Energy Transition and Microgrid Meetings, June 2024

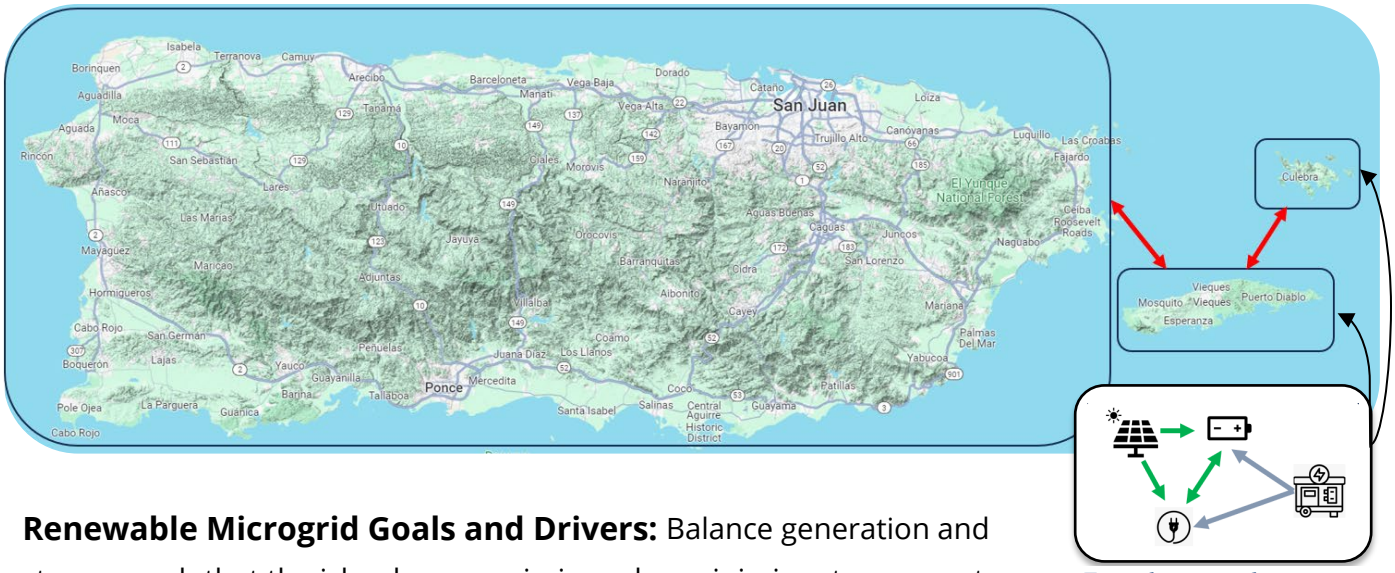
Community discussion hosted by the US Dept of Energy and Sandia National Labs with LUMA

Culebra, Puerto Rico. June 25, 2024

Context: Sandia National Labs performed a conceptual analysis of a microgrid solution for the island's energy independence and sustainability goals in 2021, incorporating feedback from the community obtained during onsite workshops. Since then, FEMA funding has been identified to build a microgrid. LUMA is taking the lead in designing and implementing the new infrastructure.

2021 Stakeholder Engagement Meeting

Meeting Purpose: To facilitate open communication with residents. DOE, Sandia, and LUMA will present current state, future goals, and discuss known challenges. Community members will have an opportunity to ask questions and provide input. This is intended to be a continuation from previous discussions, with future meetings scheduled as project develops.



Renewable Microgrid Goals and Drivers: Balance generation and storage such that the island can maximize solar, minimize storage costs and fossil-fuel demand, while maintaining reliable electrical service even during times when the larger island is suffering an outage.

Typical microgrid components including solar generation, battery storage, fossil-powered generators, and loads. The islands will be connected, working together most of the time. When needed, however, each island can function independently.

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Balancing Supply and Demand Using a Microgrid

A design that can optimize the supply and demand for energy across multiple assets should result in a significant reduction in outages experienced by people on the island. Leveraging the concept outlined above, loads that have previously experienced blackouts can now be served continuously via the microgrid islanding capability and onsite generation.

Below are two profiles intended to exhibit the difference in power availability with and without a microgrid. The top figure shown here is the load demand (black line) for a typical week in Culebra. The dashed red line shows the actual power delivered to the island, which goes to zero during two blackout periods in July 2019. The white area between these two lines shows the load NOT served during these blackouts.

The bottom figure shows the same load (black line) served by the microgrid when the main island experiences a blackout. Rooftop solar (blue), microgrid solar (yellow), and a battery or other microgrid generation (green) work together during the blackout (indicated by red lines at top) to meet the loads. Excess generation (dark gray) can be used to charge the battery.