



Virtual Power Plant Pilot Program

To meet our clean energy goals, we'll need a lot of load flexibility and tools to predict or control the way those loads will behave. This program explores the potential of customers sharing their investments in residential battery storage and thermal storage with SMUD in exchange for incentives. Customers with compatible devices, such as SolarEdge StorEdge batteries, GE heat pump water heaters, and Rheem heat pump water heaters that are connectivity-enabled can participate. By coordinating a fleet of these devices, we can create a Virtual Power Plant (VPP) that grid operators can use in lieu of conventional resources in times of need.

We wanted to demonstrate that use of controllable heat pump water heaters and battery energy storage systems, shared between customers and SMUD, can be cost-effective and reliable for both parties. PowerMinder, a water heater program, began in Summer 2019 and Smart Energy Optimizer (SEO) began enrolling customer battery systems in Fall 2019.

The PowerMinder program adds to the value of controllable GE and Rheem Heat Pump Water Heaters by providing additional bill savings without compromising hot water delivery. By using a thermostatic mixing valve,

tank temperature can be raised at times of additional grid capacity or energy availability (such as excess solar energy generation) without impacting the delivered hot water temperature. The mixing valve automatically mixes hot tank water with cold water to maintain each customer's desired hot water temperature. Participating customers receive an enrollment incentive of \$150 and an ongoing monthly incentive of \$2.

The SEO program adds to the value of residential battery systems for customers and for the electrical grid by shifting battery operation in response to signals dispatched by SMUD. On 120 days of the year, SMUD sends a signal to discharge the batteries during the peak hours of grid operation. The remaining 245 days of the year, customers can still save money on their bills by shifting renewable energy from the battery to the peak hours. Customers receive an upfront incentive of \$500 and a \$10 monthly bill credit for their participation.

These programs offer customers an opportunity to reduce their electricity costs while providing a taskforce of VPP devices that we anticipate will become cost-competitive with traditional power plants.