

# Enabling Demand Response: Removing Barriers to Time of Use Rates

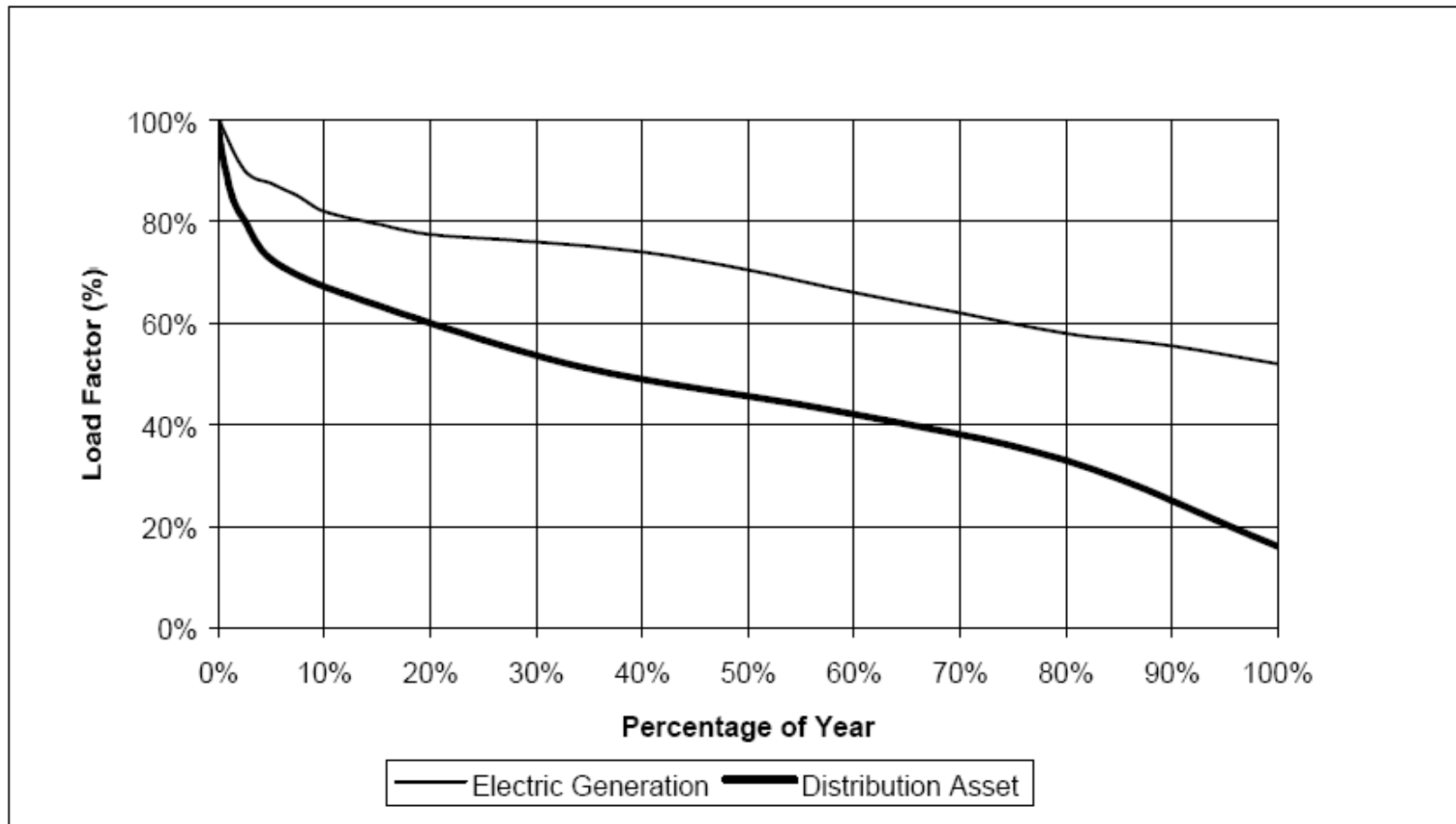
Joshua Finn

Center for Environmental Studies

Brown University

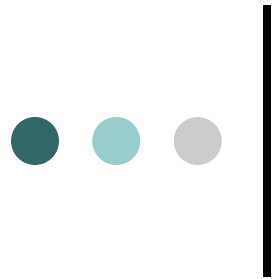
November 27, 2007

# The US electric grid is overbuilt and underutilized



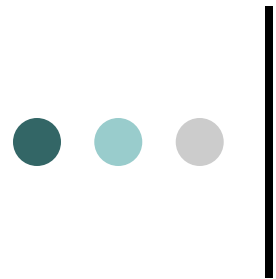
- ● ● | Demand response  
increases utilization

- Time of Use (TOU) rates
  - Approximate the cost of providing electricity
  - Provide incentives for “load shifts”
  - “Flatten” load curves
- Advanced Metering Infrastructure (AMI)
  - Collects interval data
  - Enables TOU rates



## AMI and TOU are not used widely

- 6% penetration of AMI among US electric customers
- 15% of utilities *with AMI* use it for price-sensitive demand response



## Research questions

- What financial, normative and regulatory barriers prevent utility implementation of AMI and TOU in the Pacific Northwest (PNW)?
- What solutions can utilities and regulators implement to overcome these barriers?



# Research design

- Case study design

- In-depth interviews

- Utility execs, policy analysts, resource economists

- Review of regulatory filings

- State public utility commissions

- Three PNW utilities

- Puget Sound Energy

- Portland General Electric

- PacifiCorp



# Metering and infrastructure costs have been high

Meter and Data Management Costs of TOU-Only and Ops Benefits Business Models

First year cost per enrolled customer

○ No economies of scale in rollouts

	<u>TOU-Only</u>		<u>Operational Benefits</u>	
	PGE Existing	PacifiCorp	PGE with AMI	PSE
Meter	\$ 110.00	\$ 150.00	\$ -	\$ -
Data management	\$ 6.00	\$ 189.60	\$ 6.00	\$ 11.51
<b>Meter + Data Costs</b>	<b>\$ 116.00</b>	<b>\$ 339.60</b>	<b>\$ 6.00</b>	<b>\$ 11.51</b>

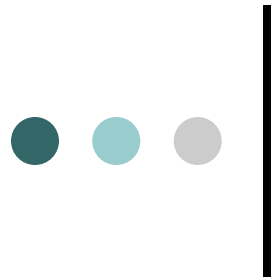
○ Only TOU benefits attributed to AMI

○ Expensive data management

● PSE vs PGE

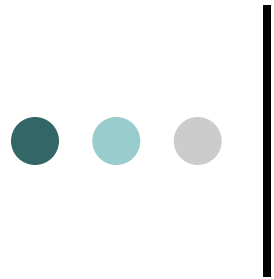
● ● ● | Programs have also seen low participation/high dropout rates

- Service charge depresses participation
- OPUC ruling prevents marketing of programs



## Utilities should roll out AMI for operational benefits

- Reduces meter reading costs and accuracy
- Increases cost effectiveness of TOU programs



The service charge  
should be removed

- Properly allocates the costs and benefits of TOU rates
  - Flat rates impose high costs
  - TOU rates create net benefits
    - Reduce economic and environmental costs

- ● ● | This study further contributes to policy and theory

- Policy

- Collects and compares cost data
- Identifies failures and successes of programs

- Theory

- Cultural aversion to new technology not observed
- Regulatory approval is essential for new technologies and business processes



# Acknowledgements

- Simone Pulver, Watson Institute
- Kurt Teichert, Center for Environmental Studies
- Conrad Eustis, Portland General Electric
- Laura Rooke, Portland General Electric
- Eric Englert, Puget Sound Energy
- Douglas Marx, PacifiCorp



# Questions

???