Value of Solar in Rates

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My Experience at Austin Energy

- Dedicated distributed energy services function: Efficiency, Demand Response, Municipal Solar, Customer Solar, Electric Vehicles, Green Building, Energy Code, Large Accounts, Data Analysis
- World-class energy efficiency programs with measured success (23% lower bill than in Texas); 18 years between rate cases; paid cash for smart grid
- Distributed solar as a resource
- Systems perspective, comprehensive programsTestimony in VA (2), GA (2), NC (2), LA, MI (2), IA, KY (2), FL, TVA, MO, DC
- Drafted and helped implement Value of Solar Tariff law in MN
- Webinars, seminars, consulting & advisory nation-wide
- Support and participation with RMI eLab Initiative
- Articles, white paper, testimony, commentary at www.rabagoenergy.com

Utility Transformation: On the Road to a New Business Model

From	*To*
"Ratepayers"	Empowered customers
1-way electron flow	3-way dynamic interactions: U to C, C to U, C to C; facilitated by new market entrants
"Throughput" model where assets equal wealth and utilities sell a commodity	"Integrated services" model where the utility creates value for customers and shareholders by delivering services
"A requirement to take energy"	Customers manage and self-generate
Customer control as a threat	Distributed energy services as a revenue center

Rates should reflect costs AND support policy

Issues with Traditional Net Metering

- PURPA legacy
- Relationship between retail rates and solar value
- Accounting under-recovery for the utility, impacts between rate cases
- Perverse results with tiered rates
- Energy efficiency incentives hidden in netting
- Low payments for solar offset & (some places) excess energy
  - Reduces optimal investment size
  - Encourages consumption during periods of solar production
- Monthly true-up leads to sub-optimal system size; sub-optimal investment per install

The Ideal Distributed Solar Tariff

- Fair to the utility and non-solar customers
- Fair compensation to the solar customer
- Decouple compensation from incentives
- Align public policy goals (decouple compensation from consumption)
- Intuitively sound and administratively simple

Historical Antecedents

- PURPA (US Public Utility Regulatory Policy Act of 1978)
- Externalities
- Price ≠ Cost
- Green Power
- *Small Is Profitable* (http://www.smallisprofitable.org/)
- Local Integrated Resource Planning

Problems Applying Traditional Avoided Cost Thinking to Distributed Solar

- Point for calculation of "indifference value" is customer meter, not the large-scale generator busbar
- Customer-generators assume responsibility for capital risk, operating risk, and insurance risk
- State avoided cost systems seldom use full PURPA/FERC authority to consider avoided costs and construct technology-specific values
- FERC jurisdiction ends at the wholesale level
- State jurisdiction includes "public interest" ratemaking

Objective of Value of Solar Analysis

- Provide rates and services in the public interest that support:
  - Economic efficiency
  - Societal equity
  - Technological innovation
- Comprehensively assess benefits and costs to the utility, utility customers, and society
- Establish the economic indifference price at which the utility can compensate the customer or make and deliver the service themselves
- Uses: Benchmark IPP offers (2007); index for incentives (2010); as a foundation for a retail rate (2012)

Solar Value: Analytical Approach

- When a customer and the community invest in solar, we all benefit from useful, privately-funded, clean electricity at or very near the point of use.
- If the utility had to provide that same electricity, what would it be worth? *What is the fair value?*
- Analysis shows value or avoided cost for:
  - Electric energy
  - Electric capacity
  - Transmission (energy & capacity)
  - Distribution (energy & capacity)
  - Line losses (transmission & distribution)
  - Fuel price hedging (cost to maintain stable fuel prices)
  - Environmental value (non-fossil, carbon-free, "waterproof")
- Analysis shows additional societal value, often >2X utility value, for jobs, economic development, local tax revenues, etc.

Two Simple Changes

- **Compensation** - Change **from**:
  - "retail up to consumption, then something else" (avoided cost/fuel, avg. retail, etc.)"

  change to
  - "annually updated value of solar (present value of 30-year stream) for **ALL** solar generation
- **Rate Design** - Calculate bill by charging for total consumption as if the customer had no solar, then credit **ALL** solar production at the value of solar rate (other options possible)

Billing the Value of Solar Tariff

Customer Charge (per customer)	$
Energy Charge (per total kWh use)	$
Fuel Charge (per total kWh use)	$
Other Charges	$
Total Charges	$
Value of Solar Credit (per solar kWh)	($)
Total (net) Bill	**$**

- The solar customer is charged for all energy consumption as if the customer did not have a solar system. This ensures that utility cost of service is always covered, regardless of solar system performance.
- The solar customer is credited for all solar generation at the annually adjusted VOS rate, empirically derived, based on actual values.
- The customer pays any net charges, carries over net credits to the next month, for 1 year.
- All credits remaining at the end of the year are zeroed out. (tax issue)
- The utility accounts for the difference between the charges and the credits through the fuel factor.

Major Benefits of VOS Approach

- Reduces or eliminates class subsidies
- Eliminates need and justification for “stand-by” charges
- Explicitly charges for consumption; keeps utility whole on cost of service (some utility upside due to conservative calculation approach)
- Explicit incentive for efficiency
- Annual adjustment prevents over- or under- payment as utility costs change
- Better aligns with sound rate making principles
- Reduces simple payback; reduces pressure on incentives

Beyond Value of Solar

- Value of Storage - Stationary, and soon, the electric vehicle kind (operating in V-to-Grid settings)
- Value of Smarts - smart inverters, home, local grids, substations and feeders
- Value of Security - smart, self-healing, storm-resistant, secure grids and micro grids
- Value of Savings - customer or utility controlled curtail-able and shape-able loads interacting in dynamic curtailment markets

Handouts:

Solar Rate Design Options
Benefits Comparison

Thanks!

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