Beneficial Electrification
EE Version 2.0

Committee on Energy Resources and the Environment
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What Makes for *Beneficial* Electrification (BE)?

Three explicit criteria: Achieve At Least One Without Adversely Impacting The Others

1. Saves Customers Money Long-Term; New Services
2. Reduces Environmental Impacts
3. Enables Better Grid Management
Analysis of Consumer and Marginal Costs for Electric and Natural Gas Space and Water Heat in Single Family Residences in Puget Sound Power and Light Company Service Territory

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DIRECT USE OF NATURAL GAS FOR RESIDENTIAL SPACE AND WATER HEAT COMPARED TO GAS-FIRED ELECTRIC GENERATION FOR HYDRO-FIRMING

THERMODYNAMIC, ECONOMIC, AND ENVIRONMENTAL IMPACTS

PREPARED FOR
ASSOCIATION OF NORTHWEST GAS UTILITIES
Portland, Oregon

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December, 2017
Xcel Bid Median Prices, $/kWh

SOLAR: $0.029
WIND: $0.018
Existing Plants vs. Excel Bids

Existing Plant Average Fuel and O&M from USEIA Table 8.4 Electric Power Annual 2016

- **COAL**
  - Fuel: $0.037/kWh
  - O&M: $0.030/kWh

- **GAS**
  - Fuel: $0.025/kWh
  - O&M: $0.030/kWh

- **NUCLEAR**
  - Fuel: $0.029/kWh
  - O&M: $0.025/kWh

- **SOLAR**
  - Xcel Bids: $0.018/kWh

- **WIND**
  - Xcel Bids: $0.018/kWh
An Easy Example: Oil vs. Heat Pump Water Heater

BOCK 58800 32E OIL FIRED WATER HEATER
GALLON / 104000 BTU - TANK ONLY

Our Price Per Unit: $1,054.83

Rheem Prestige Hybrid Electric Water Heater

$1,389.00
Oil vs. Heat Pump Water Heater:

- Consumer Economics: 40% advantage

- Emissions: 40% advantage

- Grid Flexibility: Heat pump can be controlled into key hours.
Even if we generate the electricity with fossil fuels, we use less primary energy via a heat pump.

This is unambiguously a form of energy efficiency.
Easy Examples of Electrification

- Oil and propane water heater replacement
- Electric vehicles with smart charging
- Hotel water heating
The Easy Stuff Needs Support From Regulators

- Societal cost test, to determine what is truly “beneficial.”
- Time-varying rates, to align consumer and system costs.
- Programmatic support like other energy efficiency programs.
Promising Opportunities for Electrification

- New build super-efficient residences
- Oil and propane space heat
- Warm climate residential
Challenging Areas for Electrification Today

- Existing gas space and water heat
- Cold Climate space heat
Gnarly Issues for Regulators
#1: Electric Vehicle Supply Equipment

- Role of the electric utility
  - No special treatment
  - Make-ready only
  - Retail service at regulated prices
  - Exit the market when it is competitive
Gnarly Issues for Regulators #2: New/Renewal Gas Infrastructure

- **New Construction**: Cost-effectiveness is driven by line extension cost.
- **Renewals**: Replacement of gas infrastructure may be uneconomic.
Regulators: Stay Ahead of the Curve

- Insist on transparency
- Consider an all-fuels IRP
- Reconsider bans on fuel switching programs
- Review line extension policies
- Invite innovation
- Remain skeptical
Available at the RAP table
Or for free download at
www.raponline.org
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org