

RENEWABLE ENERGY

Microgrids promise new revenue streams for US wastewater utilities

An increasing number of wastewater treatment facilities are opting to reduce their energy bills by implementing microgrids with solar power and battery storage. So far, the uptake has been concentrated in states with initiatives to mitigate the restrictive capital costs.

Microgrid power systems are poised for wider uptake at wastewater treatment plants across the US, as the economics increasingly justify the associated resiliency benefits.

McKinleyville Community Services District in California is the latest utility to embrace the concept (see table below), after awarding a \$2 million contract to Ameresco to design, build and operate a microgrid consisting of a 580KW solar photovoltaic (PV) and 500KW/750 KWh battery storage system at its 1MGD (3,785m³/d) Hiller Park wastewater treatment facility.

Ameresco will deliver the project under a 10-year energy service contract, with guaranteed cost savings from the onsite solar generation and battery storage systems serving to offset the entirety of the

WWTP's \$120,000 in annual energy costs.

While many WWTPs already utilise solar PV, as well as back-up diesel or gas generators during power outages, what sets a microgrid apart is the use of controllers and software to interact with the electric grid and operate independently if required. While this improves resilience during planned power outages and emergency situations, it also provides meaningful financial benefits – such as the ability to purchase and store energy from the grid while prices are low.

The economic benefits are the primary reason that McKinleyville pursued its project. The district had recently implemented an upgraded extended aeration treatment process to meet more stringent discharge requirements, which had quadrupled the

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facility's annual energy costs.

"If you go from paying \$30,000 per year to \$120,000 per year in energy costs, your elected officials start taking notice," McKinleyville CSD general manager Greg Orsini told GWI. "Being able to offset those costs with some sort of renewable energy project suddenly became much more relevant and tenable."

Monetising microgrids

While the cost savings associated with the McKinleyville microgrid will exceed the debt service payments on the project, Orsini conceded that it may not have moved forward without an energy efficiency grant which was awarded through the California SRF programme. The grant will cover half of the project's \$2 million cost, while the balance consists of a low-interest loan.

Microgrid projects implemented at WWTPs elsewhere in the US have been reliant on state-level grants or incentives – and as a result have largely been concentrated in California and the Northeast.

"With the right winds in your sails at the state level, there's a lot of money out there to offset up-front capital costs and address ROI," observed Paul Bennison, business developer for microgrid solutions at Siemens Smart Infrastructure USA.

Despite their tax-exempt status, utilities in states such as New York and California can still access investment tax credits by leveraging a private sector partner in order to reduce capital costs by as much as 50%.

"For a not-for-profit or government entity it's hard to take a pinch of those tax incentives, but you can bring in a third-party for-profit company to own and operate the assets so that they become eligible," explained Tim Kelley, market director of renewable and storage solutions for Siemens' Russelectric business.

While the high capital cost of battery systems in particular can prove a hurdle, Kelley nevertheless argues that microgrids can be financially viable even in states without incentives. Besides simply offsetting higher energy costs, microgrids are able to create additional revenue streams by enabling utilities to sell stored energy ▶

THE CURRENT STATE OF US WASTEWATER MICROGRIDS

A growing crop of precedents demonstrate that microgrids can make economic sense for wastewater utilities under the right conditions.

Location	Scope
McKinleyville, CA	Ameresco awarded \$2m contract in March 2020 to design, build and operate for ten years a microgrid at the 1MGD (3,785m ³ /d) Hiller Park WWTP, consisting of 580KW solar PV and 500KW/750 KWh battery storage.
Rialto, CA	Anaergia received a \$5m grant from the California Energy Commission in 2018 to develop a microgrid and battery storage at its \$160m bioenergy project, which will dispatch 17,520 MWh per year of power to the grid, generated from biogas.
Santa Rosa, CA	Microgrid at 21MGD (79,485m ³ /d) Laguna WWTP consisting of 126KW solar PV, 2MW/480KWh battery storage system and upgraded biogas cogeneration system. Received \$5m grant from California Energy Commission in 2015.
Orlando, FL	Duke Energy signed an MoU with the City of Orlando in 2019 to develop a microgrid using solar PV and battery storage at the 40MGD (151,400m ³ /d) Iron Bridge WRF under a BOO structure.
Camden County, NJ	CCMUA plans to expand an existing microgrid using solar PV and cogeneration to encompass a solid waste incineration facility owned by Covanta.
Fairfield, CT	Schneider Electric completed a microgrid project utilising solar PV and a 400KW fuel cell at Fairfield's 10MGD (37,850m ³ /d) WWTP in 2018.
Borough of Caldwell, NJ	Public Service Electric and Gas Company installed a 250KW/1MWh battery system and 896KW solar PV at the Borough's 4.5MGD (17,032m ³ /d) WWTP in 2017.

Source: GWI

back to the grid.

“That’s a new option that just started this year in most parts of the country, whereby a battery system can fit into the regional power markets and supply energy and other services,” Kelley explained.

Utilities are increasingly expected to integrate biogas from anaerobic digesters into microgrids as a further source of revenue. Siemens is supplying the microgrid for Anaergia’s Rialto bioenergy facility in California, which will sell electricity generated from biogas to grid operators once it becomes operational later this year (see *GWI April 2020, p28*).

Market participants also suggest that wastewater utilities can monetise relationships with electric utilities by shifting ener-

gy consumption to different times of the day. In turn, they would receive financial compensation from their electric utility for reducing the load on the grid.

Building systems manufacturer Trane intends to demonstrate this at Santa Rosa’s Laguna WWTP in California, where a microgrid using solar PV and upgraded biogas cogeneration units should be up and running this year. The project will deliver at least \$85,000 in annual energy cost savings, with the scope for an additional \$140,000 in annual revenue generation by participating in the state’s demand resource programme.

“In California, water and wastewater facilities consume 18 out of every 100 kilowatt-hours used,” Michael Day, micro-

grid deployment lead at Trane, explained to *GWI*. “There are existing, mature technologies at treatment plants that can reliably move that energy consumption from one part of the day to another.”

Day argues that the adoption of legislation enabling community choice aggregation (CCA) in states such as California, New York and Massachusetts is making this prospect increasingly viable. CCAs are non-profit government entities that take responsibility for procuring power locally – and are much better placed to work with individual assets such as WWTPs.

“CCAs have really opened up the upstream counterparty model, and we’ve seen an explosion of interest over the past year.” Day concluded. ■

NASDAQ WATER INDEX

Dry year propels California water index

In stark contrast to other commodity markets, the value of the Nasdaq Veles California Water Index has tripled since early March. An ongoing lack of tradeable derivatives could mean investors miss the chance to speculate on an anticipated dry year.

