Beyond Net Metering
Issues for Washington State

Washington Solar Summit
Bellevue, WA

Jim Lazar, RAP Senior Advisor
Solar is Soaring – Costs Declining
Perspectives AND Issues

PERSPECTIVES
• Utility
• Consumer
• Societal
• Solar Industry

ISSUES
• Incentives
• Rate Design
• Net-Metering
Overview of Net Metering and Value of Solar Ratemaking

• Net-Metering:
  – Simple
  – No new metering required
  – Typically not TOU based
  – Considered an infant-industry subsidy by many

• Value of Solar Analysis
  – Can be narrow (short-run) or broad in scope
Two Views of Cost Recovery

Traditional Utility View
- DG customer “uses” the grid and should pay for it;

Solar Advocate View
- Value of distributed resource is greater than the retail rate;
Range of Solar Valuation Studies

• Narrow studies
  – Short-run cost savings from solar additions

• Long-Run studies
  – Generation capacity and energy value

• Broad Utility Sector Studies
  – Generation, transmission, distribution, and other utility system values.

• Extensive Societal Studies
  – Utility system and societal benefits
## Categories of Costs Considered

<table>
<thead>
<tr>
<th>Type</th>
<th>Variable</th>
<th>Capital</th>
<th>Externalities</th>
<th>Societal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-Run</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broad Utility</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>x</td>
</tr>
<tr>
<td>Extensive</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Some Costs Treated Very Differently

- Production Capital Costs
- Transmission Capital Costs
- Distribution Capacity Credit
- Marginal or Average Line Losses
- Current or Future Environmental Costs
- Fuel Cost and Fuel Supply Risk
- Macroeconomic Effects
RMI Survey Of Multiple Studies: Average: $0.1672/kWh
Traditional Ratemaking

Utility
Average Cost of Service

Retail Rates
Critical View of Net Metering

Lost Revenues from Net Metering

Short-run Fuel and Purchased Power Costs Avoided By Net Metering
Solar Advocate View of Net Metering

Lost Revenues From Net Metering

Long-Run Avoided Cost for Generation, Trans, Dist
+ Reduced Emissions
+ Avoided Fuel Cost Risk
+ Avoided Fuel Supply Risk
+ Local Economic Development
+ Future Carbon Costs
+ Shading Benefits on AC Load
+ Much, much more
Observations

• The answer you get depends on the question you ask.
  – Long-run vs. Short-run
  – Utility direct effects only?
  – Utility direct and future effects?
  – All societal effects

• Valuation of risk and environmental costs have a significant impact.
Smart Rate Design:

Rate design as though the future is important.
Three Guiding Principles

• A customer should be able to connect to the grid for no more than the cost of connecting to the grid.

• Customers should pay for power supply and grid services based on how much they use and when they use it.

• Customers supplying power to the grid should receive full and fair compensation – no more and no less.
Principle #1

A customer should be allowed to connect to the grid for no more than the cost of connecting to the grid.
Principle #2

Customers should pay for the grid in proportion to how much they use the grid, and when they use the grid.
Principle #2

Customers should pay for power supply in proportion to how much they use and when they use it.
Principle #3

Customers delivering power to the grid should receive full and fair value — no more and no less.
Where Did The Idea that High Fixed Charges are Appropriate Come From?
Straight Fixed / Variable:

100% of Distribution System Classified as Customer-related
Minimum System Method:

~50% of Distribution System Classified as Customer-related
Basic Customer Method

ONLY customer-specific facilities classified as customer-related
## Comparing Methods

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Straight Fixed / Variable</th>
<th>Minimum System Method</th>
<th>Basic Customer Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$/month/customer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poles</td>
<td>$10</td>
<td>$5</td>
<td>$</td>
</tr>
<tr>
<td>Wires</td>
<td>$20</td>
<td>$10</td>
<td>$</td>
</tr>
<tr>
<td>Transformers</td>
<td>$10</td>
<td>$5</td>
<td>$</td>
</tr>
<tr>
<td>Services</td>
<td>$1</td>
<td>$1</td>
<td>$1</td>
</tr>
<tr>
<td>Meters</td>
<td>$1</td>
<td>$1</td>
<td>$1</td>
</tr>
<tr>
<td>Billing</td>
<td>$2</td>
<td>$2</td>
<td>$1</td>
</tr>
<tr>
<td>Customer Service</td>
<td>$2</td>
<td>$2</td>
<td>$1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$46</strong></td>
<td><strong>$26</strong></td>
<td><strong>$4</strong></td>
</tr>
</tbody>
</table>
Only Component Sized To Customer Demand
Final Line Transformer
## Bottom Line: Smart Rates

### Customer-Specific Charges

<table>
<thead>
<tr>
<th>Customer Charge</th>
<th>$/Month</th>
<th>$ 3.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer:</td>
<td>$/kVA/Mo</td>
<td>$ 1.00</td>
</tr>
</tbody>
</table>

### Energy Charges

<table>
<thead>
<tr>
<th>Peak Level</th>
<th>$/kWh</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-Peak</td>
<td>$0.08</td>
<td>$0.08</td>
</tr>
<tr>
<td>Mid-Peak</td>
<td>$0.12</td>
<td>$0.12</td>
</tr>
<tr>
<td>On-Peak</td>
<td>$0.18</td>
<td>$0.18</td>
</tr>
<tr>
<td>Critical Peak</td>
<td>$0.75</td>
<td>$0.75</td>
</tr>
</tbody>
</table>
## Example Residential Rate:

<table>
<thead>
<tr>
<th>Service</th>
<th>Pacific Power</th>
<th>Franklin PUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Charge</td>
<td>$7.75</td>
<td>$34.00</td>
</tr>
<tr>
<td>First 600 kWh</td>
<td>$0.067</td>
<td>$0.067</td>
</tr>
<tr>
<td>Over 600 kWh</td>
<td>$0.106</td>
<td>$0.067</td>
</tr>
</tbody>
</table>
We reject the Company’s and Staff’s proposals to increase significantly the basic charge to residential customers. The Commission is not prepared to move away from the long-accepted principle that basic charges should reflect only “direct customer costs” such as meter reading and billing. Including distribution costs in the basic charge and increasing it 81 percent, as the Company proposes in this case, does not promote, and may be antithetical to, the realization of conservation goals.” Pacific Power, Docket UE-140762 (2015)
Some Approaches For Solar Treatment Being Tried Around the County

Full net-metering (PSE)
High Fixed Charges (Franklin PUD)
Partial net-metering (Texas)
Residential demand charges (Arizona)
Buy-all / Sell-all (Austin)
Self-Supply (Hawaii)
Full Net Metering (PSE)

Customer Charge $7.87/month
First 600 kWh $0.10/kWh
Over 600 kWh $0.12/kWh

Only net consumption is billed.
Credit for solar backfeed is $.10 - $.12/kWh
High Fixed Charge (Franklin PUD)

Customer Charge: $34.00/month
All kWh: $0.67/kWh

Only net consumption is billed
Credit for solar backfeed is $.067/kWh
## Partial Net Metering
### Pedernales Electric Cooperative, Texas

<table>
<thead>
<tr>
<th>Charge Type</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Charge:</td>
<td>$20.00/month</td>
</tr>
<tr>
<td>Power Charge:</td>
<td>$.06/kWh</td>
</tr>
<tr>
<td>Delivery Charge:</td>
<td>$.033/kWh</td>
</tr>
</tbody>
</table>

- All power delivered pays delivery charge.
- Credit for solar backfeed is $.06/kWh.
Residential Demand Charge
Salt River Project (Arizona)

Customer Charge: $20.00

Demand Charge:
  Winter: $3.47 - $9.54/kW
  Summer: $7.81 - $33.27/kW

Energy Charge
  Winter: $.04/kWh
  Summer: $.06/kWh

Credit for solar backfeed is $.04 - $.06/kWh
Buy-All / Sell-All
Value of Solar Rate: Austin, Texas

Austin Energy (Texas)

Key Features:
- Inclining block/seasonal rate
- Value of solar credit for PV exceeds initial block rate

<table>
<thead>
<tr>
<th></th>
<th>Summer</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Charge</strong></td>
<td>$10.00</td>
<td>$10.00</td>
</tr>
<tr>
<td><strong>Usage Charges</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 500 kWh</td>
<td>$0.087</td>
<td>$0.072</td>
</tr>
<tr>
<td>500 - 1,000 kWh</td>
<td>$0.134</td>
<td>$0.110</td>
</tr>
<tr>
<td>1,000 - 1,500 kWh</td>
<td>$0.145</td>
<td>$0.126</td>
</tr>
<tr>
<td>1,500 - 2,500 kWh</td>
<td>$0.164</td>
<td>$0.138</td>
</tr>
<tr>
<td>Over 2,500 kWh</td>
<td>$0.168</td>
<td>$0.150</td>
</tr>
<tr>
<td><strong>Value of Solar Credit</strong></td>
<td>($0.107)</td>
<td>($0.107)</td>
</tr>
</tbody>
</table>
Self Supply (Hawaii)

Customer Charge:  $9.00/month
Energy Charge:  $0.27/kWh
Minimum bill:  $17.00/month

Solar backfeed is **not permitted** for new solar customers. Full net metering applies to solar customers connected before 2015.
Net Metering
Over What Period of Time?

Annual
Monthly
Hourly
Instantaneous
Example Large Commercial Rate: PSE

Customer Charge $104.46
Demand Charge
   Summer $/kW $7.76
   Winter $/kW $11.65
Energy Charge $/kWh $.0567
What Happens When Large Commercial Customers Go Solar?
Big Box Without Solar: Demand Charge at 550 kW

Large Retail Customer Demand

Before Solar
Big Box WITH Solar: Demand Charge at 450 kW

Large Retail Customer Demand with Solar

Energy solutions for a changing world
Battery Costs Are Coming Down
Big Box Store With Solar And Batteries
Demand Charge at 250 kW

Large Retail Customer Demand
with Solar and Batteries

Before Solar
After Solar
After 600 kWh Batteries
Summary

Residential Issues:
- Size of Fixed Charge
- Full or Partial Net-Metering
- Period over which “Net” is Calculated

Commercial Issues
- Demand Charges provide utilities a buffer
- Batteries are on the horizon.
About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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