond for site/civil design services. Given the site characteristics and flood risk and snowfall complications, all critical electrical equipment, including inverters, was elevated six feet off the ground on steel platforms set on pilings. To account for snow, the solar modules required an optimal tilt angle to shed snow and ensure maximum energy production. They were also positioned about three feet above ground. The flood plain situation required that pilings for the racking system be eight to ten feet tall.

AECOM calculated energy performance estimates using a combination of various solar PV modules and equipment. The final design scenario yielded roughly 7,286 megawatt hours annually of solar energy production, enough electricity to power 1,800 homes for a year.

The solar farm sits on a 22-acre parcel of the total 130-acre Mt. Tom site. The optimal location for the project proved to be a challenge in terms of accessibility, so the company worked with an adjacent landowner for better access.

How the company approaches construction of a solar project depends, of course, on the size of the project and the site itself. On larger projects, Pike says, the company would likely approach it from multiple directions. "But most of the time," he added, "we start working from the left and proceed right. We do some grading, then start installing the posts, with the racking crews following, and finally the module crews. For this project, we started from the north end of the site and worked our way south, a process that took about six weeks to complete."

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"During the racking process, we didn't experience much in terms of adverse weather issues," said Pike. "However, it was still challenging at times due to rain and snow. Once we started construction, we saw some mud building up, which our contractor was experienced in dealing with."

ENGIE NA has a strong commitment to hiring local and regional contractors and suppliers whenever possible. The installation contractor on the project was Fischbach & Moore Inc, a Boston-based company; the electrical subcontractor was



A driver, time-wise, for the construction schedule of the Mt. Tom solar project was a Commonwealth of Massachusetts incentive program. ENGIE North America wanted to ensure that the project schedule met the incentive deadlines, as well as the timeframe set by Holyoke Gas & Electric.

Massachusetts-based Collins Electric. Tighe & Bond, also based in Massachusetts, oversaw the environmental aspects and permitting for the project. The solar modules were provided by Trina Solar, with inverters from KACO and racking from GameChange Solar.

Smith said they did not have any specific brand of solar power components in mind for the project, but they specified—and used—quality products.

"We were agnostic when it came to technology," he said. "But we wanted Tier 1 components that had a good reputation and were financeable. This was a 20-year project, making quality equipment essential.

Although we did not have any specific technology in mind going in, we wanted to get the best product in the ground within our established timeframe."

Smith said that a driver, time-wise, for the construction schedule was a Commonwealth of Massachusetts incentive program. "We wanted to ensure that the project schedule met the incentive deadlines, as well as the timeframe set by Holyoke Gas & Electric. The schedule was not compressed, but we definitely wanted to

get the project online as quickly as possible."

"We followed an execution strategy typical for a project of this kind, which included a formal bid process for the various components," added Pike. "One of the considerations was delivery time. Projects like this are usually driven by the delivery of the inverters and transformers, and this project was similar in that regard."

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The procurement process included the ENGIE NA Contract and Procurement team in addition to the project team. "Being a larger company, we most often have better procurement power than our contractors," said Pike. "So we typically purchase the racking, modules,

inverters, and in some cases, the switchgear.

We are using that business model, in which we procure for a project, more and more."

Construction of the 5.7-MW project went relatively smoothly, thanks to solid planning and coordination between ENGIE NA and its contractors, said Pike, and that meant

being able to deal with unforeseen challenges.

"What we found was that no matter how well you structure things, it's the relationships on the ground that really matter. We had employees on-site daily providing oversight, which allowed our contractors to get creative and solve problems along the way."

It can be hard to determine whether certain contractors have that creative troubleshooting ability during the review process, he says.

"When you are talking with contractors prior to awarding the contract, you can't necessarily see that intangible capability."

The fact that the project was completed on time and on budget underlined that the project was well planned and executed, he said. ●