Third-Party Distributed Generation:
Setting the Stage for Debate

Steve Kihm
Director of Market Research and Policy
January 15, 2014
Q. What is distributed generation?
distributed generation technologies
Q. What is third-party distributed generation?
two parties

utility

customer
two parties

customer buys

utility

customer
three parties

customer leases

utility
customer
three parties

utility

customer leases

customer
Q. Why should utilities be concerned about distributed generation?
Q. Why should utilities be concerned about third-party providers?
“Third-party investors help to make digesters a reality,” *Progressive Dairyman*
Over 75 per cent of California’s new residential solar systems in 2012 were leased.

Source: Climate Policy Institute
Q. Is distributed solar PV technically feasible in Wisconsin?
Worshiping in Germany
Stock Price Change 2008-2013

German stocks in general (DAX Index)

Germany's two largest investor-owned utilities (RWE and E.ON)
Source: National Renewable Energy Lab
Q. Is distributed solar PV cost-effective in Wisconsin?
PV MODULE COSTS PER WATT

Source: U.S. Department of Energy
Q. Who is installing distributed solar PV?
Fig 1: COMMERCIAL CUSTOMERS ARE INSTALLING DISTRIBUTED SOLAR CAPACITY

- Wal-Mart
- Costco
- Kohl’s
- Ikea
- Macy’s
- McGraw-Hill
- Johnson & Johnson
- Staples
- Campbell’s Soup
- Walgreens

Source: Solar Energy Industries Association (reported in the Wall Street Journal, 9-17-2013)
Q. What factors are driving customers to adopt distributed solar PV?
Example: Global Solar PV Trends and Factors

LT TREND: increasing distributed solar PV use

- Improving economics
- New leasing options
- Favorable policies
- Customer preferences
Example: Global Solar PV Trends and Factors
Example: Global Solar PV Trends and Factors
• environmental impacts
• self-determination
• reduced uncertainty
Example: Global Solar PV Trends and Factors

LT TREND: increasing distributed solar PV use

- Improving economics
- New leasing options
- Customer preferences
- Favorable policies
Q. Do utility rates (prices) reflect utility system costs?

(implications for distributed generation adoption rates)
To provide service, utilities need to spend money on:
Which costs diminish when usage declines?
utility costs

required revenues

rates (prices)
Determining revenue requirement is a science; designing rates is an art.

James Totten, Director
Public Utilities Commission of Texas
utility costs

required revenues

rate design A  rate design B  rate design C
fixed monthly charge  

based on usage (kWh)
rate design based on historical costs

<table>
<thead>
<tr>
<th>Charge Type</th>
<th>Amount</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed charge</td>
<td>$40.00</td>
<td>per month</td>
</tr>
<tr>
<td>Variable charge</td>
<td>$0.06</td>
<td>per kWh</td>
</tr>
</tbody>
</table>
There are conflicts among the competing objectives of ratemaking that are difficult to resolve.
Are we setting rates…

…to reflect current cost structures?

…to send a price signal as to future costs?
Pricing and avoided costs

- Short-run
  - Fuel
  - Generation
  - Transmission
  - Distribution

- Long-run
  - Fuel
  - Generation
  - Transmission
  - Distribution
regulator’s art
typical rate design

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed charge</td>
<td>$10.00</td>
<td>per month</td>
</tr>
<tr>
<td>Variable charge</td>
<td>$0.11</td>
<td>per kWh</td>
</tr>
</tbody>
</table>
Utility system costs embedded in volumetric prices

- Cost-based:
  - Fuel costs

- Traditional:
  - Contribution to fixed costs
  - Fuel costs
Q. How does utility ratemaking affect the economics of distributed generation?
every kWh of distributed generation saves $0.11 on the utility bill.
even though the utility saves only $0.06 per kWh
Q. How are utility revenues affected by loss of load to distributed generators?
REVENUES AND COSTS UNDER LOSS OF LOAD (traditional rate design)

Actual revenue

Actual costs

Net = $100,000,000

Net = $32,000,000

Reduction in Load
Q. Who is initially responsible for the lost net revenues that result from solar PV adoption?
utility investors
Q. Who is ultimately responsible for the lost net revenues that result from solar PV adoption?
What happens to the revenue shortfall?

- **Hope** and **Bluefield** cases

*Rates which are not sufficient to yield a reasonable return on the value of the property used at the time it is being used to render the service of the utility to the public* are unjust, unreasonable, and confiscatory, and their enforcement deprives the public utility company of its property, *in violation of the Fourteenth Amendment.*
Q. How does the lost net revenue from distributed generation adoption affect utility rates?
RATES INCREASE AS REGULATORS ALLOCATE UNRECOVERED COSTS OVER REMAINING SALES
Source of the problem?

Solar PV economics?  Rate design?
Q. What can regulators do to correct this problem?
rate design based on historical costs

<table>
<thead>
<tr>
<th>Charge Type</th>
<th>Amount</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed charge</td>
<td>$40.00</td>
<td>per month</td>
</tr>
<tr>
<td>Variable charge</td>
<td>$0.06</td>
<td>per kWh</td>
</tr>
</tbody>
</table>
Utility system costs embedded in volumetric prices

rates and costs are the same

fuel costs

per kWh

$0.00

$0.02

$0.04

$0.06

$0.08

$0.10

$0.12

cost-based
REVENUES AND COSTS UNDER LOSS OF LOAD (cost-based rate design)

- Actual revenue
- Actual costs
- Net = $100,000,000

Reduction in Load:
- 0%
- 5%
- 10%
- 15%
- 20%
- 25%
- 30%
- 35%
- 40%
- 45%
- 50%
NO NEED TO ALLOCATE UNCOVERED REVENUE—THERE IS NONE
Q. Does this solution create any new problems?
We would be setting rates…

…to reflect current cost structures.

not…

…sending a price signal as to future costs.
Utilities understandably oppose competition in the distribution business, and their first instinct likely will be to block it or marginalize it. But doing so poses its own risks—**including the real possibility of a backlash**.

Michael Burr, *Economy of small: How DG and microgrids change the game for utilities* (PUBLIC UTILITIES FORTNIGHTLY, May 13, 2013)
Today, even distributed generators are partially captive customers.

- Competitive load
- Captive load
Cost-based rates make small purchases from the utility uneconomic.
no utility connection required
What if the high fixed charge rate structure causes customers to disconnect from the system?
Features of cost-based rates

• PROS
  o Reflect actual costs
  o Eliminate lost net revenue
  o Avoid rate impacts

• CONS
  o Are difficult to obtain politically
  o Prompt customer backlash
  o Encourage disconnection from grid
What if loss of load is **huge**?

- **Market Street Railway** case

  *The due process clause does not insure values, nor require restoration of values that have been lost by the operation of economic forces...* In view of the company's economic plight, the [rate reduction] order was not invalid even though **under the prescribed rate the company would operate at a loss.**
Q. What is happening in other jurisdictions?
Actions in the States

- Agencies
- Legislatures
- Courts
Contact information

Steve Kihm
Director of Market Research and Policy
608.210.7131
skihm@ecw.org

Joe Kramer
Senior Project Manager
608.210.7119
jkramer@ecw.org