Designing Distributed Generation Tariffs Well: Fair Compensation in a Time of Transition

Presented by Carl Linvill

February 11, 2014
We Have Visited Lands Proximate ...
Now We Prepare to Head Out to Sea ...
Our Main Points ...

- Value is a two way street
- Defining value and cost is important
- Subsidies only occur if cost exceeds value
- Extrapolating from extreme situations is misleading
- Transitioning to a transactive paradigm
- In the mean time: Net Energy Metering and Feed-in Tariffs work well if ...
Tariffs Designed Well if ...

• Valuation aligned with the Public Interest
• Fair value paid for DG services and Grid services
• Tail block rates set at LRMC (most places)
• Set other tariff and rate design parameters accordingly
• Administrative simplicity matters
• Consider incentives and decoupling separately
Consider: Valuation is your compass
Major Categories of Value

**Benefits**
- Energy
- Line loss savings
- Generation capacity
- T&D capacity
- Fuel price hedge
- Risk reduction
- Environmental
- Grid security & reliability

**Costs**
- Direct
- Administrative
- Interconnection
- Integration
- Risk/opportunity cost

**Terminology** differs from study to study
RMI Survey Of Multiple VOS Studies:
Average Value of Solar: $0.1672/kWh
Helpful Reference Documents

• RAP, *Full Value of Energy Efficiency*, Lazar & Colburn (September 2013)

• Rocky Mountain Institute (RMI), *A Review of Solar PV Benefit & Cost Studies, 2nd Edition* (September 2013)

• Interstate Renewable Energy Council (IREC), *A Regulator’s Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation* (October 2013)
Consider: Cross-Subsidies run both ways

• If value of PV < volumetric charges:
  – Other customers subsidize PV customers
  – Under-recovery of utility’s fixed costs
  – Upward pressure on rates (cross subsidy)
  – Reduced utility shareholder returns

• If value of PV > volumetric charges:
  – PV customers subsidize other customers
  – Suppresses PV deployment
Consider: Don’t Extrapolate from Extremes
Tail Block Rates Vary (E3, 2013)
Consider: Many Possible Alternative or Supplemental Tariff Policies

• Fixed charges
• Demand charges
• Minimum monthly bills
• Time-based rates
• Stand-by rates
• Two-way rates (i.e., value of solar)
• Separate PV customer class
# Illustration of Alternative Rate Designs

<table>
<thead>
<tr>
<th>Type of Charge</th>
<th>Unit / Usage</th>
<th>Typical Current Residential Tariff</th>
<th>Option 1 Fixed Monthly Charge</th>
<th>Option 2: Demand Charge</th>
<th>Option 3: Bidirectional Distribution Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Fixed Charge:</td>
<td>$/Month</td>
<td>$ 5.00</td>
<td>$ 35.00</td>
<td>$ 5.00</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>Demand Charge</td>
<td>$/kW/Month</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 3.00</td>
<td>$ -</td>
</tr>
<tr>
<td>Distribution Charge</td>
<td>$/kW</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 0.03</td>
</tr>
<tr>
<td>Off-Peak Energy</td>
<td>$/kWh</td>
<td>$ 0.145</td>
<td>$ 0.08</td>
<td>$ 0.08</td>
<td>$ 0.08</td>
</tr>
<tr>
<td>On-Peak Energy</td>
<td>$/kWh</td>
<td>$ 0.145</td>
<td>$ 0.15</td>
<td>$ 0.15</td>
<td>$ 0.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Average Customer Bill</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Charge</td>
<td>Per Customer</td>
<td>$ 5.00</td>
<td>$ 35.00</td>
<td>$ 5.00</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>Demand Charge</td>
<td>10 kW Demand</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 30.00</td>
<td>$ -</td>
</tr>
<tr>
<td>Distribution Charge</td>
<td>1,000 kwh total energy</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 30.00</td>
</tr>
<tr>
<td>Off-Peak Energy</td>
<td>500 kWh on-peak</td>
<td>$ 72.50</td>
<td>$ 40.00</td>
<td>$ 40.00</td>
<td>$ 40.00</td>
</tr>
<tr>
<td>On-Peak Energy</td>
<td>500 kWh off-peak</td>
<td>$ 72.50</td>
<td>$ 75.00</td>
<td>$ 75.00</td>
<td>$ 75.00</td>
</tr>
</tbody>
</table>

|                                    |              |                                    | $ 150.00                    | $ 150.00                | $ 150.00                                    |

Each alternative produces $150/month from a customer using 1,000 kWh/month
### Breakdown of Hypothetical PV Customer Bill

<table>
<thead>
<tr>
<th>Rate Element</th>
<th>Typical Current Residential Tariff</th>
<th>Option 1 Fixed Monthly Charge</th>
<th>Option 2: Demand Charge</th>
<th>Option 3: Bidirectional Distribution Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Charge</td>
<td>$5.00</td>
<td>$35.00</td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Demand Charge</td>
<td>$-</td>
<td>$-</td>
<td>$30.00</td>
<td>$-</td>
</tr>
<tr>
<td>Distribution Charge</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$30.00</td>
</tr>
<tr>
<td>Off-Peak Energy</td>
<td>$72.50</td>
<td>$40.00</td>
<td>$40.00</td>
<td>$40.00</td>
</tr>
<tr>
<td>On-Peak Energy</td>
<td>$(72.50)</td>
<td>$(75.00)</td>
<td>$(75.00)</td>
<td>$(75.00)</td>
</tr>
<tr>
<td>Total Bill:</td>
<td>$5.00</td>
<td>$35.00</td>
<td>$35.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>Total Distribution Service:</td>
<td>$5.00</td>
<td>$35.00</td>
<td>$35.00</td>
<td>$35.00</td>
</tr>
</tbody>
</table>

Assumptions: 10 kW maximum demand; 1,000 kWh total consumption, 50% on-peak; 1,000 kWh total on-site production. 500 kWh imported from grid off-peak; 500 kwh exported to grid on-peak
Consider: Financing Matters (3rd Party Ownership Models)

Source: SEIA/GTM Research: U.S. Solar Market Insight® (Q2 2013)
Consider: Sound Decision-making benefits all

- For consumers: Keep more $$, Quality
- For utilities: Corporate health, purpose
- For investors: Safety, value, expectations
- For employees: safety and welfare, pride
- For the regulatory process: confidence
- For society: key role for power in society

A process that promotes shifting risk rather than minimizing risk is inherently unstable
In Fact, though often not in appearance,

• Consumer, Utility, Third Party and Investor interests are intertwined
• All are served by strategies that limit risk

• But who advocates for this societal perspective?
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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Designing DG Tariffs Well:
http://www.raponline.org/document/download/id/6898