

(http://energy.sandia.gov/wp/wp-content/gallery/infrastructure/mesa_del_sol.jpg)

Mesa del Sol & NEDO Microgrid Collaboration



As worldwide demand for electrical energy skyrockets, electricity grids everywhere will be forced to adapt. Renewable energy sources, like solar and wind, will be integrated to preserve the environment. Consumers will one day assume an active role in the purchase, use, and possible resale of the energy used in their everyday lives. To incorporate many of these new concepts, communities, office parks, military bases, universities, and others are taking steps to move toward Microgrids.

The New Energy and Industrial Technology Development Organization (NEDO), Japan's largest public research and development organization for promoting advanced industrial, environmental, and energy technologies, is planning to implement Microgrids in Japan. However, Japan's current power environment does not allow on its centralized grid the installation of Microgrid technologies that have not been previously proven in a real world system. Therefore, Forest City's Mesa del Sol project provides a perfect test bed for the technologies that will one day be used in Japan, and will allow NEDO to introduce Japanese Microgrid technologies to worldwide markets.



The State of New Mexico is supporting Microgrid research as part of its Green Grid New Mexico Initiative, a State-led effort to support the creation of innovative, clean energy solutions. In April 2009, the State accepted NEDO's proposal to demonstrate real-world Microgrid technologies at Mesa del Sol, and NEDO is constructing a demonstration Microgrid system in partnership with the Public Service Company of New Mexico (PNM). NEDO will supply cutting-edge hardware and software for generating and controlling the flow of electricity and information between the Microgrid and the main power grid, which is managed by PNM. An additional Microgrid demonstration is planned for Los Alamos, NM.

Sandia National Laboratories, which has been tasked by the US Department of Energy to study cyber-based risks to the US power grid, will use the Mesa del Sol Microgrid as an opportunity to apply what it has learned through its cyber security research.

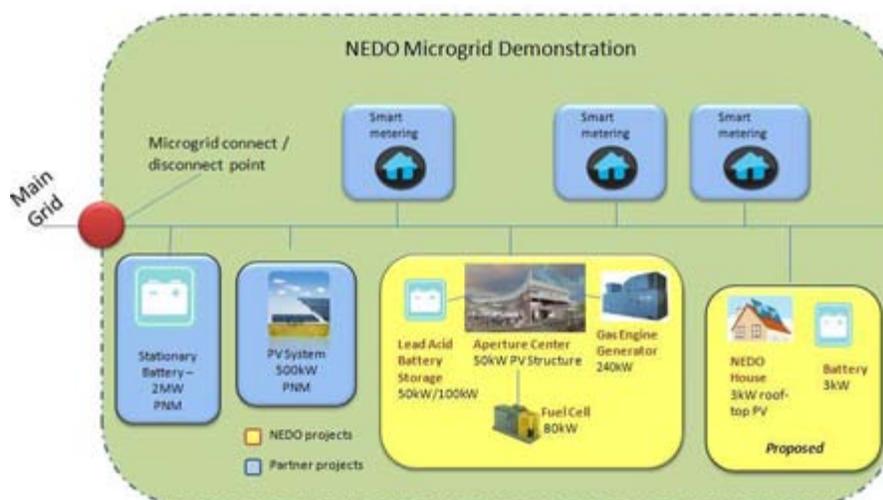
The NEDO project is unique in that it encompasses a large-scale Microgrid that can produce up to 50% of its required energy through renewables, including a hydrogen fuel cell. As part of the project, PNM has agreed to install PV and energy storage systems within the Mesa del Sol Microgrid, and will provide advanced metering devices on several residential homes within it. NEDO will also construct a demonstration home with smart metering, rooftop PV, battery energy storage, and the capability to communicate energy usage and cost information at the consumer level.

Aperture Center, a commercial structure that houses the Mesa del Sol Corporate offices and the Sandia Energy Showcase, provides a unique opportunity to test Microgrid hardware and software at the commercial level. The NEDO Microgrid at

Mesa del Sol, will be a showcase for Microgrid capabilities on national grid systems.

A Microgrid is a small-scale version of a centralized electrical grid, but implemented at a local level. A Microgrid can be tied to the larger grid, yet retain the ability to independently supply energy in the event the larger grid experiences power interruptions. Microgrids can take advantage of locally-generated power sources, such as photovoltaics (PV), small wind, and energy storage systems, rather than relying completely on electrical energy delivered by the larger, centralized grid.

A Microgrid can switch quickly between operating on or off the larger grid: when the grid offers cheap electricity, the Microgrid can choose to purchase it; but, if prices rise or a power failure occurs, the Microgrid can isolate itself and continue to operate using its own distributed power generation sources. While the Microgrid concept is gaining popularity, many of the cutting-edge hardware, software, and control systems that will be used to implement Microgrids have yet to be tested in a real world situation.



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