A New Data Resource for a Changing Energy Landscape

August 21, 2019

2019 IEPEC Conference
Denver, CO

Kevin Price, Evergreen Economics
Why am I here today?
Presentation Overview

- Study Background
- Research Objectives and Project Overview
- Research Implementation
- Implications
"with the planned retirements of four Northwest coal plants by July of 2022, the [Pacific Northwest’s power supply] system... will have to acquire nearly 1,400 megawatts of new capacity."

Source: Northwest Power and Conservation Council’s Pacific Northwest Power Supply Adequacy Assessment for 2021

Source: U.S. Energy Information Administration, based on National Oceanic and Atmospheric Administration Northwest River Forecast Center

Study Background

Forecasted reductions:
- Coal plants
- Natural gas plants
- Hydro reliability

Due to economics, climate change, and GHG reduction goals

Needed to meet demand:
- Energy efficiency
- Demand response
- Renewables

And a better understanding of how they work together
“The [Northwest Power and Conservation] Council relies on… the End-Use Load and Consumer Assessment Program (ELCAP) database.”

“…The ELCAP database… is more than 30-years old, and so its accuracy in representing modern load shapes is questionable.”
New Research Needs

Northwest End Use Load Research (EULR) Studies:

- Residential: Home Energy Metering Study (HEMS)
- Commercial: Commercial Energy Metering Study (CEMS)
HEMS Study Objectives

Collect comprehensive data to determine contributions of EE technologies

- Load shapes for EE technologies
- How EE reduces peak demand

Collect current data to reflect growth of new technologies and renewables

- Load forecasting & resource planning
- Integration of renewables
HEMS Study Overview

• Residential Building Stock Assessment (2017)

• Home Energy Metering Study initiated in 2018:
  • Remote panel monitoring of 400 homes
  • Certain key end uses prioritized
  • Interior and exterior temperature monitoring
HEMS Study Details

• Sampling Strategies
• Recruitment Overview
• Metering Installation Overview
Sampling Strategies

Leverage Resources
- RBSA as sample frame
- Existing metering data used to inform needs

Compare Variance
- More/fewer points for certain end uses
- Treatment of geographic sub-strata

Ongoing Adjustments
- Variance analysis to update targets
- Adjust recruitment to meet targets
Recruitment Overview

- Advance Letter sent to prospective participants
- Confirmation email
- Customer called for scheduling
- Engineer introductory call, appointment reminder
- Automated appointment reminder email
- Engineer appointment reminder call
- Site visit and in-person incentive payment

4 Weeks Prior to Site Visit
3 Weeks Prior to Site Visit
2 Weeks Prior to Site Visit
1 Week Prior to Site Visit
3 Days Prior to Site Visit
Day of Site Visit
Metering Installation Overview

- Orientation discussion
- Site assessment
- Equipment installation
- Wrap-up / Incentive
Whole House vs Disaggregated

Energy Usage (kWh)

Site A

0 5 10 15 20
Hour of Day

Site B

0 5 10 15 20
Hour of Day

Energy Usage (kWh)

Site A

0 5 10 15 20
Hour of Day

Site B

0 5 10 15 20
Hour of Day

End Use: Other, Water Heater, HVAC, Cloth. Wash/Dryer, Kitchen App
Northwest Implications

- Collecting granular data for load forecasting and resource planning
- Developing a better understanding of EE technologies in Northwest homes
- Developing a better understanding of renewables integration in the Northwest
- Informing assessments of the impact of EE, demand response, and renewables on the grid
Applying study findings to regions with similar climates, housing stock?

Opportunity to inform load disaggregation technologies?

Research design applicable to other states, utilities?

Innumerous additional uses!
Contact Info

Kevin Price
Senior Consultant, Evergreen Economics

price@evergreeneco.com
(510) 899-5557
www.evergreeneco.com