Borrego Springs Microgrid

As part of our sustainability strategy, SDG&E® is committed to building the infrastructure needed to strengthen resilience in our remote communities.

Tucked away in the desert area of San Diego County, Borrego Springs has historically experienced many outages because the community is served by a single transmission line and weather conditions are extreme. To strengthen this community's energy reliability and climate resiliency, SDG&E has implemented advanced technology solutions, including a microgrid, and continually makes upgrades and improvements.

What is a microgrid?

A microgrid is a local energy network that can leverage technology like renewable energy and battery storage to provide power to a specific area if an outage occurs on the larger grid. Essentially a mini power grid, the microgrid can connect and disconnect from the regional grid. It can function in parallel with or independently (island mode) of the regional grid, utilizing local resources such as battery storage and generators to provide power until utility service can be restored.

Innovation in Borrego Springs

Microgrids that use renewable energy and battery storage can increase energy resilience and reduce carbon emissions. The Borrego Springs Microgrid is designed to be a robust, renewable-based system that provides critical power during emergencies and planned outages, which are necessary when system upgrades and maintenance work are required.

Renewable energy from the abundance of local rooftop solar, and third-party owned solar photovoltaic plants, can be stored within the microgrid's battery systems and then deployed when needed. SDG&E plans to put a long-duration, hydrogen-based energy storage system into service at the microgrid site in 2022.

The plan is to produce green hydrogen using local solar generation. The water used to produce the hydrogen would be the equivalent of what's used in a standard American home. The hydrogen can be stored in tanks for long periods and then converted back to electricity when needed via emission-free fuel cells.

The Borrego Springs Microgrid is a true community microgrid, providing benefits to the entire area, and not just to a single metered customer.

Did you know?

The Borrego Springs Microgrid is the first utility-owned, community-scale microgrid in America to demonstrate the full capabilities of renewable generation and new technologies to enhance energy reliability.

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System operation

Normal conditions: The Borrego Springs Microgrid is typically dormant or operating with the regional grid. Local solar plants export power as available, with the battery storage and ultracapacitors charged and ready to provide various grid support.

Grid outage scenarios

Planned outage: The microgrid can seamlessly transition to and from the regional grid to provide power. The microgrid can be placed in island mode on demand, both locally and remotely to respond to conditions which force the community off the larger grid.

Unplanned outages: The microgrid can be activated to restore power. In order to ensure community safety, this process is initiated only after SDG&E is able to patrol the region to identify and isolate any cause of the unplanned power outage. Once it is safe to activate the microgrid, the batteries and/or generator can power the community and critical facilities, such as the fire and sheriff's station and local food mart.

Day vs. night outages: During the day, the microgrid can harness energy from two local solar plants as well as use batteries and generators to power the entire community. During the night, the microgrid's batteries and generators can power designated critical load areas. As needed, non-critical loads are shed to maintain microgrid stability.

Powering Borrego Springs

- **March 2012** – Provided power to 2,128 customers for approximately 5.5 hours during a planned outage.
- **April 2013** – Provided power to 1,225 customers for approximately 6 hours during a windstorm.
- **August 2013** – Community Energy Storage (CES) units islanded 6 customers for approximately 5.5 hours during a flash flood.
- **September 2013** – Provided power to 1,060 customers for more than 25 hours during a severe storm that took down 9 transmission poles and 11 distribution poles.
- **October 2017** – Successfully conducted an islanding test and provided power to nearly all 2,800 customers in Borrego Springs for over 2 hours during the night.
- **March 2018** – Successfully conducted an islanding test and provided power to nearly all 2,800 customers in Borrego Springs for approximately 3 hours during the day.
- **May 2018** – Provided power to the entire Borrego Springs Community for 4.5 hours, during the day, while supporting compliance maintenance on the local substation. This maintenance work normally would have shut down power to all 2,800 customers.

Borrego Springs is a remote desert community located about 87 miles from the City of San Diego. It's connected to the regional grid by a single transmission line, making it vulnerable to outages due to harsh weather conditions.

- **December 2019** – Provided power to all of Borrego Springs during planned compliance maintenance testing and repairs for 10 hours.
- **Summer 2020** – Provided community power for 8 days during a time of system stress.

Project funding and partners

Utility:

SDG&E Distributed Energy Resources and Advanced Clean Technology

Partners:

- ABDNHA – Anza-Borrego Desert Natural History Association
- Borrego Water District
- CEC – California Energy Commission
- NREL – National Renewable Energy Laboratory

Recent funding:

In 2020, the Borrego Springs Microgrid was awarded a $4.5 million federal grant from the U.S. Department of Energy's Solar Energy Technologies Office (SETO) to help stabilize the microgrid, improve energy reliability and transition the project to 100% renewable energy.

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