A Conversation About Standby Rates

PRESENTED TO:

Standby Rate Working Group
Michigan Public Service Commission
Lansing, Michigan

PRESENTED BY:

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Principal

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Self-generation is increasingly attractive to commercial and industrial electricity customers

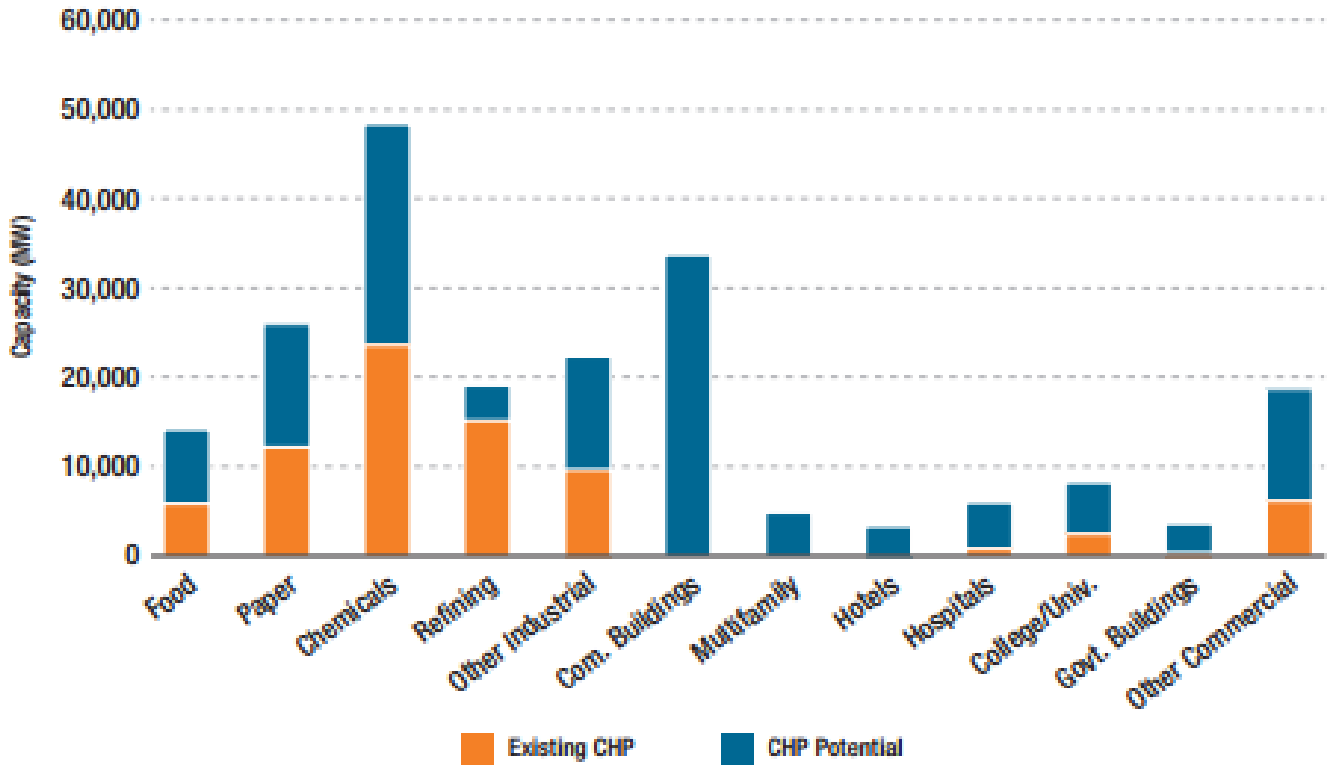
Low natural gas prices, increased manufacturing activity, and concerns about energy self-sufficiency have rekindled interest in combined heat and power (CHP)

- A 2012 Executive Order called for an additional for an additional 40 GW of (CHP) by 2020
  - This would be a 50% increase from 2012 levels
- There were 82 GW of CHP in the U.S. as of 2014, about 8% of U.S. generating capacity

Additionally, extensive incentives for solar PV, the decreasing cost of solar panels, and increasing consumer demand for green labeling are increasing the uptake of solar PV

- Development of cost-effective battery technologies would further enhance the desirability of solar self-generation

A large share of the technical potential for CHP resides in commercial buildings



Source: US Department of Energy and US Environmental Protection Agency, *Combined Heat and Power: A Clean Energy Solution*, August 2012

The desirability of self-generation varies

Economic benefits depend on:

- The relative cost of self-generation versus utility generation -- this can differ significantly by customer, state, and market
- Rate flexibility and negotiating power of the customer to obtain discounted rates

Reliability concerns are more important for some customers:

- Self-generation eases concerns about power outages

Regulatory (and legislative) environment is important:

- Subsidies for solar PV and sometimes CHP incentivize self-generation
- The willingness of the state commission to permit standby or interruptible rates
- Lobbying from solar and CHP equipment installers and manufacturers
- Environmental constraints

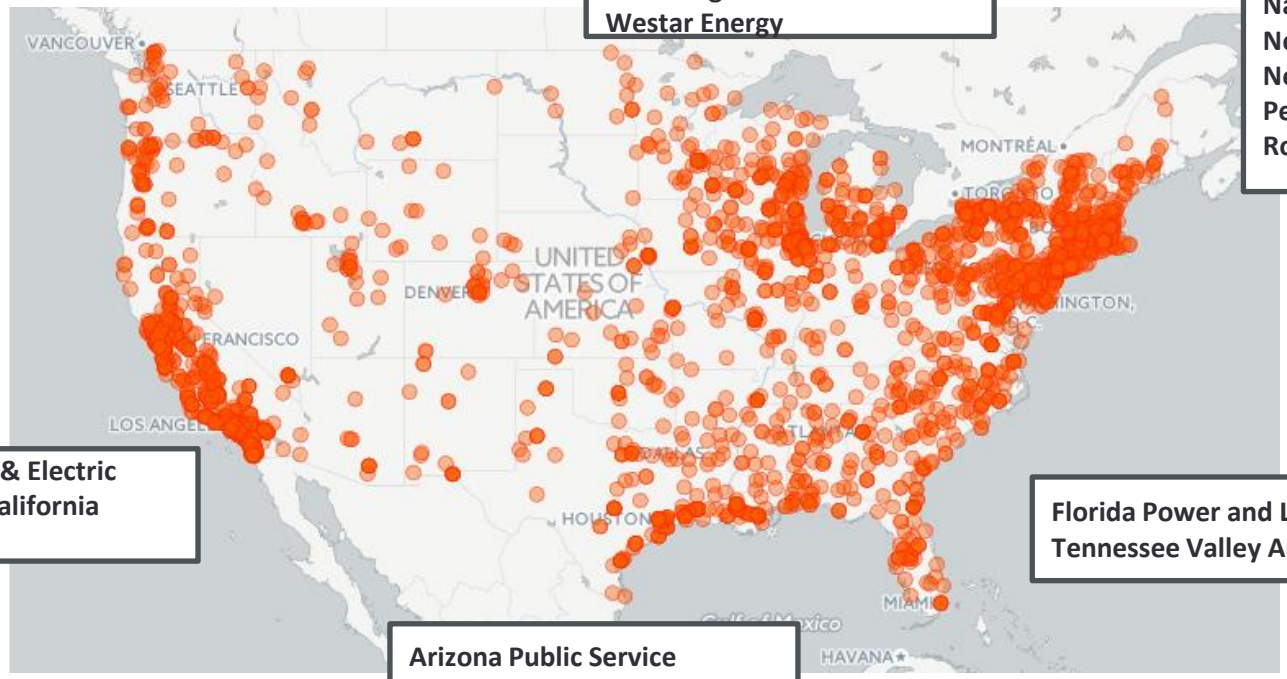
In 2014, we surveyed 24 utilities on issues related to self-generation

Locations of 24 Surveyed Utilities and CHP Facilities (2013)

Idaho Power
Portland General Electric
Puget Sound Energy

Ameren
Commonwealth Edison
Kansas City Power and Light
Madison Gas and Electric
We Energies
Westar Energy

Baltimore Gas and Electric
Central Maine Power
Hydro Quebec (Canada)
National Grid
New York State Electric and Gas
Northeast Utilities
Pepco Holdings Inc.
Rochester Gas & Electric



Pacific Gas & Electric
Southern California Edison

Florida Power and Light
Tennessee Valley Authority

Arizona Public Service
Oklahoma Gas & Electric
Oncor (Texas)

Source: ICF and U.S. DOE via CHP Association. "CHP Installation Database." 2013.

Utilities must tread carefully as large customers consider self-generation

Large customers are active in rate cases directly or through trade associations

- Key issues are cost allocation between rate classes and rate design
- Customers want lower bills, higher reliability, and cleaner air
- Self-generation sometimes emerges as a winning proposition

Utilities offer alternative tariffs to customers that are considering self-generation

- Economic development rates and real time pricing
- Interruptible rates and backup generation rates
- Demand charges
- Exit fees
- Standby rates

The challenges of self-generation vary across utilities and regions

Treatment of self-generation varies across states

- Most utilities are not incentivized to promote self-generation
- Self-generation is a bigger concern for vertically integrated utilities
- Some states do not allow utility ownership of generation
- Some states do not allow flexible (negotiated) rate structures
- Rules on “retail wheeling” or equivalent may inhibit uptake, but a few utilities have found alternate means to work with third parties to sell energy back to the customer
- Other utilities have negotiated special ad-hoc agreements with customers who are situated in particular circumstances (e.g., universities)

Some utilities do not currently see self-generation as a significant issue

These utilities share several features

- Do not own generation
- Have decoupling
- Have low rates
- Customer mix is not favorable to CHP
  - Low steam or heat requirements
  - No refineries, pulp and paper, process industries
- Few governmental incentives for CHP

But the significance of self-generation could grow with time

While it is true that CHP has been around a long time, other kinds of self-generation may arise to augment it

- Incentives for solar PV and push to renewable sources
- Growth of battery technology, micro grids and fuel cells

In the long run, revenues will be undermined even with decoupling

Rising rates will trigger greater customer interest in self-generation

Account management is key to successful solutions

Most utilities maintain close working relationships with their largest accounts

- Most utilities, including distribution-only utilities, are aware of customer plans for self-generation, assist them in project planning and make sure customers benefit from incentive programs
- Some also maintain "executive-level" relationships to cover strategic issues that may be missed at the key account level
  - Executive-to-executive program

Most utilities pick up intelligence about self-generation during the planning stage

- Sometimes a utility will provide design assistance to not-for-profit organizations (e.g., universities and hospitals)

Self-generation can be a risk or an opportunity for utilities

Utilities can provide customers with the benefits of self-generation through creative contract arrangements

- Allow customers to be 100% renewable through PPAs with third party owned off-site solar and wind generation that is transmitted through the utility's wires
- Buy solar energy from a third party that installed and manages solar panels on site for a customer and sell it back to the customer
- Allow customer to install standby generator for backup, but utility pays for fuel, runs and maintains generator
- Sell customers energy efficiency services

Finally, flexible rate design can help in managing self-generation customers

Flexible rate design is being used to retain customers

- A standard tariff for high load factor customers, (e.g., > 90%)
- Real time pricing
- Ratcheted demand charges which act as a disincentive for customers to self-generate
- Explicit exit fees and departing load charges
- Standby tariffs that allow customers to be grid connected for backup or meeting peak demand

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Standby rates are a common solution for billing partial requirements customers

Standby charges are special rates designed to collect only those costs which the partial requirements customer imposes on the grid

- For example, a standby rate can be applied to self-generation customers to compensate the utility for providing backup energy

Self-generation customers are considered a "partial requirements" electricity customer because they do not need all of the same services as a traditional "full requirements" customer

- For example, when a self-generation customer experiences unexpected demand or an outage, they must rely on the utility's connection to the grid

The structures of standby rates vary by utility

A standby rate may have the following components:

Volumetric charge ($/kWh), recovers the distribution and generation costs of the delivered electricity

Demand charge ($/kW), recovers the cost of maintaining peak distribution and generation capacity to accommodate the self-generation customer in the event of a backup

Monthly charge ($/month), recovers a utility's fixed costs (e.g., meters, monthly billing, and hook-up)

*a capacity reservation charge ($/kW) for the capacity the utility must always have available may be billed separately from a demand charge for the capacity actually supplied during a billing cycle

**a maintenance capacity charge ($/kW) for the capacity supplied during scheduled outage may be billed separately

Avoiding cross-subsidies is the primary justification for standby rates

Self-generating customers impose costs on the grid when they draw energy and because the grid has to maintain generation and distribution capacity in anticipation of these events

If rates for self-generating customers do not reflect these costs, then the utility will pass these costs to other customers, who do not self-generate

This potential cross-subsidy can be eliminated with well designed standby rates

Standby charges are designed to compensate utilities for one or more of the following services

	Service	Situation
1.	Backup power	unplanned generator outage

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5.	Delivery	delivery of energy associated with any of the services above

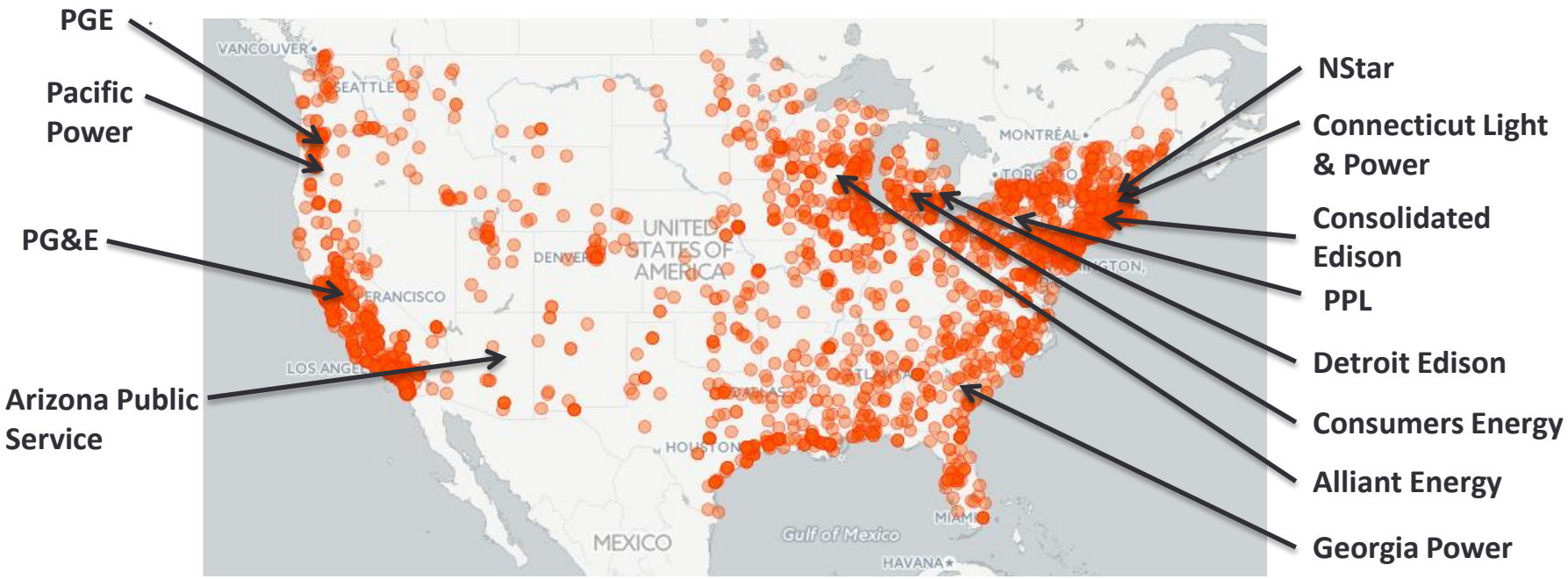
Federal legislation exists to guide the design of standby rates

Public Utilities Regulatory Policy Act of 1978 (PURPA, amended in 2005 by the Energy Policy Act) mandates that rates for sales of backup and maintenance power:

- *Shall not be based upon an assumption (unless supported by factual data) that forced outages or other reductions in electric output by all qualifying facilities on an electric utility's system will occur simultaneously, or during the system peak, or both*
- *Shall take into account the extent to which scheduled outages of the qualifying facilities can be usefully coordinated with scheduled outages of the utility's facilities*

Examples of utilities with standby rates:

Locations of CHP Facilities (2013) and Examples of Utilities with Standby Rates



Hawaiian Electric (not shown)

Sources:
ICF and U.S. DOE via CHP Association. "CHP Installation Database." 2013.
NRRI. Tom Stanton. "Electric Utility Standby Rates." July 2012.

New challenges are emerging as smaller customers turn to self-generation

Large commercial customers at many utilities already face demand charges ($/kW) that accomplish similar goals to a standby charge (i.e., ensuring capacity is there when it's needed)

However, smaller commercial and residential commercial customers often have all of their costs recovered through volumetric charges ($/kWh), making the implementation of standby rates particularly important

The challenge is that standby rates are often only designed for large customers, and designing effective rates for smaller customers can be difficult, especially in the face of customer and regulatory hostility

Also, some net metering statutes prohibit standby charges

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Why are standby rates controversial?

Self-generation customers and members of industries that install or manufacture distributed generation technologies often advocate for minimal standby rates or no standby rates at all

Common criticisms of standby rates include:

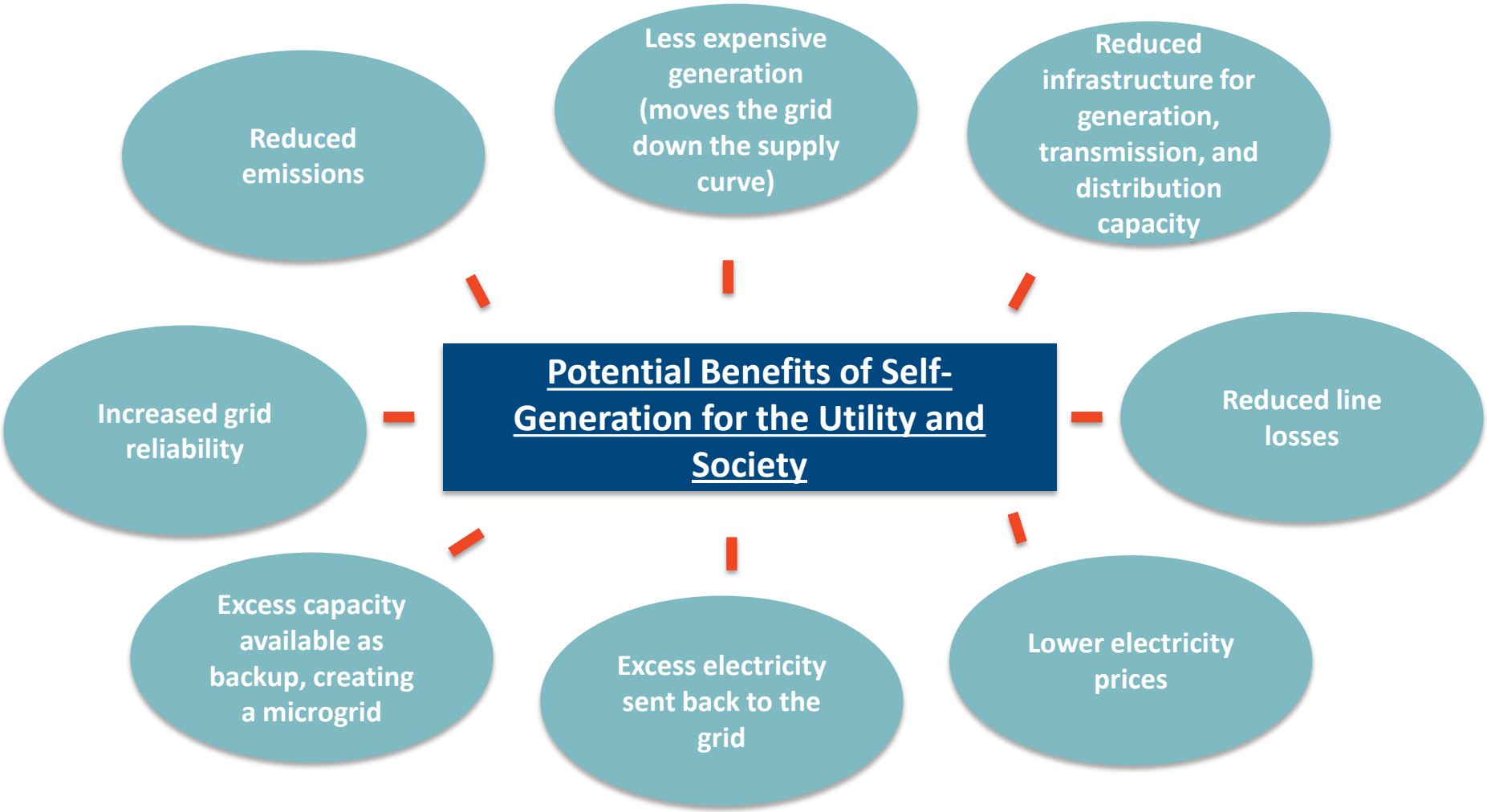
- Rates do not consider the benefits of self-generation
- Rates are poorly designed and fail to account for the statistical probability that a customer will need to use the grid at any given time
  - There is insufficient data for the actuarial accounting that is necessary to create fair rates

Demand charge ratchets are a controversial feature in some standby rates

Some demand charges are based on a single measure of a customer's kW-demand during a particular time period

- This demand charge "ratchet" may then apply to a customer for several months or even a year
- Under this type of rate, it is possible that a customer will have a very rare outage event during a window when demand is measured
- The unlucky customer will then be locked in at that rate for a long period even though their demand at that time was not representative of their expected capacity needs or the true costs they impose on the grid

Opponents of standby rates point to the many benefits of self-generation



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Standby rates can account for the benefits of self-generation

In some cases, it may be desirable for the utility to compensate self-generation customers for services to the grid

- Examples include:
  - Compensation mechanisms for electricity sent back to the grid include:
    - various forms of net metering
    - sale to utilities at “avoided cost”
    - sales to wholesale markets
  - Some utilities even have tariffs that pay self-generation customers for *providing* dispatchable standby generation

However, self-generation should not be subsidized by other customers

For some benefits, it may be a matter of accounting to determine whether or not self-generators should be compensated and by how much

- For example, benefits like reduced line losses and reduced capacity infrastructure will already accrue to customers as lower electricity prices, so utilities must be cautious to avoid double-counting

Other public goods, like lower emissions, should not be incentivized through rate design

- These public goods are best incentivized with government policies and taxes, not cross-subsidies between groups of electricity customers

It does not make sense to eliminate standby rates because some are badly designed

The solution to badly designed standby rates is to design better standby rates

- Through better data collection and more careful consideration of cost incidence, utilities *can* design fair and effective standby rates
- Fair standby rates will account for all of the benefits self-generation customers provide to the utility as well as the true costs of providing partial services to these customers

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Standby rates will become increasingly contentious as self-generation increases

Now is the time to design and implement fair and effective standby rate structures so that utilities and their customer can make informed decisions about self-generation

Self-generators are a fast-growing cohort of electricity customers, and it will only become more difficult and contentious to change rate designs for these customers

Standby rate designs must also consider opportunities for small commercial and residential customers to take advantage of partial service

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Ahmad Faruqui leads the firm's practice in understanding and managing the changing needs of energy consumers. This work encompasses tariff design and evaluation, distributed generation, energy efficiency, demand response, demand forecasting and cost-benefit analysis of emerging technologies. He has consulted with more than 125 clients, including utilities, system operators, and regulatory commissions, in the U.S. and in Australia, Canada, Egypt, Hong Kong, Jamaica, Philippines, Saudi Arabia, and Thailand. He has filed testimony or appeared before state commissions, government agencies, or legislative bodies in Alberta (Canada), Arizona, Arkansas, California, District of Columbia, Illinois, Indiana, Kansas, Maryland, Michigan and Ontario (Canada). He has spoken at conferences in Australia, Bahrain, Brazil, Egypt, France, Germany, Ireland, Jamaica, and the United Kingdom. And his work has been cited in *Business Week, The Economist*, *Forbes, The New York Times*, *USA Today*, *The Wall Street Journal* and *Washington Post*. He has appeared on Fox News and National Public Radio and is the author, co-author, or co-editor of four books and more than 150 articles on energy economics. Dr. Faruqui holds bachelors and masters degrees from the University of Karachi in economics and masters and doctoral degrees from the University of California, Davis, in economics and in agricultural economics.

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