

Heat Pumps and Refrigeration: A Utility Perspective



Customer Energy Solutions-
Energy Efficiency Programs

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About PG&E

Our mission:

*To provide **safe, reliable, cost-effective, and clean** gas and electric service to the 15 million residents of Northern and Central California we serve*





Driving Toward A Green Future

PG&E is the nation's leading utility in delivering clean energy and helping to manage their energy

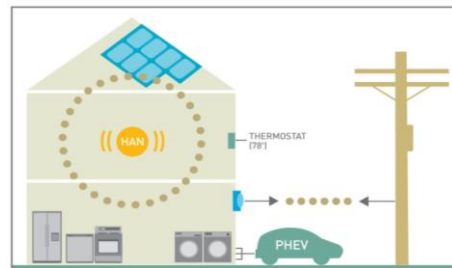
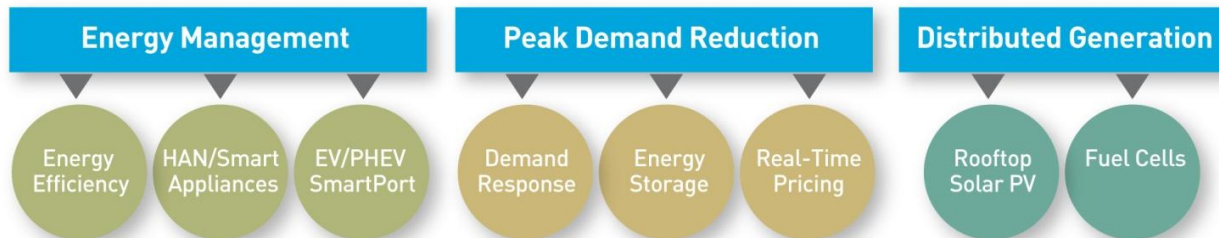
Low-Carbon Power Generation: 1/3rd the national average per kWh delivered



Corporate GHG Management



Customer Energy Solutions





California State Strategic Goals

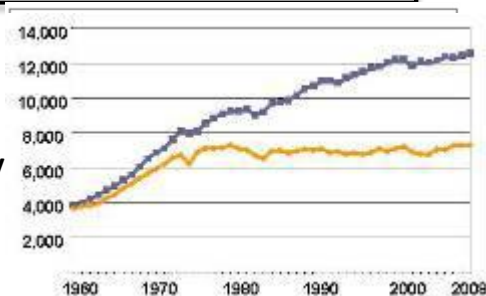
“All new residential construction in California will be zero net energy by 2020.”

“All new commercial construction in California will be zero net energy by 2030.”

“Heating, Ventilation and Air Conditioning (HVAC) will be transformed to ensure that its energy performance is optimal for California’s climate

Strategic Vision:

“Energy efficiency, which helped to flatten the state’s per capita electricity use, will continue to be the keystone of California’s energy strategy. California’s building and appliance standards have saved consumers more than \$56 billion in electricity and natural gas costs since 1978 and averted building 15 large power plants.”





How does PG&E address energy efficiency?

- Wide variety of EE programs and program implementers.
- Covering:
 - Energy analysis, tools and rate options
 - Emerging Technology,
 - New Construction,
 - Retrofit,
 - Retrocommissioning
 - Codes and standards
 - Workforce Education and Training



Advanced HVAC and Refrigeration Technologies

- **Challenges to scaled adoption of Advanced HVAC and Refrigeration Technologies:**
 - Variability in energy savings across end-uses and climate zones
 - Interoperability of systems and components
 - Technical Expertise required for installation and commissioning
 - Energy savings relies on proper commissioning, O&M

Thank you!

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