Net Metering 2.0:
The Value of Solar Tariff

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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

Solar Value: Traditional Net Metering

- If solar generation **offsets** consumption, value is *retail rate*
- If solar generation is **excess** to consumption, solar value is *retail rate up to consumption, then avoided cost or fuel factor (or average class rate, in MN)*

Solar Value: Analytical Approach

- When a customer and the community invest in solar, it provides valuable, 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 expenses 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.

Solar Value: Analysis-Based

	Developer/Investor	Utility/Ratepayer	Society/Taxpayer
Distributed solar* system Cost	20-30 ¢/kWh		
Transmission Energy Value		6 to 11 ¢/kWh	
Transmission Capacity Value		0 to 5 ¢/kWh	
Distribution Energy Value		0 to 1 ¢/kWh	
Distribution Capacity Value		0 to 3 ¢/kWh	
Fuel Price Mitigation		3 to 5 ¢/kWh	
Solar Penetration Cost		0 to 5 ¢/kWh	
Grid Security Enhancement Value			2 to 3 ¢/kWh
Environment/health Value			3 to 6 ¢/kWh
Long-term Societal Value			3 to 4 ¢/kWh
Economic Growth Value			3+ ¢/kWh
TOTAL COST / VALUE	20-30 ¢/kWh	15 to 41 ¢/kWh	

** Centralized solar has achievd a cost of 15-20 cents per kWh today. However less of the above value items would apply. The distribution value items would not apply. Transmission capacity, and grid security items would generally be towards the bottom of the above ranges, while penetration cost would be towards the top of the ranges because of the burden placed on transmission and the possible need for new transmission lines -- nevertheless, a value of 14-30 cents per kWh could be claimed.*

http://www.cleanpower.com/resources/solar-power-generation-in-the-us-too-expensive-or-a-bargain/

Two Simple Changes

- Change compensation from “retail up to consumption, then something else" (avoided cost/fuel, avg. retail up to 40 kWh)” **to** “annually updated value of solar (present value of 30-year stream) for **ALL** solar generation
- 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

Billing the Value of Solar Rate

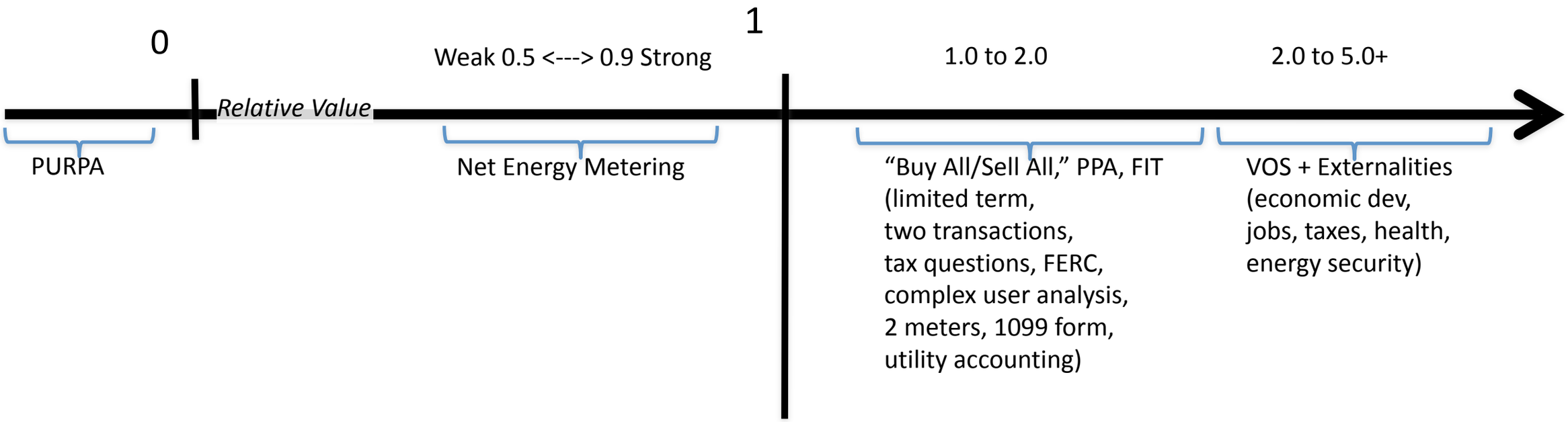
Customer Charge (per customer)	$
Energy Charge (per total kWh use)	$
Fuel Charge (per total kWh use)	$
Other Charges	$
Total Charges	$
Value of Solar Credit (per solar kWh)	($)
Total (net) Bill	**$**

- 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.
- The customer carries over net credits to the next month.
- 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.
- The VOS rate is adjusted each year to reflect current electric energy economics.

Major Benefits of VOS Approach

- Reduces or eliminates class subsidies
- Keeps utility whole on cost of service (some utility upside due to conservative calculation approach)
- Incentive for efficiency
- Annual adjustment prevents over- or under-payment as utility costs change
- Better aligns with sound rate making principles
- Reduces simple payback

Distributed Solar Value Continuum



Value of Solar Rate

(annually adjusted, present value of 30-yr stream,
net on 1 bill, 2 meters, avoids cross-subsidy,
recovers cost of service, encourages efficiency)

Improving Solar Valuation

Strong NEM: Annual netting; remove limits for excess production, system size, total capacity (e.g., up to 10-15% of system)

AND

Good: Credit for excess = retail value (historical)

Better: Credit for excess = adj. PPA value (market test)

Best: Credit for generation = Value of Solar (present value of 30 yr stream)

Suggested Step-Wise Approach

1. Undertake Value of Solar Analysis
    - Index & improve net metering rate
    - Evaluate PPA offers
    - Index residential incentives
    - Index performance-based incentives (PBI)
2. Adopt VOS valuation & develop new tariff, modify billing
3. Improve VOS calculations & values

Common Questions

- What about intermittence?
- Does annual change make this unpredictable?
- Are valuation components subjective?
- What about lost revenues (stranded costs)?
- What about increasingly fixed/unavoidable costs?
- What happens when we get a lot of solar?
- Doesn't IRP take care of solar?

Thanks!

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