SmartMeter™ System—How It Works

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PG&E's SmartMeter™ program is part of a statewide effort driven by the California Public Utilities Commission (CPUC) to upgrade California's energy infrastructure with automated metering technology. This technology will enable new programs that help California energy customers use less energy and save money.

SmartMeter™ Electric System

Traditional Residential Electric Meter

SmartMeter™ Residential Electric Meter

The SmartMeter™ system uses programmable solid-state meter technology that provides two-way communication between the meter at your home or business and the utility, using secure wireless network technology.

The solid-state digital SmartMeter™ electric meter records hourly meter reads and periodically transmits the reads via a dedicated radio frequency (RF) network back to PG&E. Each SmartMeter™ electric meter is equipped with a network radio, which transmits meter data to a electric network access point (pictured below). The system uses RF mesh technology, which allows meters and other sensing devices to securely route data via nearby meters and relay devices, creating a "mesh" of network coverage. The system supports two-way communication between the meter and PG&E. SmartMeter™ electric meters can be upgraded remotely, providing the ability to implement future innovations easily and securely.

The electric network access point collects meter data from nearby electric meters and periodically transfers this data to PG&E via a secure cellular network. Each RF mesh-enabled device (meters, relays) is connected to several other mesh-enabled devices, which function as signal repeaters, relaying the data to an access point. The access point device aggregates, encrypts, and sends the data back to PG&E over a secure commercial third-party

network. The resulting RF mesh network can span large distances and reliably transmit data over rough or difficult terrain. If a meter or other transmitter drops out of the network, its neighbors find another route. The mesh continually optimizes routing to ensure information is passed from its source to its destination as quickly and efficiently as possible.

SmartMeter™ Gas System

Traditional Residential Gas Meter

SmartMeter™ Residential Gas Meter

The SmartMeter™ gas system uses point-to-point RF technology to transmit gas usage data from SmartMeter™ gas modules back to PG&E over a dedicated, secure wireless network. Due to the simpler data requirements of the gas system, the SmartMeter™ gas system supports only one-way communication from customers to PG&E. PG&E attaches the SmartMeter™ gas module to the traditional gas meter. This module is outfitted with a radio frequency (RF) transmitter. The module records daily meter reads and then uses an RF signal to transmit the reads to a data collector unit (see below) in the vicinity.

The data collector unit (DCU), in turn, collects meter reads from many meters and securely transmits the gas usage data over a secure wireless network back to PG&E. The DCU shown here is attached to a streetlight.