

NV Energy

NVEnergize

Scope of Work

NV Energy's NVEnergize project involved deployment of smart meters and communications infrastructure for all residential and commercial customers, as well as a new meter data management system (MDMS), demand response management system (DRMS), and energy management system (EMS). The advanced metering infrastructure (AMI) system and MDMS generate and validate data that are delivered to customers via the MyAccount customer portal, enabling customers to better manage their energy consumption and monthly bills. NV Energy initiated a demand response program, "mPowered," that uses new customer-facing systems, such as programmable communicating thermostats that link to a web interface for remote temperature control. NV Energy also initiated a dynamic pricing trial with time-based rates for a pilot group of residential customers.

Objectives

The project aimed to increase operational efficiencies that resulted in reduced operations costs, fewer truck rolls, and associated reductions in emissions. The advanced technologies also enhance system operators' situational awareness, improving system reliability and allowing NV Energy to respond more efficiently and effectively to resolve emergency and reliability issues. The new customer web portal provides significantly enhanced information to customers, allowing them to make informed decisions about managing their energy use, lowering their energy bills, and reducing their energy-related impact on the environment. Implementation of these new systems and customer tools, combined with NV Energy's demand response activities that optimize assets and manage peak demand, allowed the utility to defer additional infrastructure investments. The dynamic pricing trial will help NV Energy determine the optimal combination of time-based rates and in-home technologies for future implementation.

Deployed Smart Grid Technologies

- **Communications infrastructure:** A set of interoperable and cyber-secure components link the AMI, MDMS, DRMS, and customer portal. The AMI system uses FCC-licensed spectrum from the Tower Gateway Base Station (TGBS) collectors to AMI meters and modules. The backhaul communications network consists of existing NV Energy

At-A-Glance

Recipient: NV Energy

State: Nevada

NERC Region: Western Electricity Coordinating Council

Total Federal Share: \$138,877,906

Total Project Cost: \$277,755,812

Project Type: Advanced Metering Infrastructure
Customer Systems

Equipment Installed

- 1,202,248 Smart Meters
 - AMI Communications Systems
 - Meter Communications Network (RF to Substations, Fiber to Utility)
 - Backhaul Communications (Public Carrier)
 - Customer Web Portal Access
 - Home Area Network
 - 1,015 Programmable Communicating Thermostats
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Dynamic Pricing Trial

- 3,199 Residential Customers
 - Time-of-Use Enhanced Rates
 - Critical Peak Pricing Rates
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Key Benefits

- \$25 Million Net Benefits for Customers
 - Reduced Meter Reading Costs
 - Reduced Operating and Maintenance Costs
 - Reduced Truck Fleet Fuel Usage
 - Reduced Greenhouse Gas and Criteria Pollutant Emissions
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telecommunications infrastructure (fiber from substations to the utility) or a third-party public carrier (for rural customers) to transmit data back to the head end system and the regional network interface (RNI) system.

- **Advanced metering infrastructure:** All 1,202,248 residential and commercial customer sites have received new AMI-enabled electric meters (and gas modules, which were not part of the SGIG project scope). Meters and modules capture and register interval consumption data. These devices transmit various alarms and events, such as power failure and tamper indicators, based on premise conditions.
- **Meter data management system:** The MDMS processes and validates smart meter data for use in system management, operations, web presentment, and billing activities.
- **Demand response management system:** This system integrates and coordinates the utility's portfolio of demand response programs and provides a link to customer service, control operations, system operations, and other functions.
- **Energy management system:** The new EMS enables coordinated control of the electric generation, transmission, and distribution facilities which includes the two distinct northern and southern Nevada balancing areas, thereby consolidating transmission and balancing operations statewide across all of NV Energy's generation fleet and grid interface points.
- **Customer system devices:** A secure web portal ("MyAccount") provides customers with access to information about energy usage at 15-minute intervals, costs to date, and projected bills. Customers receive emailed threshold alerts for both dollar amounts and kilowatt usage. Customers also have access to home electric consumption data through home area networks. Through a web-based software platform, these networks are integrated with NVEnergize systems for the initiation of demand response events. Customers can also use a web interface to program new "smart" thermostats (programmable communicating thermostats), establishing home heating and cooling settings that are responsive to peak demand events and electricity prices.

Consumer Behavior Study

The Nevada Dynamic Pricing Trial was marketed to residential customers in NV Energy's northern and southern service territories as the *Choose When You Use* program. *Choose When You Use* began in March 2013 and is ongoing. It was an opt-in program, i.e., participants volunteered to enter the two-year program and have the opportunity to leave the study after the first year. The study design provides participants bill protection for the first year. NV Energy also allows participants to budget the cost of electric service into equal monthly payments, helping to mitigate high summer bills. NV Energy will measure the response in both consumers' electricity consumption behavior and their attitudes toward taking ownership of their electricity consumption patterns. The program will demonstrate the value of various combinations of time-based rates, enhanced customer education, and in-home technology.

Benefits Realized

- **Reduced operating and maintenance costs:** NV Energy's meter-related operating and maintenance costs will experience an estimated net benefit to its customers of \$25 million per year once all implementation activities are completed following the grant-funded project. At that point, features such as remote meter reading and remote connect/disconnect capabilities will have been activated to enable this level of cost reduction.
- **Reduced electricity costs for customers:** The AMI deployment allows for time-based rate programs and the next generation of smart grid-compatible demand response systems. These advanced technologies allowed NV Energy to launch the "mPowered" program, which provides robust year-round HVAC savings and demand response benefits.

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In 2013, enough customers were enrolled in “mPowered” to provide 2014 peak demand reduction in southern Nevada equivalent to nearly 44 megawatts (MW).

Lessons Learned

The NV Energy project scope included a consumer confidence plan. Through that plan, NV Energy developed a smart meter deployment approach that works—as well as a handbook describing the approach. NV Energy realized that because the smart metering system touches all customers, consumer confidence needed to be established in specific areas: safety, security, privacy, accuracy, deployment, verification, and ownership. Establishing confidence was not easy; it was a time-consuming process that needed to be woven into all of its customers’ touch points.

Future Plans

The NVEnergize project has been the initial step in realizing NV Energy’s smart grid vision. The project provided a statewide communications network to link together many smart grid components. Building on this foundation, the following initiatives are under way or in the planning stages: implementing business intelligence applications to transform data into information, deploying distribution automation devices and applications, upgrading the distribution management system, implementing a customer preference center, integrating AMI meter power failure messages with the distribution management system to improve outage identification and power restoration efforts, enhancing outage communications via mapping capabilities and proactive outage notifications, piloting flexible payment programs and other pricing and payment programs, launching enhancements to the customer portal experience, and piloting volt/volt–ampere reactive optimization (VVO). This long and diverse list of initiatives illustrates how the NV Energy smart grid evolves through interdependent sets of individual projects.

The demand response program started in 2013. This three-year action plan is expected to increase the installed demand response reduction capacity by 190 MW. The smart grid-compatible demand response systems have enabled expansion of the program not only in the residential and small commercial sectors but also in the large commercial and industrial sectors.

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