CASE STUDY

Resolving Ultra-Complexities in a Solar Project's Success: from COVID-19 to Landfill to Community Solar

Beverly Community Solar Project

Project Overview

This unique solar project began in early 2016 when the city council of Beverly, Massachusetts decided to explore the possibility of installing solar on some of their underutilized assets. BlueWave Solar who are headquartered in nearby Boston responded to the city's request for a proposal. BlueWave Solar, a national solar developer with over 200 megawatts under their belt, specializes in community solar projects. They have built a proprietary program with customized infrastructure that serves the distinct needs of this type of solar project. The city council was purposeful in their actions. BlueWave Solar is known for its collaborative approach and their dedication to their clientele. That kind of commitment was an important factor in their agreement moving forward. BlueWave was awarded the project.

BlueWave undertook an analysis of the city's properties to assess if any would satisfy the requirements to support the construction of a solar power generation plant, along with achieving the city's obligatory financial and sustainability goals. They identified the Beverly Landfill as a primary site. Landfill sites can be optimal real estate for solar due to their location (outside of major business and population areas), proximity and access to utility power lines, along with

the benefits of converting unusable land into a productive asset. BlueWave's extensive solar development experience was relevant, along with its proven track record of successful landfill solar projects.

Located on the outskirts of the city in Essex County, the community solar project was four and a half years in the making. Early challenges included waiting for an open incentive program that would make the project economically viable. In late 2018, Massachusetts introduced its new solar incentive program, Solar Massachusetts Renewable Target Program or SMART, and the door opened for the Beverly Solar Project. Little could the project stakeholders anticipate the extraordinary circumstances that were to be encountered ahead.

As the development of the project progressed challenges were apparent with access to the site. Through a series of negotiations, land adjacent to the landfill was contracted for construction, interconnection and, operations and maintenance.

Best Practices
From the Development Perspective

- Research the closing of the landfill and review all related information and documentation
- Verify documented information and site conditions to avoid misinformation
- Include weather in project planning and scheduling
- Hire a highly experienced, and responsive EPC firm to not only manage the work but proactively anticipate and manage potential challenges
- Carefully review all plans and timelines to ensure schedules are met and stakeholders' expectations are being achieved

TIP:

"While we did not encounter an issue with the cap on this project, on another site we did experience an issue with plans that were out of alignment with the cap's location. Had we not caught that; it could have had expensive ramifications. We are now more cautious and tend to double-check important data points."

William B. Gaudet,
Managing Director of Construction,
BlueWave

The largest landfill solar project BlueWave has built to date, construction on the Beverly site came with some expected and unexpected challenges. The developer selected Signal Energy DG as the engineering, procurement, and construction (EPC) firm. Based in Union, NJ, the company is recognized for its creative solutions and the exceptional value they bring to every project. Signal's team also had successfully completed several other projects for BlueWave.

Paramount for every landfill project is vigilant attention to the integrity of the environmental cap that tops the landfill.

This unique aspect permeates every activity from the initial planning phase, logistics, scheduling, design, installation, to post-construction work.

Signal Energy DG proved the value of their relevant experience early in the project addressing some potential issues. They made minor modifications to the equipment pad locations that optimized the plant by reducing voltage drop. The improved design also made access to the equipment easier for installation and maintenance, while reducing access road length and associated costs. The EPC firm also worked directly with the utility to finalize the medium voltage run to ensure a smooth interconnection and worked in conjunction with the landowner to carry out a portion of the modification that included land clearing for the re-location of power poles.

One area where the project caught a break was space. Space is a premium on landfill projects. There is constant concern over protecting the environmental cap as personnel and regular shipments of equipment move in and out of the site. In this respect, the Beverly Landfill site was extraordinary. The site had an acre's worth of laydown area off the cap giving the team a luxury rarely seen. From staging areas to office trailers, parking, and accepting all deliveries off the cap, this project was as good as it gets.

In contrast to other landfill projects, the engineering and construction teams were faced with additional challenges at the project site:

- Exposed rock and ledge surrounding the landfill
- Extreme soil resistivity; and
- Sloping terrain

Signal Energy DG performed grounding studies above and beyond normal requirements to address the resistivity issue. The engineering team worked to formulate a specific design that would adequately ground all areas and safeguard them. The solution included extensive grounding grids throughout the site in addition to the standard rods and rings typically installed.

Solar FlexRack's project support team assisted with developing solutions for the slope challenges. In areas throughout the site where the slope was extreme, stone armoring was employed to help solidify the racking foundations. The site was installed with its B3P-X Series racking known for its ease of installation and adjustability to accommodate sloping terrain. The design characteristics of the ballasted racking are self-squaring for better module alignment and better flow with the topography of an undulating site.

> *"We had great contractors. They worked with us to resolve all issues and that is a statement that shouldn't be taken lightly."*
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> *William B. Gaudet, Managing Director of Construction, BlueWave*

Best Practices
From the Construction Perspective

- Effective planning, communication, and execution
- Put the time into due diligence, focus on detail
- Assess and validate the project delivery plan
- Explore access routes and traffic patterns and impacts far in advance from the perspective of isolating and simplifying travel paths, road work to ensure access, identifying deliveries and unloading areas on-site, limiting and managing weight on the cap
- Place high importance on timing and strict abidance to requirements
- Maintain effective communication
- Hire highly experienced and responsive contract partners from cradle to grave of the project to not only successfully execute the work but proactively collaborate with the teams to manage potential challenges

TIP:

"We conduct both a pre and post-construction site analysis. In the case of the Beverly Landfill, we came in prior to active construction to fill in any depressions to avoid ponding and assure all low spots due to settlement were rectified. This is, then again, verified post-construction. Our goal is to leave the landfill and cap in better condition than when we started."

Mark Anderson,
Project Manager, Signal Energy

THE BEVERLY PROJECT IS ACQUIRED

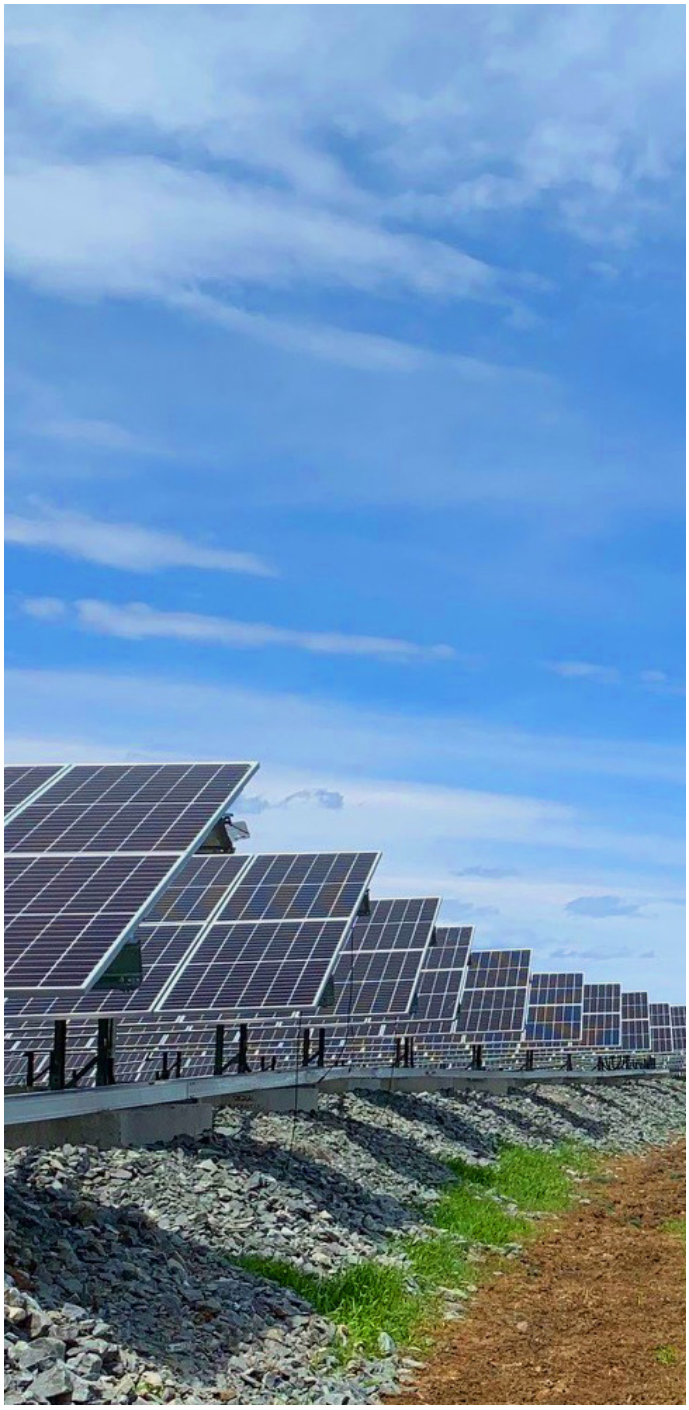
Independent power producer, Navisun acquired the Beverly Community Solar Project in 2020. Their growing portfolio includes commercial, industrial, municipalities, and community solar projects.

Project's Biggest Challenge: COVID-19

One of the biggest and most unique challenges the teams were confronted with on the Beverly Landfill Solar Project was COVID-19. This was a potential force majeure event that was not in the plans. With very little notice, Signal Energy DG needed to mobilize their teams to develop an inventive and extensive plan to meet the needs of the situation. They had to re-think managing a project from an installation standpoint.

First-order was to establish hyper-sanitary conditions with hand washing stations, hand sanitizer, and regular cleaning of work areas. Crews were issued mandatory personal protective equipment. New schedules were created that limited crew members to specific tasks and engagement with team members. Their activity was closely documented and managed to ensure rules were adhered to and employees' health and safety were foremost.

The construction crew also dealt with delivery issues as the supply chain became disrupted due to the pandemic. The company managed schedules and juggled work activities to accommodate the delays and to date remain on schedule with the project. While Signal Energy DG could have declared force majeure and stopped work, as some solar EPCs had done on other projects, their team and subcontractors persisted through the challenges.



Project: **Beverly Community Solar Project**
Size: **4.9 MW**
Location: **Beverly Landfill, MA**
Developer: **BlueWave Solar**
EPC: **Signal Energy**
Modules: **Hanwha Q Cells 400 W**
Racking: **Solar FlexRack B3P-X Fixed Tilt**

Inverters: **SMA**
Monitoring: **Also Energy**
Project Owner: **NAVISUN**
Power Offtakers: **City of Beverly, Residents and Local Businesses**
Date Completed: **Operational Dec. 2020**

Project Benefits

When Navisun's Beverly Community Solar Project meets completion, it will deliver significant benefits to the community and be a milestone project in the solar industry.

The distributed generation project will fiscally impact the municipality with income from lease payments, the PILOT tax agreement, and electricity cost savings totaling over the 20 years of the project to the tune of an estimated five million dollars. Ultimately those monies will benefit the residents and businesses of Beverly.

As a landfill project converted to a solar power generation plant, the land has gone from an unused asset to a productive source of clean power. The Beverly Solar Project will generate enough energy to power approximately 500 homes.

The community will effectively reduce their carbon footprint and the project will contribute to a cleaner environment. On an annual basis, the plant will offset 3,720 metric tons of carbon emissions or the equivalent of removing nearly 800 cars off the road.

As a community solar project, the city has created an opportunity for residents and businesses to utilize clean renewable energy. Solar is a lower-cost energy, so the city will reduce their electricity spend, unlocking a portion of their budget for other important initiatives. Through the subscription process for community solar, they have also made lower-cost energy available to the people who live and work in the community.

Project Partners

BlueWave is on a mission to revolutionize energy with simple, powerful solar solutions. As a pioneering solar developer and leading community solar service provider, BlueWave has built more than 200 MW of solar projects to date and provides community solar access to thousands of customers. BlueWave's innovative community solar subscriptions make it possible for homeowners, renters, small business owners, and municipalities to be part of the energy revolution. BlueWave's cutting-edge Switch Platform enables solar asset owners and installers to conveniently manage their customers while giving those same customers an easily accessible online dashboard to sign up, manage their subscriptions, and review their account activity.

A certified B Corp, BlueWave has received national recognition for its work to protect the planet, including being named the Clean Energy Company of the Year in 2018 by the Northeast Clean Energy Council, a top impact company by Real Leaders Magazine, and a leading growth company by Inc. Magazine. For a full list of our awards and to learn more, visit bluewavesolar.com or follow us on Twitter, Facebook, LinkedIn, or Instagram.

Signal Energy is known for our great people and by our customers for providing exceptional value through our creative solutions. We are on a mission to be the preferred engineering, procurement, and construction (EPC) contractor for our strategic customers by providing innovative solutions, delivering exceptional results, and attracting and developing the best workforce in the industry. We strive to be Elite in every commitment we make. Learn more at http://www.signalenergy.com/

Solar FlexRack, a division of Northern States Metals, is an integrated solar company that offers custom-designed, fixed tilt ground mount and single-axis solar tracking systems in the commercial and utility-scale solar mounting industries. Solar FlexRack also offers full turnkey packages, including engineering, geotechnical, pullout testing, field, layout, and installation services to address the actual site conditions of an installation and provide a full scope of services from design to delivery and installation. Solar FlexRack has completed over 2 GW of solar racking installations in 40 states across America and five countries globally. For more information, go to www.solarflexrack.com and follow us on Twitter, Facebook, and LinkedIn.

Navisun is a solar independent power producer within the United States that codevelops, acquires, constructs, finances, owns, and operates distributed and small utility-scale ground mount and rooftop solar projects. Its principals have completed numerous solar projects for utilities, municipalities, universities, schools, hospitals, and similar institutions, with typical project sizes ranging from 500 kilowatts to 20 megawatts. Learn more at Navisunllc.com.