

Residential Energy Efficiency Potential in California

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Background

This study assesses electric and natural gas energy-efficiency achievable potential in existing residential buildings in California over the next 10 years. The study focuses on the service territories of the four major investor-owned utilities (IOUs), which account for about 80 percent of the state's electric consumption and peak demand, and 99 percent of natural gas consumption.

Our method for estimating the achievable potential is a "bottom-up" approach in which we assess energy efficiency costs and savings at the market segment and energy-efficiency measure level. For cost-effective measures, we estimate the likely achievable energy-efficiency program savings potential as a function of energy-efficiency measure economics, and energy-efficiency programs rebate levels and marketing efforts. Four different residential sector energy-efficiency funding scenarios were constructed. The base scenario assumes the current annual funding levels of \$ 52 million continue for the next 10 years. The other three scenarios represent increases in funding of 50%, 100% and maximum achievable (about 200% higher) over the 10-year period. Three future energy cost scenarios are assessed to address uncertainty in these costs. For the twelve possible scenarios, the study assessed the program cost-effective energy and peak demand savings.

Results

Significant untapped achievable and cost-effective potential savings for electricity and natural gas in California's residential sector exist over the next ten years. Increased marketing efforts combined with higher rebate levels can result in still more cost-effective additional savings. The largest electric savings are likely to be obtained through the further dissemination of energy-efficient lighting, air-conditioning, refrigeration, pool pumping and clothes washing. For natural gas, the main opportunities lie in water heating, space heating and clothes washing.

Under the base energy cost forecast, net program peak and electricity and natural gas savings achievable potentials range from roughly 385 MW, 2.4 TWh, and 51 Mth under current funding to 1,773 MW, 9.8 TWh, and 238 Mth if current funding is tripled. Net financial savings to California range from \$550 million to \$ 2.0 billion. All these base energy cost funding scenarios are cost-effective.

The main achievable electricity savings are from improved lighting (50%), refrigeration (34%) air conditioning (6%), pool pumping (4%), and clothes washing (2%). Main achievable peak load reductions are from more efficient lighting (55%), refrigeration (28%), air conditioning (5%), pool pumping (5%), and clothes washing (4%). For natural gas, most of the savings accrue in more efficient technologies for water heating (65%), space heating (27%), and clothes washing (8%).

