Utility Energy Efficiency Programs and Prospects for Heat Pumps: View from the Southwest

Ellen Zuckerman & Howard Geller

Presentation for ENERGY STAR Products Partner Meeting
Sept. 5, 2018
Southwest Energy Efficiency Project

- Non-profit public interest organization, founded 2001
- Advances policies and programs to stimulate greater energy efficiency in six western U.S. states
- Advances energy efficiency in the buildings, transportation, industrial and utility sectors

www.swenergy.org
# Electric Utility DSM Program Spending Trends in the Southwest

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Innovative Program Strategies—Residential Sector

- Shift to midstream incentives
  - HVAC (NV Energy, initial stages)
  - Water heating (strong prospect)
  - Indicator from commercial unitary HVAC—Xcel Energy increased sales 350% after shift

- Integrate EE and DR efforts
  - Smart thermostats with HVAC Optimization
  - NV Energy program savings: ~3kW peak reduction and 450 kWh/yr savings per home; ~70,000 installed

- Utilize smart meter data for remote home assessments, EE program targeting and energy savings evaluation
Cost-Benefit Analysis Reform

- Colorado PUC doubled non-energy benefits adders for Xcel Energy-CO
  - 20% for residential and C&I programs
  - 50% for low-income programs

- 2017 Nevada legislation
  - Cost effectiveness at portfolio level rather than program or measures level
  - Valuation of non-energy benefits in cost effectiveness analysis – NV Energy used an adder value of 15% in 2019-21 DSM Plan
SWEEP Heat Pump Study

Benefits of Heat Pumps for Homes in the Southwest

By Neil Kolwey and Howard Geller
June 2018
SWEEP Heat Pump Study: Objectives

- Do heat pumps save energy, lower GHG emissions and save consumers money in homes in major cities in the Southwest?
- Compares natural gas space and water heating to electric heat pumps and heat pump water heaters (HPWHs) in Denver, Phoenix, Salt Lake City (SLC), Las Vegas & Reno
- Considers both new homes/ductless heat pumps and existing homes/ducted heat pumps
SWEEP Heat Pump Study: Methodology

- Considers lifecycle cost from perspective of homeowner, using actual variable costs for electricity and natural gas in each city
- Analyzes primary energy use and CO$_2$ emissions
- Uses projected average CO$_2$ emissions factors for the major electric utility in each city
- Assumes ENERGY STAR rated equipment
- Existing homes: install HP when either furnace or CAC system needs replacing
- Denver, SLC and Reno: cold-climate HPs
# SWEEP Heat Pump Study: Results


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SWEEP Heat Pump Study: Results

- Ductless HPs provide about 30% energy savings, 20-45% GHG emissions reductions, and 15-30% life cycle cost (LCC) savings in new homes.
- Ducted HPs provide 5-20% energy savings, 2-35% GHG emissions reductions, but 5-30% LCC penalty in existing homes (except in Phoenix).
- HPWHs provide 50-65% energy savings and GHG reductions but LCC penalty (except in Phoenix).
SWEEP Heat Pump Study: Recommendations

- Provide incentives or attractive financing for HPs:
  - Homes with electric resistance heating
  - Ductless HPs for new homes
  - HPWHs in all homes based on large energy and GHG benefits
  - Targeted existing homes (e.g., Phoenix)
- Offer Time-of-Use (TOU) electric rates which should improve the consumer benefit-cost picture
- Educate/train consumers, builders, HVAC contractors
- Establish a regional Heat Pump market transformation initiative in the Southwest
SWEEP:
Dedicated to More Efficient Energy Use in the Southwest

Resources available online at:
www.swenergy.org

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