



RESILIENT

An Innovative Approach to Resilience in Public Facilities

Montgomery County, Maryland USA

How Montgomery County gained microgrids and electrical upgrades for no money down

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Montgomery County is a sizeable government that found itself with an equally sizeable problem. With 9,000 employees and 400 buildings totaling 9 million square feet, the Maryland county has a budget as large or bigger than many states. Bordering Washington, D.C., with over 1 million people, the county represents 16 percent of the state's economy.

Even before installing microgrids, Montgomery County was a clean energy leader. As early as 2009, the county set a goal to reduce greenhouse gases. In 2017, the county accelerated to the aggressive stretch goal of an 80% reduction in greenhouse gases by 2027 and 100% reduction by 2035. The county has also installed 7.6 MW of solar, taken aggressive steps to make its buildings more energy efficient, and with the help of Schneider Electric's Energy and Sustainability Services buys 100 percent clean energy for its facilities. Today, Montgomery County has achieved carbon neutrality, but seeks more directed efficiency through renewables and microgrids.

The county is making significant strides in sustainability, safety, and security. Microgrids and other upgrades to critical facilities have also improved the county's resilience, keeping residents safe and providing needed services even in the event of prolonged power outages.

The challenge: gaining resilience, going green, updating buildings – without breaking the budget

Two pivotal events led county leaders to pursue microgrids. The first occurred in 2012 when a devastating storm, known as a derecho, launched a surprise assault on the Mid-Atlantic.

Goal

Increase resilience, upgrade electrical infrastructure, and enhance sustainability – without upfront capital investment.

Solution

Install microgrids at two critical county facilities.

Story

After a devastating storm caused widespread outages, Montgomery County set out to find private partners to help mitigate the impact of future disasters. Schneider Electric was selected after robust bidding.

Results

With the right partners, the microgrid solution:

- Creates little budget impact
- Incorporated other repairs and upgrades
- Improves efficiencies and enhances sustainability

Montgomery County pioneered a microgrid model others can follow.

Originating in the Midwest, the fast-moving, complex line of tornadoes, lightning, wind, and rain proved to be one of the most devastating storms in U.S. history, leaving 22 people dead and millions without power. Over 250,000 Montgomery County residents and 71 county facilities were without power for multiple days.

The storm was reason enough for the county to seek the resilience of microgrids. But there was another pressing need that framed the county's interest in microgrids. The electrical infrastructure within county buildings, – low- and medium-voltage gear, was beginning to show its age. The buildings are between 30 and 50 years old on average. Government administrators needed to find a way to pay for expensive upgrades.

The county decided to plan holistically. How could it package capital upgrades with installation of new microgrids and at the same time further its green energy goals? Most of all, how could it do all of this without adding to its debt obligation or straining a budget, already pressed by the needs of schools, libraries, police, and fire?

In 2014, the county turned to the private sector for ideas, issuing a challenge in the form of a request for proposals that sought creative solutions from a proven energy partner.

What followed was robust bidding for the job, with Schneider Electric coming out on top.

The solution: no money down for the microgrid and electrical upgrades

Schneider Electric and its partner, Duke Energy Renewables, offered a plan that would allow the county to install two advanced microgrids and upgrade aging electrical infrastructure – all without any upfront investment. In addition, the private partners would maintain and operate the microgrids for the life of the contract.

This was done using what's known as an Energy-as-a-Service (EaaS) agreement. The county signed a 25-year EaaS agreement, a form of long-term contract, with Schneider Electric and Duke Energy Renewables.

The partners design, finance, build, maintain, and operate the microgrids and upgrades. Montgomery County makes capacity and energy payments to the capital partner over the life of the contract. The payments include a locked-in energy rate, so the county avoids market price escalation. For the electrical upgrades, alone, the EaaS agreement averts what would otherwise have been a \$4 million capital expenditure.

Moreover, the deal brings increased energy reliability, resilience, and clean power at only a marginal increase in annual energy costs for the two facilities.

Schneider Electric is charged with building and maintaining the two microgrids, while Duke Energy Renewables will own and manage the energy supply.

Client Vision

To bring reliable electricity to critical buildings, upgrade an aging electrical infrastructure, and work toward sustainability goals – all while staying within budget constraints.

Benefits

Resilient and efficient energy, achieved without budgetary pressure or operational risk.

Project

Project at a Glance

- Location: Montgomery County, Maryland USA
- Project type: two advanced microgrids

Project Details

- Infrastructure upgrades (low- and medium-voltage gear)
- Natural-gas generators
- Solar at PSHQ produces 3.3 million kWh per year
- Electric Vehicle Charging
- Total production between both sites equals over 11 million kWh per year with solar and combined heat and power
- Advanced controls and monitoring
- Advanced cybersecurity
- Completed in September 2018
- Microgrid at Public Safety Headquarters and Correctional Facility

Specifics

Microgrid 1 at Public Safety Headquarters (the county's largest building). Includes electrical distribution equipment upgrades, 2 MW solar, energy management with building automation system, combined heat and power, gas generator.

Microgrid 2 at Correctional Facility. Includes minor electrical distribution equipment upgrades, new combined heat and power, diesel generator for 1,000-occupant facility.

Funding: an Energy-as-a-Service arrangement via an innovative power purchase agreement.

The microgrid edge

Having the microgrids will give the county an edge when the next big storm hits. Microgrids typically run in parallel with the utility grid, but when a power outage occurs, the microgrids will island from the grid. Protected from the grid disturbance, the microgrids will then power the correctional facility and public safety headquarters with its on-site resources, in this case solar, trigeneration, and natural gas generators. When the grid is restored, the microgrid reconnects and relies on a mix of its on-site resources and utility power, depending on which is advantageous for the county at any given time.

The onsite microgrids will provide a significant amount of electricity – equivalent to that used by 750 homes. The solar installation at PSHQ alone, will provide 3.3 million kWh, enough to power more than 250 homes.

In addition, the microgrid will operate efficiently via its combined heat and power (CHP) plants. This technology uses the waste heat produced in generating electricity. The heat byproduct is used to make hot water and steam, or heat or cool buildings. As a result, the county reduces its fossil fuel consumption and greenhouse gas emissions. The two microgrids are expected to reduce greenhouse gas emissions by 6,800 metric tons each year, which translates to removing over 1,400 cars off the road or planting 178,000 trees.

Why Schneider Electric

Montgomery County chose Schneider Electric from among dozens of bids submitted in response to its Request for Energy Proposals (RFEP) because of the company's skill integrating microgrid components (solar, CHP, and other internal



aspects of a microgrid). The county's bid evaluators also appreciated Schneider Electric's approach to a public/private partnership, where the private partner owns and pays for the energy equipment. As the county thinned down the proposals, layer by layer, requirement by requirement, Schneider Electric rose to the top.

County officials are now exploring how to bring microgrid technology to additional buildings. Moreover, they want to help other cities, towns, and counties do the same, and as such have created a publicly available master contract. By using the competitively bid master contract, governments can move projects forward more quickly and easily, using lessons learned by Montgomery County.

The bottom line

Montgomery County set out to solve its problems involving energy resilience and an aging electrical infrastructure. But what the forward-thinking county achieved has implications far beyond its own borders. It has offered up a model that could bring microgrid benefits to many other communities nationwide.

Schneider Electric

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About Duke Energy Renewables

Duke Energy Renewables is a leader in developing innovative wind and solar energy generation projects for customers throughout the United States. The company's growing portfolio of commercial renewable assets includes 20 wind projects and 55 solar facilities in operation in more than a dozen states, totaling about 2,900 megawatts in electric-generating capacity.

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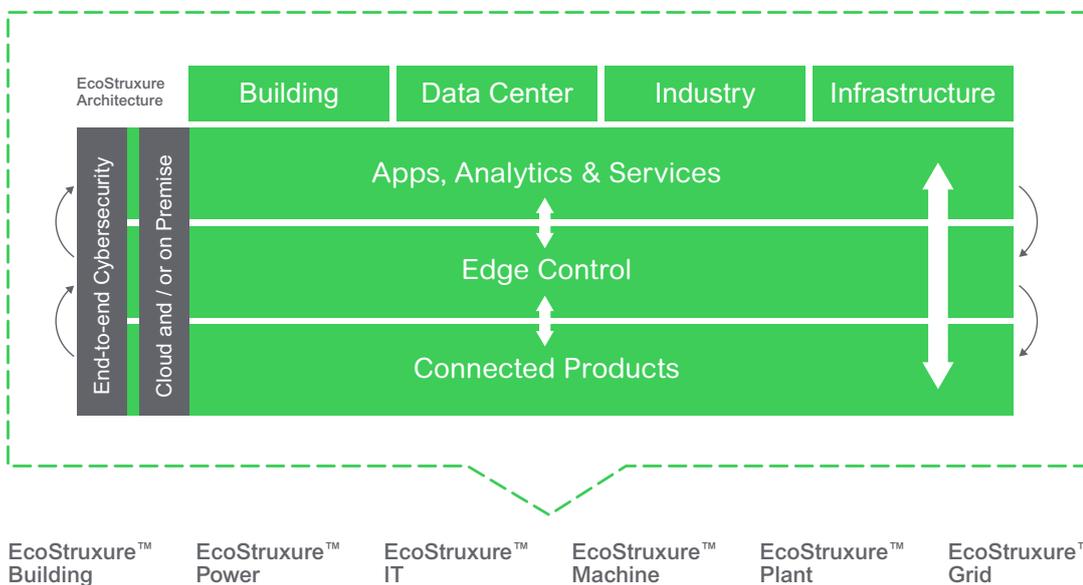
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