

Use Case: Clean energy resiliency for mission-critical facilities

Coastal community increases
resilience while cutting energy costs
and emissions

HOMER Grid

Rivermoor Energy, Boston, Mass., USA



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Challenge

Faced with increasing intensity of extreme weather events, the Cape Cod Town of Yarmouth, Massachusetts, USA, needed an energy resiliency strategy. The primary goal was to provide power to its mission-critical municipal operations — particularly when the power grid goes down for prolonged periods.

In response to the increased extreme storm frequency, the Commonwealth of Massachusetts created the Municipal Vulnerability Preparedness (MVP) grant program to provide support for Massachusetts towns to assess climate change risks to their populations and physical assets.

Yarmouth qualified for an MVP grant due to its environmental justice communities and socio-economic profile that includes a high percentage of elderly residents and low-income communities, combined with its increasingly vulnerable coastal location. With the funding secured, Yarmouth developed a plan for clean energy resiliency upgrades for two of its most mission-critical facilities — a fire station that is planned to also serve as the Town’s Emergency Operations Center and a regional septic waste and trash processing facility serving Yarmouth and surrounding communities.

To leverage the funding, Yarmouth wanted a clean energy solution that would deliver resiliency while reducing carbon emissions and annual energy costs. The Town and its professional advisory team also sought a strategy to serve as a blueprint for other Massachusetts towns facing similar challenges.

Solution

Rivermoor Energy, a national company headquartered in Boston and a state-certified provider under the MVP program, was selected by the Town of Yarmouth to develop a microgrid plan that would accomplish the project’s goals. Rivermoor Energy retained UL Solutions to assist with the quantitative big-data modeling to support the design of the optimal solution for Yarmouth.

Working in collaboration with Rivermoor Energy and the firm’s engineering partner Weston & Samson, UL Solutions modeled the fire station and regional septic waste center using HOMER Grid modeling software. The models enabled the team to size and optimize the assets for a microgrid design that would provide resilience, energy cost-cutting and sustainability.

By importing location-specific energy resource data and load profiles, UL Solutions determined optimal sizes for components of a grid-tied hybrid power system and assisted in modeling operational and financial scenarios to support solution modeling. The solution components include a single-facility microgrid for the fire station that features a 264-kilowatt (kW) solar photovoltaic canopy over the parking lot, a 180-kWh battery storage system and integration with the existing back-up generator and building energy systems. The project also includes a new energy management system with microgrid controls.

Yarmouth, Mass., Microgrid for Resiliency



Impact



Rivermoor Energy’s microgrid plan for Yarmouth will:

- Maintain power supply during outages to protect the community.
- Provide +90% reduction in greenhouse gas (GHG) emissions of firehouse operations.
- Cut energy costs and reduce peak demand via optimized battery dispatch strategies.
- Participate in a demand response program where utilities will pay participants to reduce electricity use during summer and winter peak demand periods by using energy storage.



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