USE CASE: CLEAN ENERGY RESILIENCY FOR MISSION-CRITICAL FACILITIES

Coastal community increases resilience while cutting energy costs and emissions

HOMER Grid

Client: Rivermoor Energy, Boston, Mass., USA

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.

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.

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 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 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 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 backup generator and building energy systems. The project also includes a new energy management system with microgrid controls.

RIVERMOOR ENERGY

RIVERMOOR ENERGY

Rivermoor Energy has an extensive track record of providing clean energy resiliency solutions to governmental, utility, institutional and commercial clients.

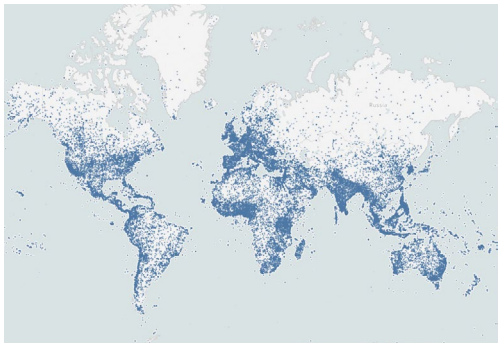
The firm selected UL to support the development of a solution using HOMER Grid to model and forecast performance, resiliency duration and costs, including participation in the Massachusetts demand response program.

UL's modeling and analytics helped Rivermoor Energy formulate the business model for the projects to benefit the Town of Yarmouth and for the planned project financing.

To learn more about Rivermoor Energy, visit rivermoorenergy.com

Why UL and HOMER Grid

Only HOMER Grid combines economics, engineering and multiple value streams in one model, then rapidly performs complex calculations to find the least-cost solution. Robust capabilities include EV charging, demand response programs, incentives, resilience and reliability.

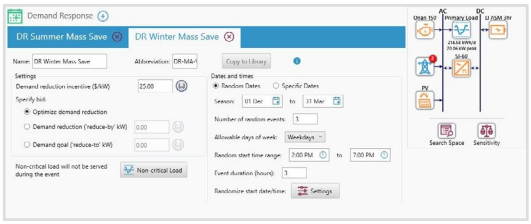


Map shows locations of 250,000+ projects analyzed by HOMER software in 190+ countries.

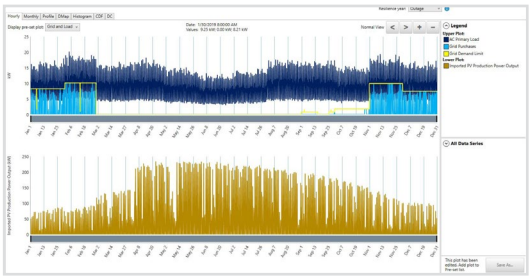
Modeling results

HOMER Grid analyzes technical and financial information side-by-side, enabling the selection of least-cost systems. Sample screenshots below illustrate critical parameters modeled for the Yarmouth microgrid.

Demand response
Incentive and demand response programs were customized to add additional revenue streams.



Demand limits
Self-consumption and demand charge reduction were optimized using monthly grid demand limits determined by the model.



Resilience during outages
System activity was analyzed to determine load-serve during resiliency or reliability outages up to 10 days long.

Evaluate savings
Savings are generated with solar and energy storage. Load reduction, state incentives and demand response programs create economic value to support the project's capital investment and provide ongoing savings to the Town of Yarmouth.

For more information on HOMER Grid, please visit homerenergy.com.

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