

The Public Benefits of Leasing Energy Efficient Equipment: A Utility Case Study

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Agenda

1. Barriers to Customer Adoption of Energy Efficiency
2. Quantifying the Public Benefits of Leasing Efficient Equipment
3. Results of the Utility Case Study

Why have energy efficiency programs failed to reach their potential?

The conventional mechanisms to encourage energy efficiency are:

- Governmental codes and standards
- Utility-funded rebates and customer education programs

Some utilities have noted that up to 50% of equipment being installed in their state is just at code

“Rebates and incentives for the customer are offered by most utilities, but often do not go far enough to offset the high cost of energy efficiency investments that yield significant and persistent savings.”

Matthew McCaffree, “Alternative Financing Mechanisms for Energy Efficiency,”
Institute for Electric Efficiency, The Edison Foundation (February 2010), page 1

Barriers to Customer Adoption

We found five key barriers to customer adoption of energy efficient equipment

1. Credit constraints

Customers have difficulty attaining the required capital

2. Risk aversion

Customers are averse to the uncertainty of new products

3. Imperfect information and search costs

There is a lack of adequate and convenient information

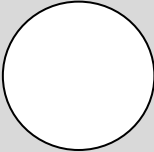
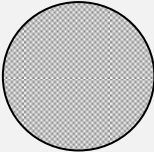
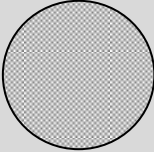
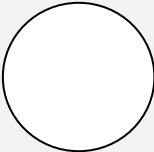
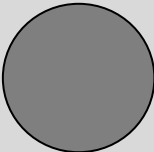
4. Myopic behavior (hyperbolic discounting)

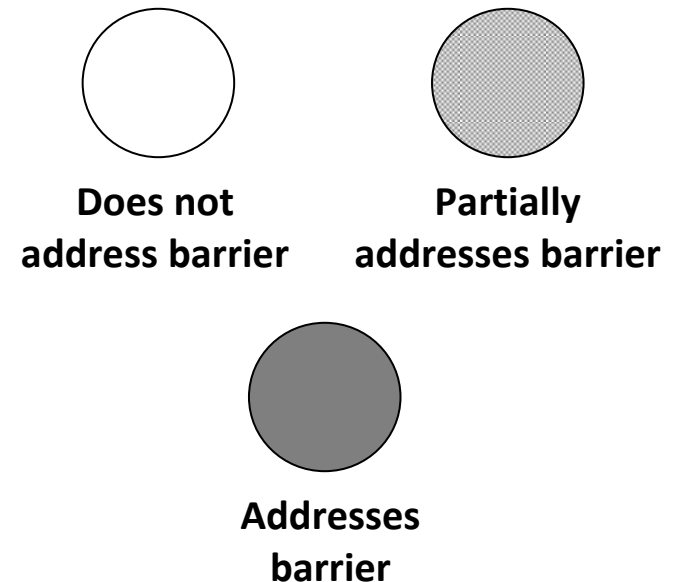
Customers discount future savings, overweight upfront costs

5. Externalities that do not directly benefit adopters

Externalities are not reflected in energy prices, so customers are not incentivized to purchase more expensive equipment

Current energy efficiency programs address some, but not all barriers

Credit Constraints	
Risk Aversion	
Imperfect Information and Search Costs	
Myopic Behavior (Hyperbolic Discounting)	
Externalities that Do Not Directly Benefit Adopters	



Financing options exist, but have some drawbacks

Several other energy efficiency financing options exist

- Banks or credit union loans
- Retailer or contractor financing
- On-bill financing partnerships

However, these services have limitations:

- Financing unbundled from product, installation, or maintenance
- Time-consuming and confusing application processes
- Consumers face search costs when choosing retailers or installers
– sometimes, hundreds of options exist

A proposal for a utility-led leasing program was explored in the Pacific Northwest

Puget Sound Energy (PSE) proposed a leasing service offering energy efficient equipment to both residential and commercial customers

- Gas and electric furnace (residential)
- Gas and electric water heater (residential and commercial)
- Electric heat pump (residential)

PSE would use its unique position to streamline the leasing process

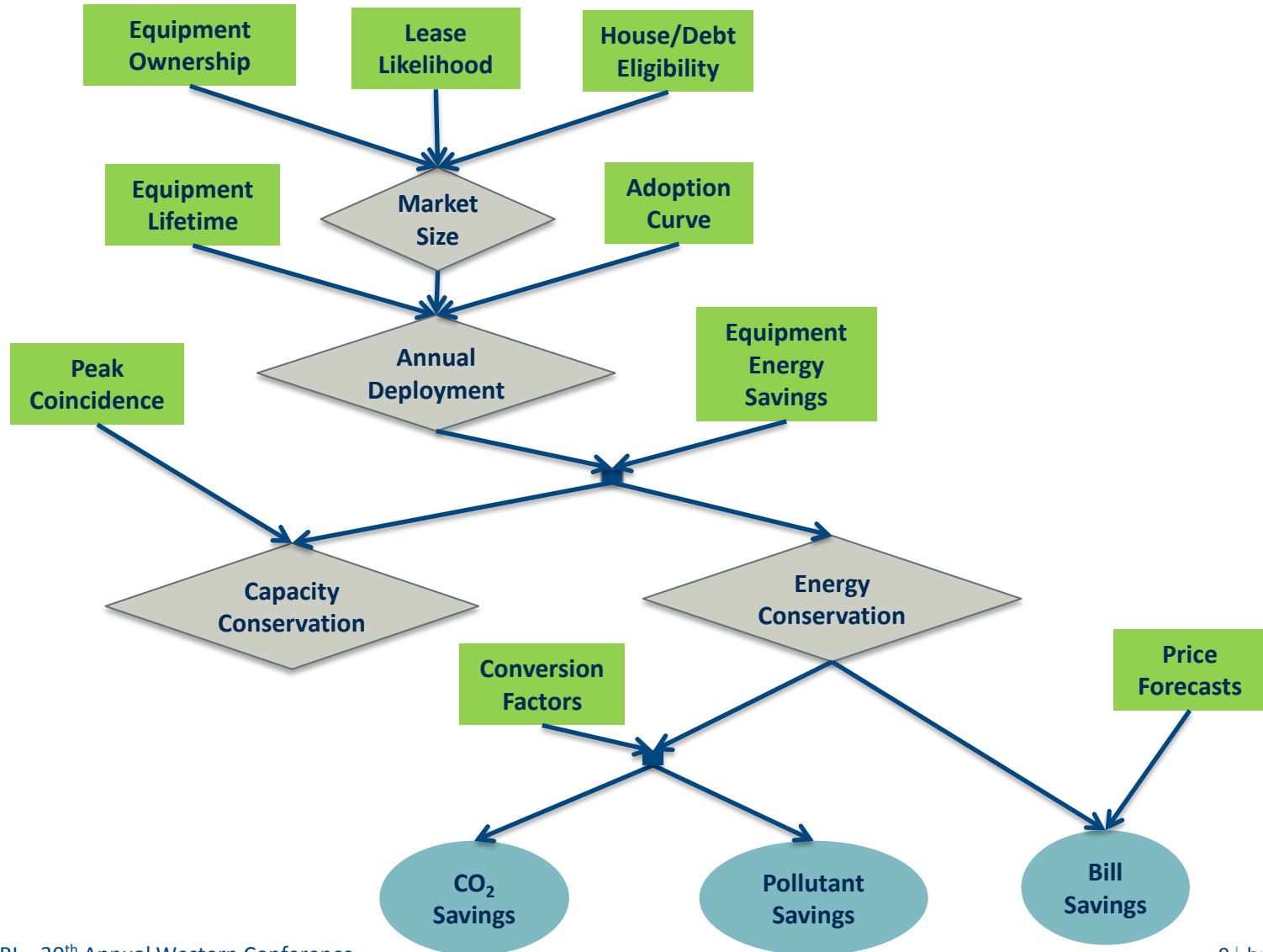
We estimated the public benefits that would be realized by the proposed leasing service

We did not:

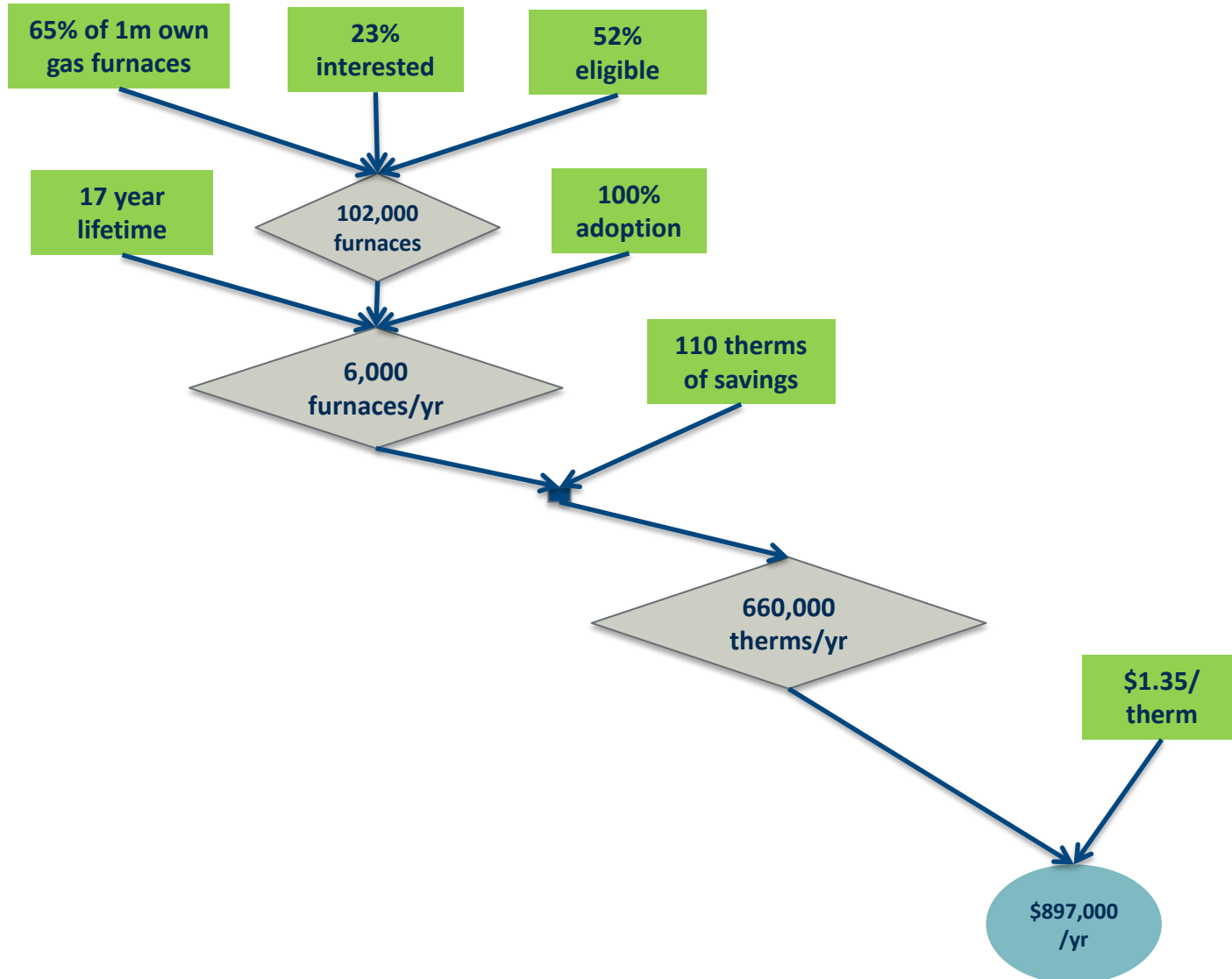
- estimate adoption rates
- estimate the private costs/benefits for the consumer or the utility

Quantifying the Public Benefits

We built a Public Benefits Model to quantify the benefits of leasing



A simple example: residential gas furnace



Benefits from accelerated replacement

Many customers continue to use equipment after the end of its useful life, even though it has become increasingly inefficient

In PSE's service territory →

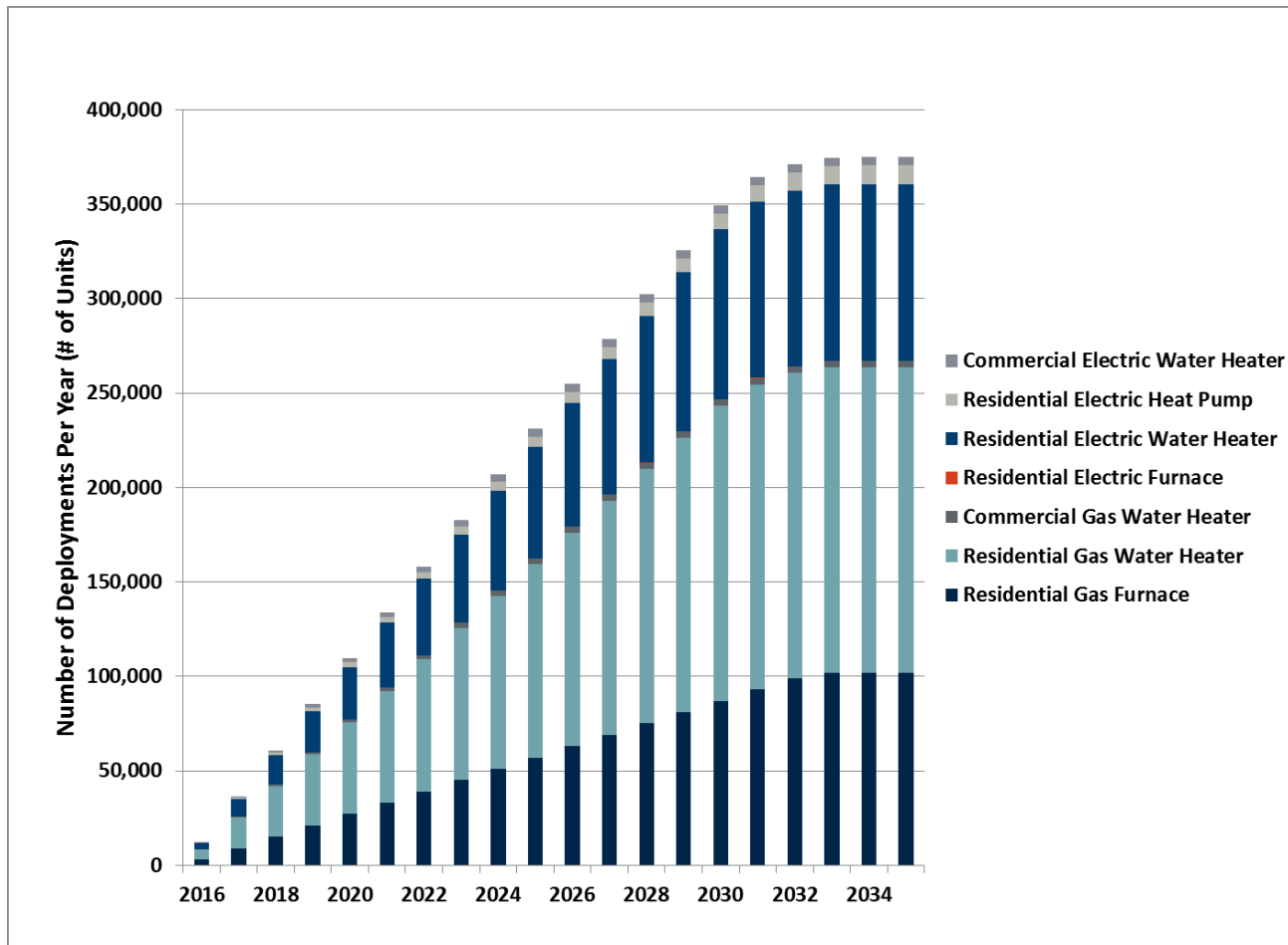
- 22% of gas furnaces are past their useful life
- The median age of “older” furnaces is six years past the useful life
- 15% of customers with “older” furnaces would accelerate replacement

In the absence of hard data, we add an incremental efficiency savings of 20% for units that are replaced “on time” rather than when they fail

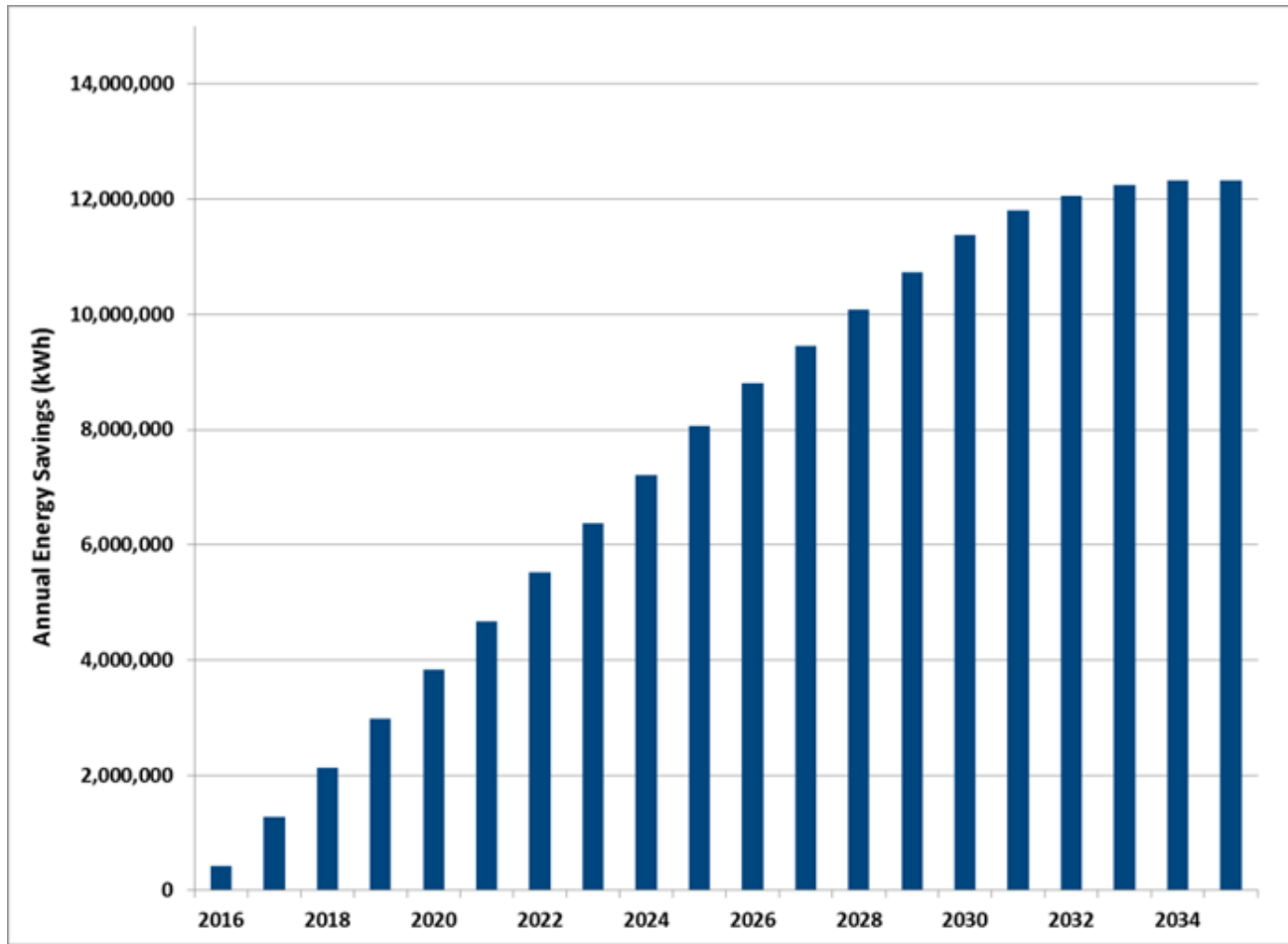
- Thus, replacing older gas furnaces saves an incremental 22 therms per year for the first six years of their useful lives

Results of the Case Study

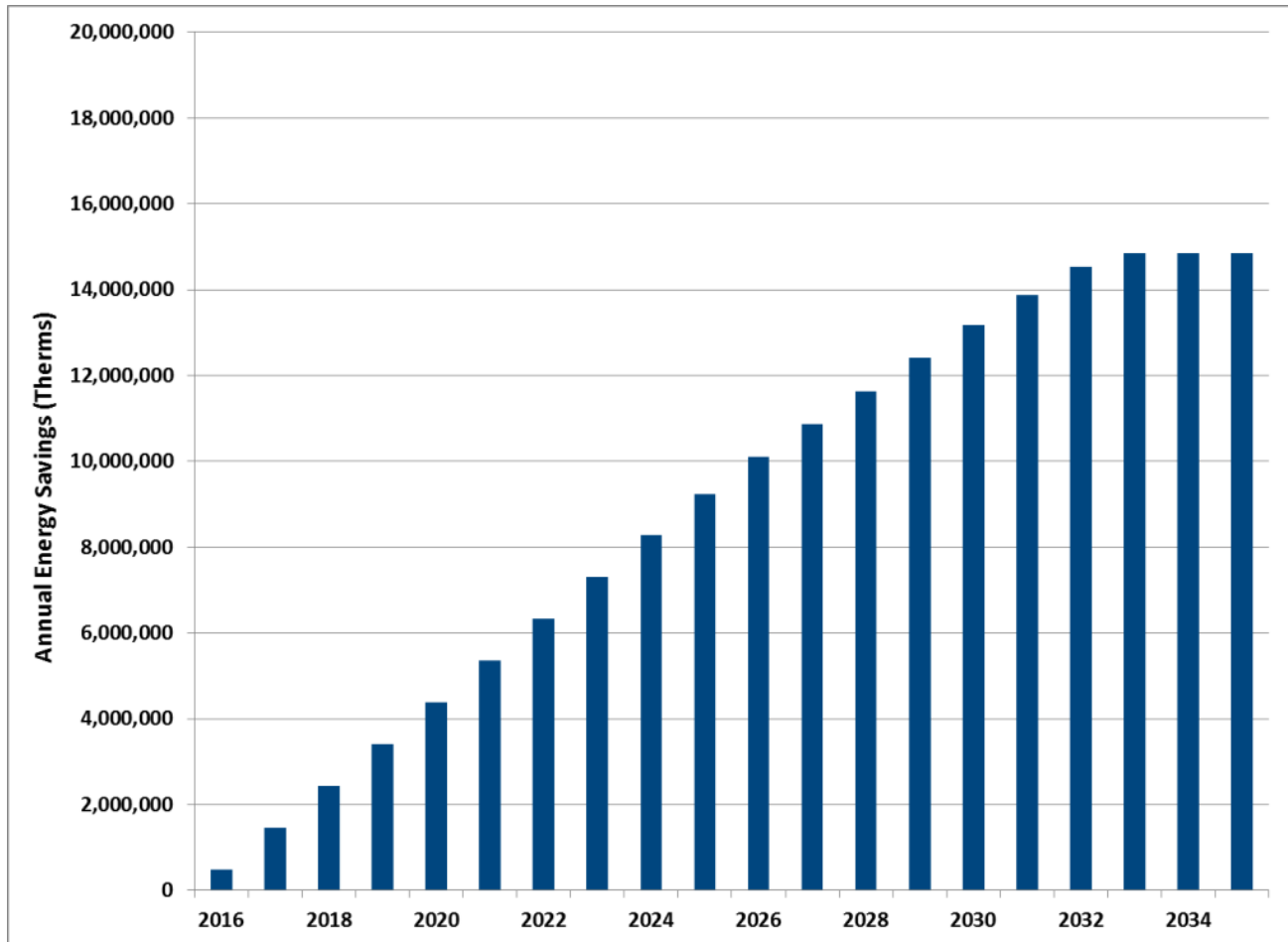
Total deployment of units reaches steady state after 17 to 18 years



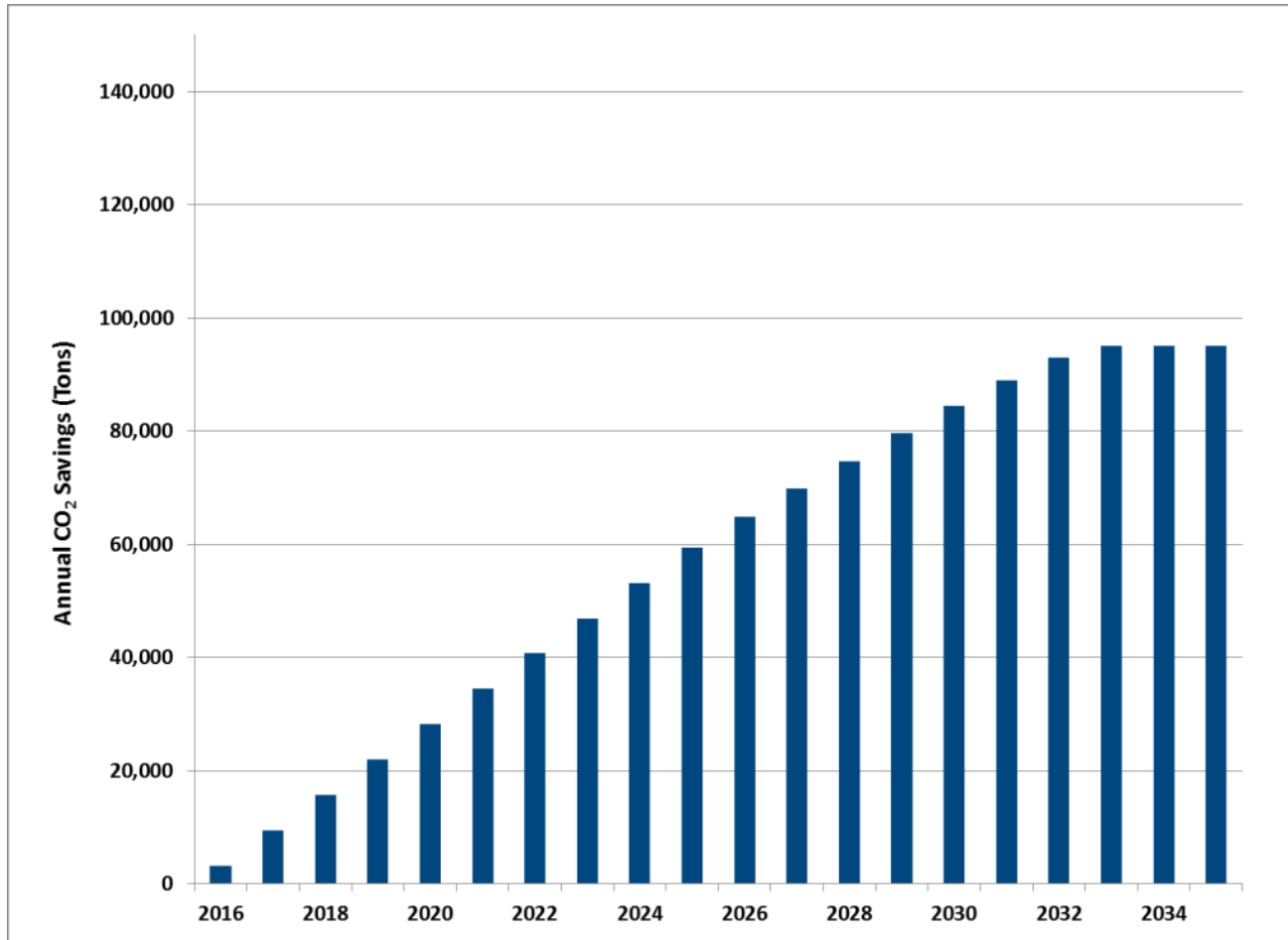
Annual electric energy savings reach 12.3 million kWh by 2035



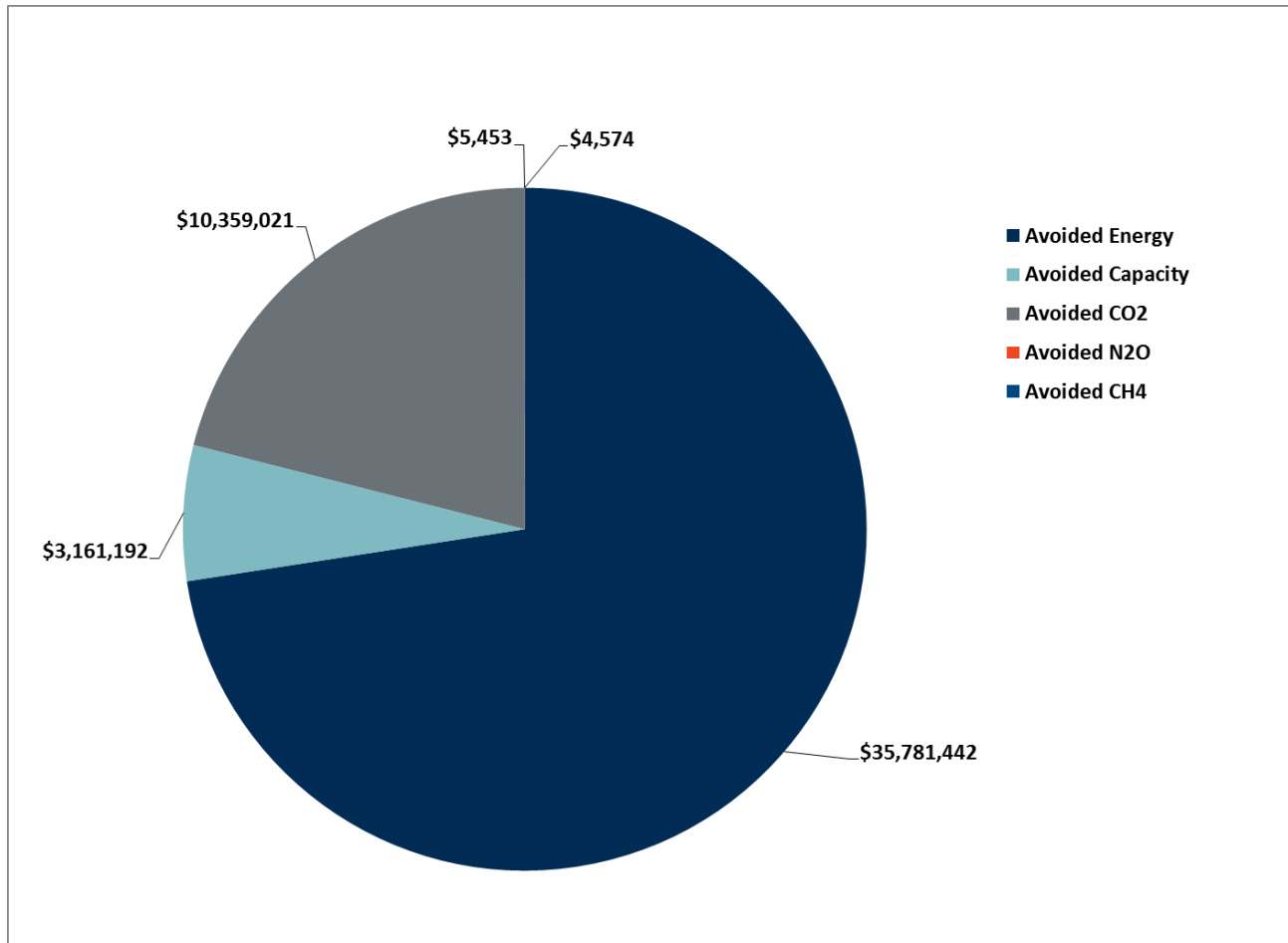
Annual gas energy savings reach 14.5 million therms by 2035



Annual CO₂ savings reach 95,000 tons by 2035



Avoided energy costs make up nearly 3/4th public benefits in the first 20 years



Summary of estimated public benefits

We found that, for PSE an energy efficient equipment leasing program would likely yield the following benefit streams over the first 20 years of the program:

- Over 153,000 MWh of electric energy conservation
- 180 million therms of gas energy conservation
- 1.15 million tons of carbon dioxide (CO₂) emissions avoided
- \$3.2 million in avoided generation and distribution capacity costs
- \$127 million saved in lower utility bills for participating customers

Ideas for further research

- ❖ What are the costs and benefits for consumers under a utility leasing program?
- ❖ How many customers are likely to take part in a leasing program?
- ❖ How might a leasing service fit in with other business lines at a regulated utility?
- ❖ What are other ways of addressing the barriers to customer adoption of energy efficiency?

Presenter Information



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Henna Trewn is a research analyst in *The Brattle Group's* San Francisco, CA office. She supports utilities, energy companies, and government organizations across North America, Europe, and Australia on ratemaking methodology, renewable finance, market development, rate design, and business risk. She has past experience in energy and environmental policymaking at the local, state, and federal levels. Ms. Trewn holds a B.A. in Political Economy from the University of California, Berkeley.

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