Getting to A Win-Win: Distributed Solar and Utility Cost Recovery

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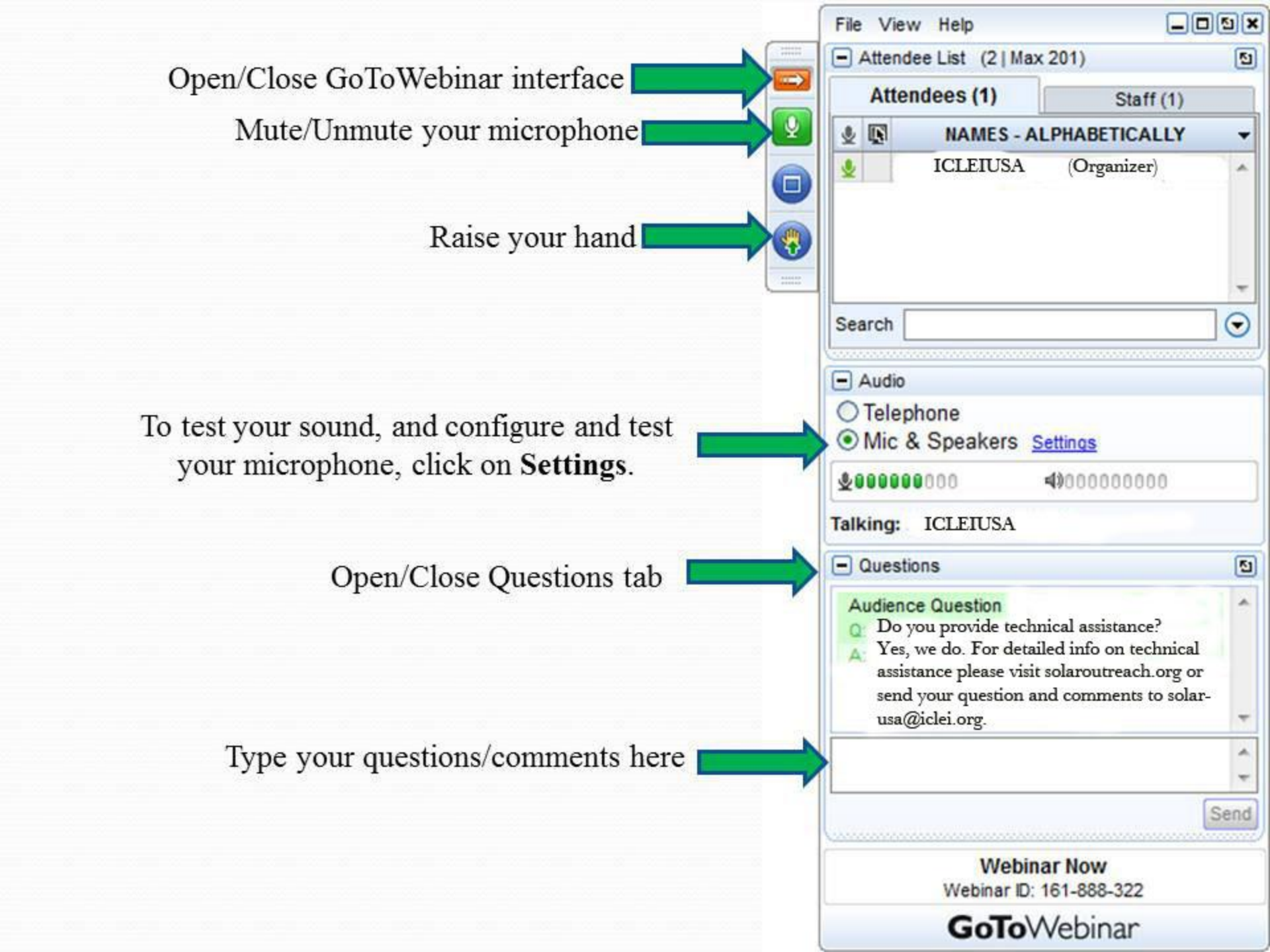
U.S. Department of Energy

November 5th, 2014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SunShot Solar Outreach Partnership

The SunShot Solar Outreach Partnership (SolarOPs) is a U.S. Department of Energy (DOE) program designed to increase the use and integration of solar energy in communities across the US.

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Technical Resources

Regional Workshops

One to One Assistance

Strategy Session

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Technical Resources

Helping Policymakers Understand Best Practices:

- Case Studies
- Fact Sheets
- How-to Guides
- Toolkits

www.solaroutreach.org

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Regional Workshops

Strategy Session

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Email solar-usa@iclei.org to request a 20 minute consultation

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Quickly get up to speed on key solar policy issues:

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Develop an implementation strategy for smart solar policy

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One to One Assistance

Receive customized technical support on implementation of smart solar policy

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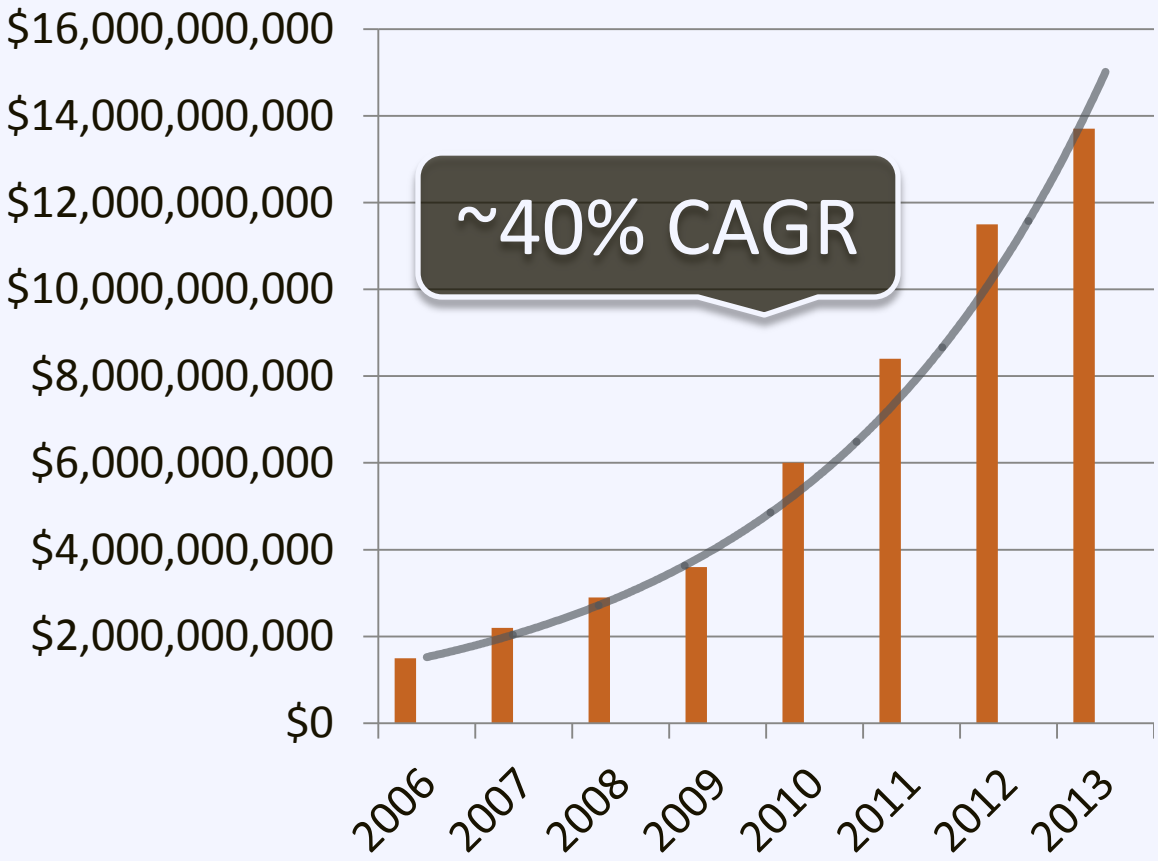
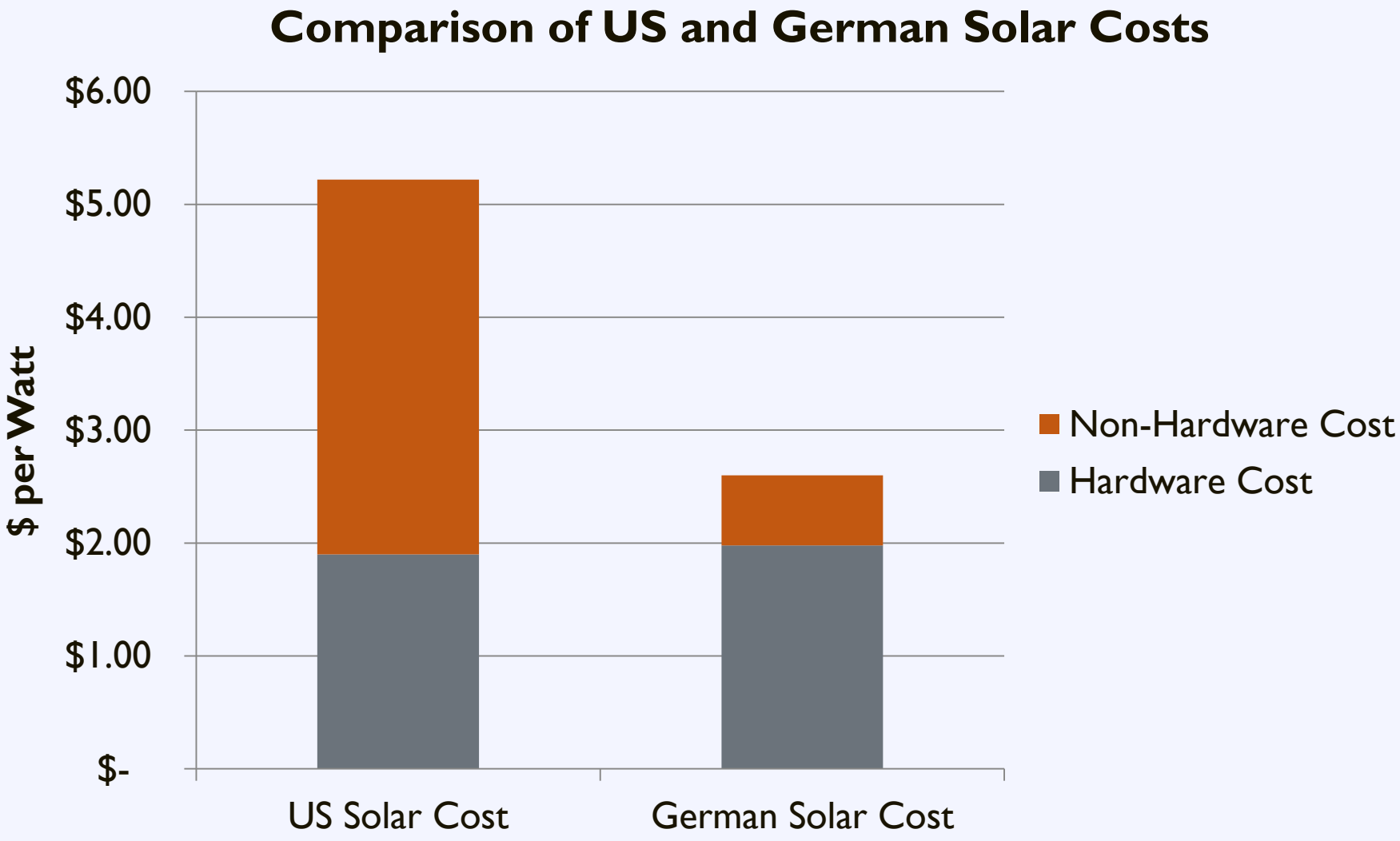
Solar Economic Growth



- Declining hardware costs
- New financing options
- Net metering incentives

Source: SEIA/GTM Research – 2009/2010/2011/2012 Year in Review Report
http://www.seia.org/research-resources/us-solar-market-insight

The Cost of Solar in the US



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Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
LBNL (http://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf)(http://www1.eere.energy.gov/solar/pdfs/sunshot_webinar_20130226.pdf)

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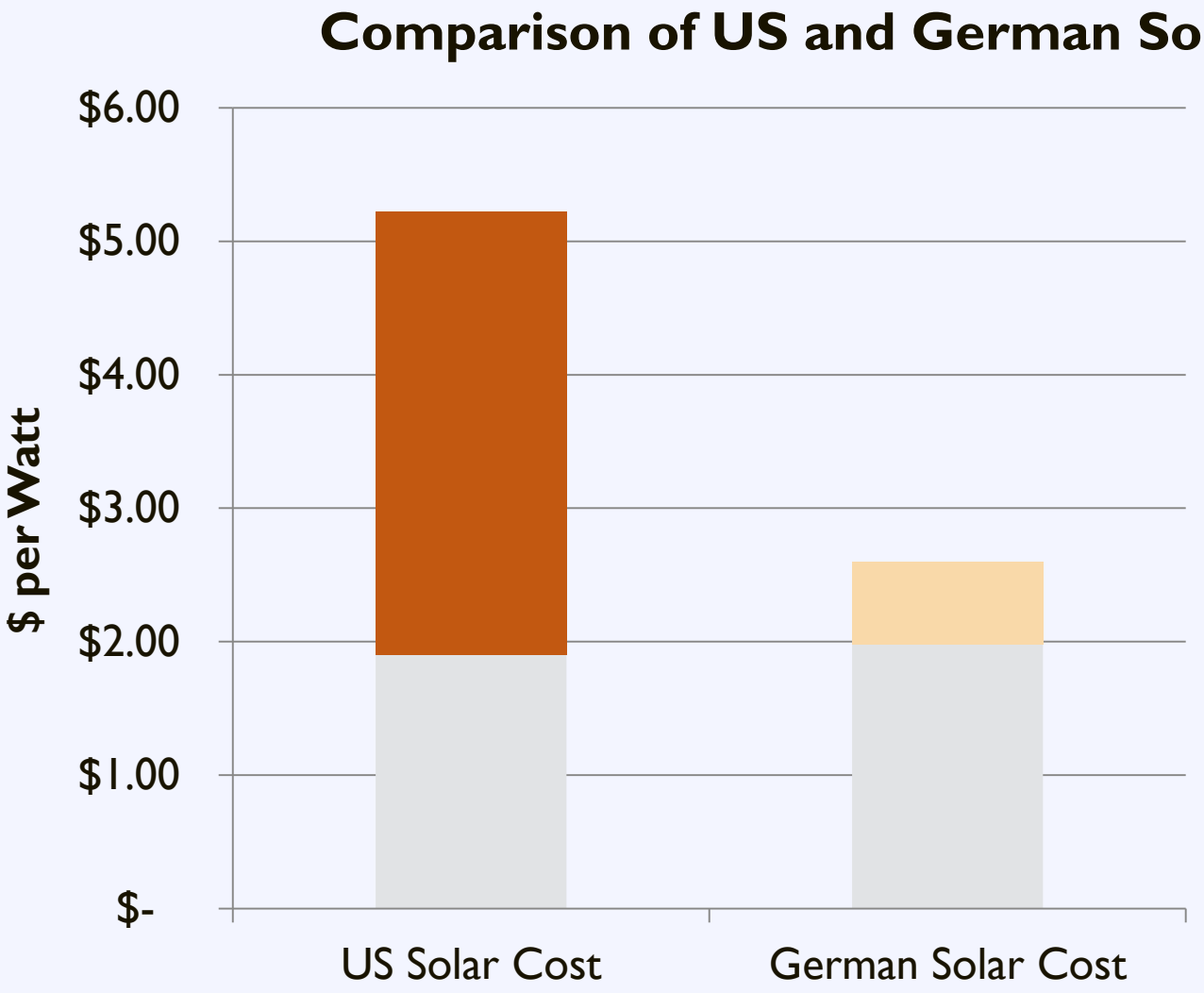

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Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
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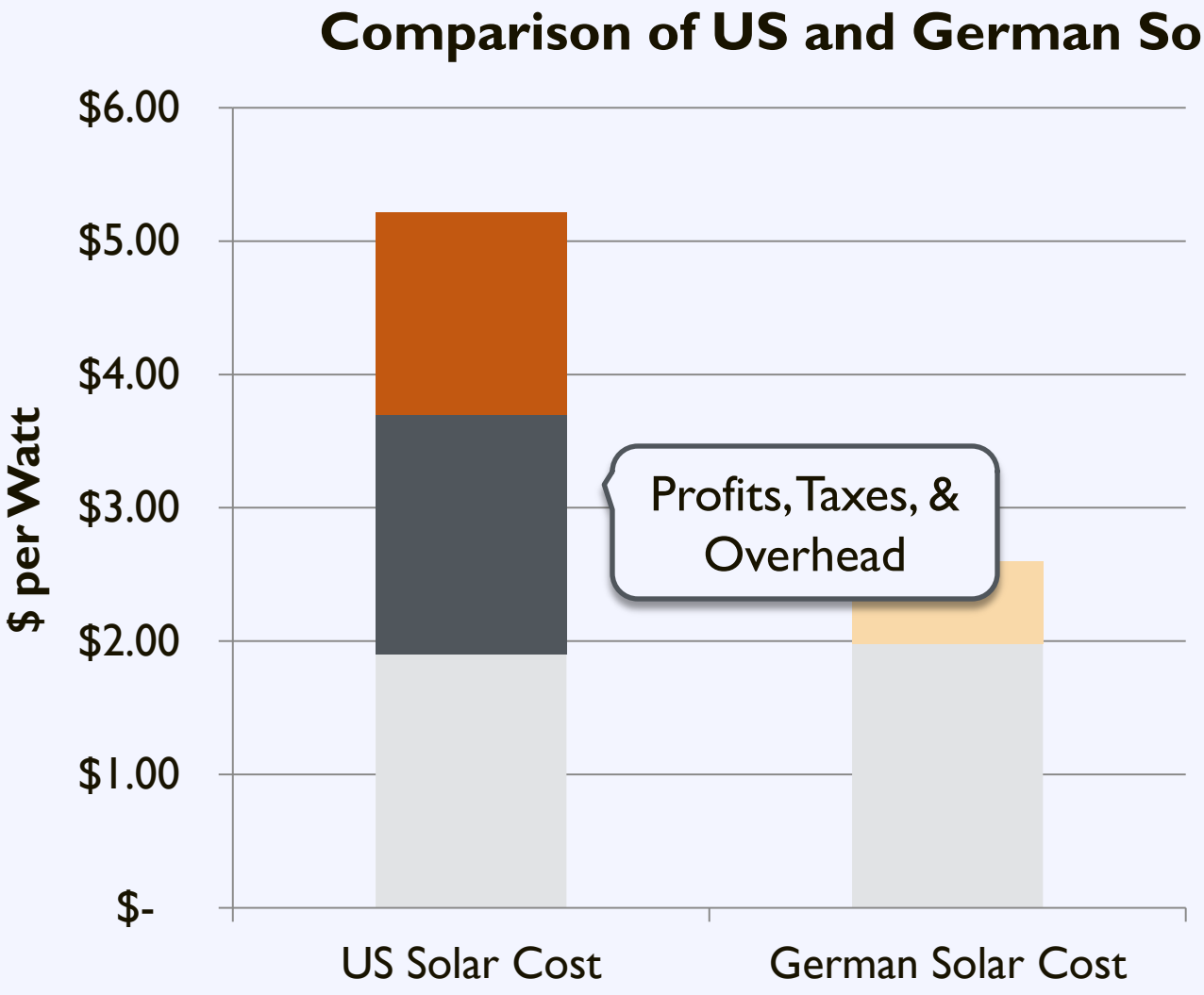

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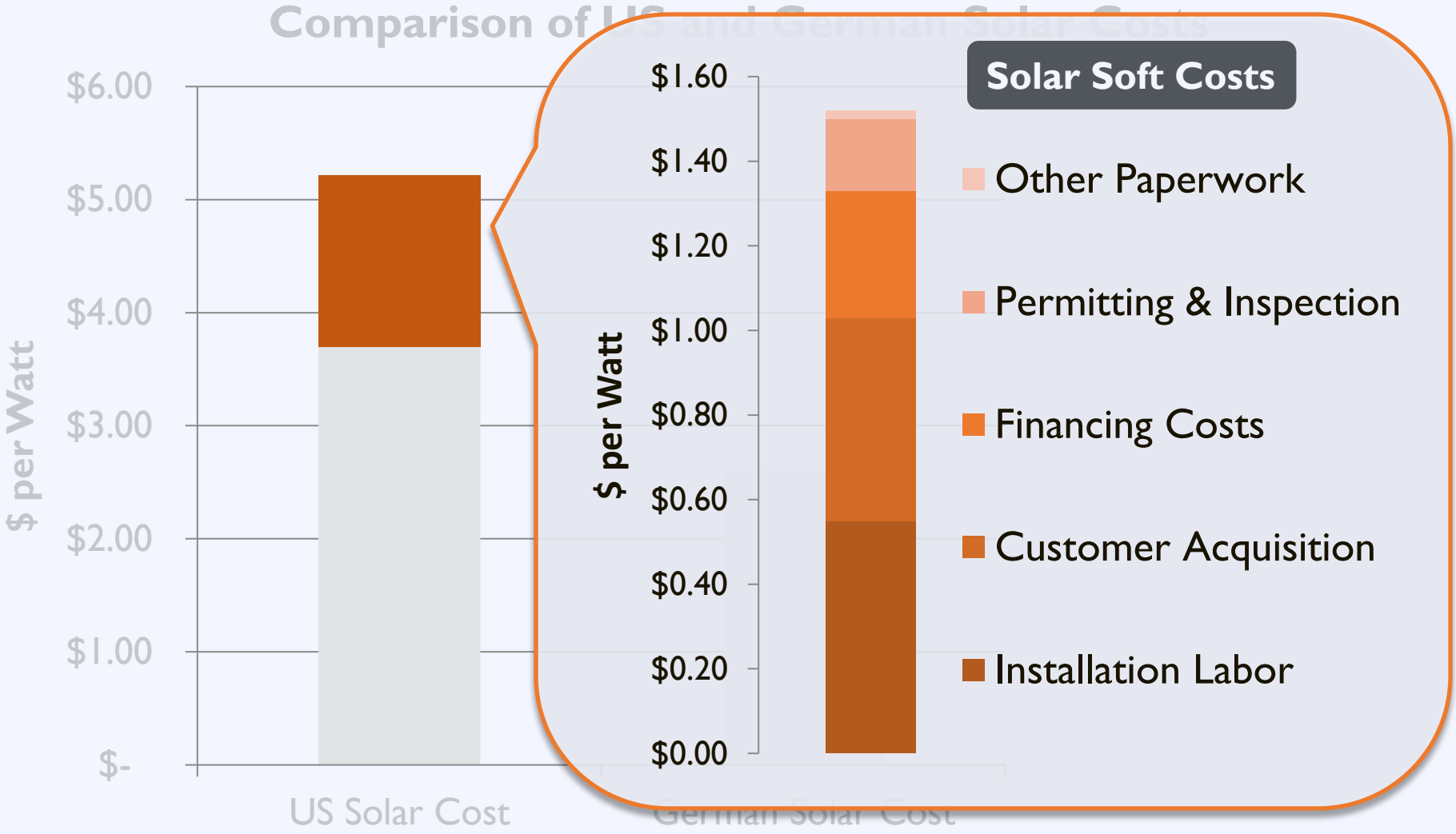

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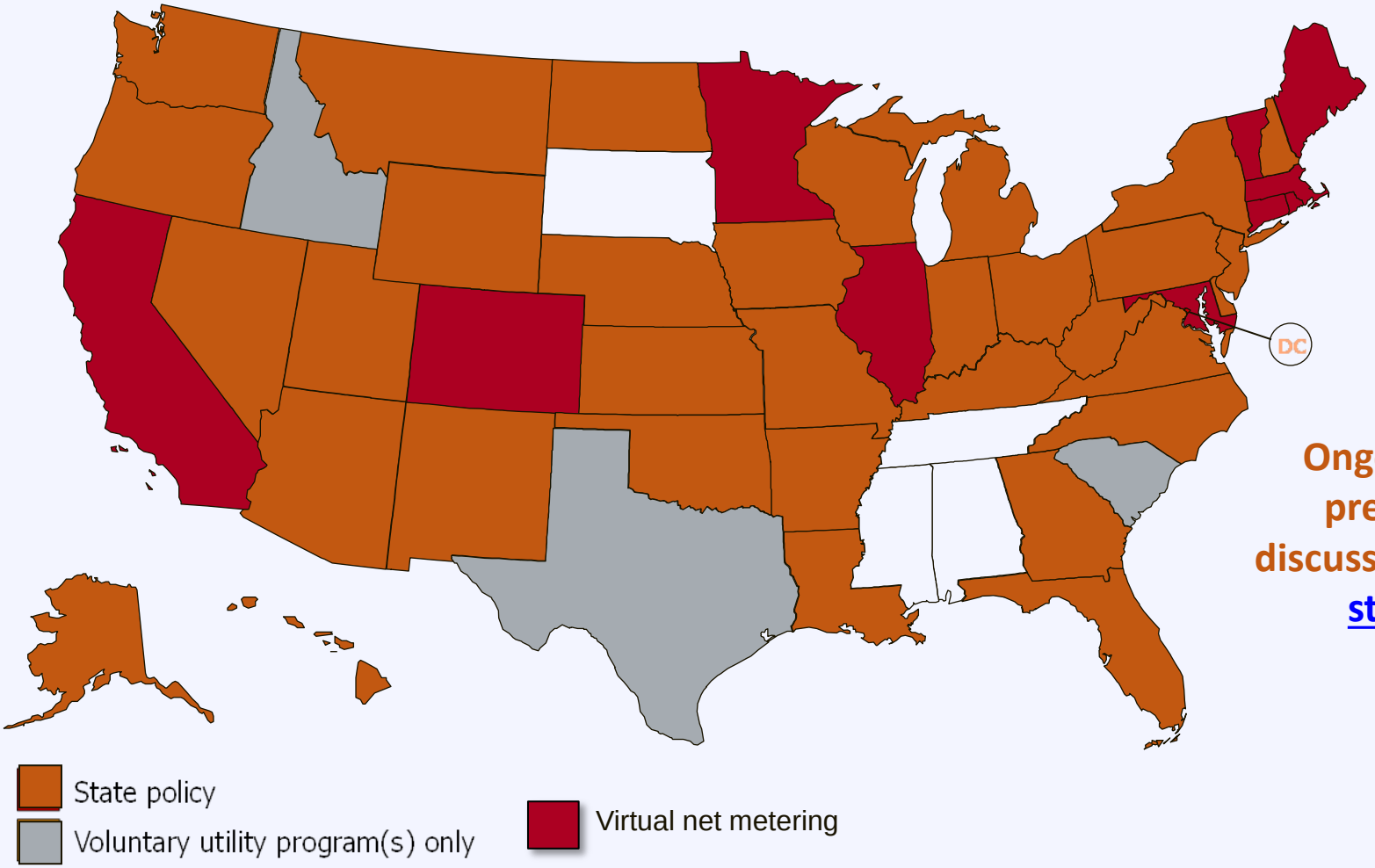
LBNL (http://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf)(http://www1.eere.energy.gov/solar/pdfs/sunshot_webinar_20130226.pdf)

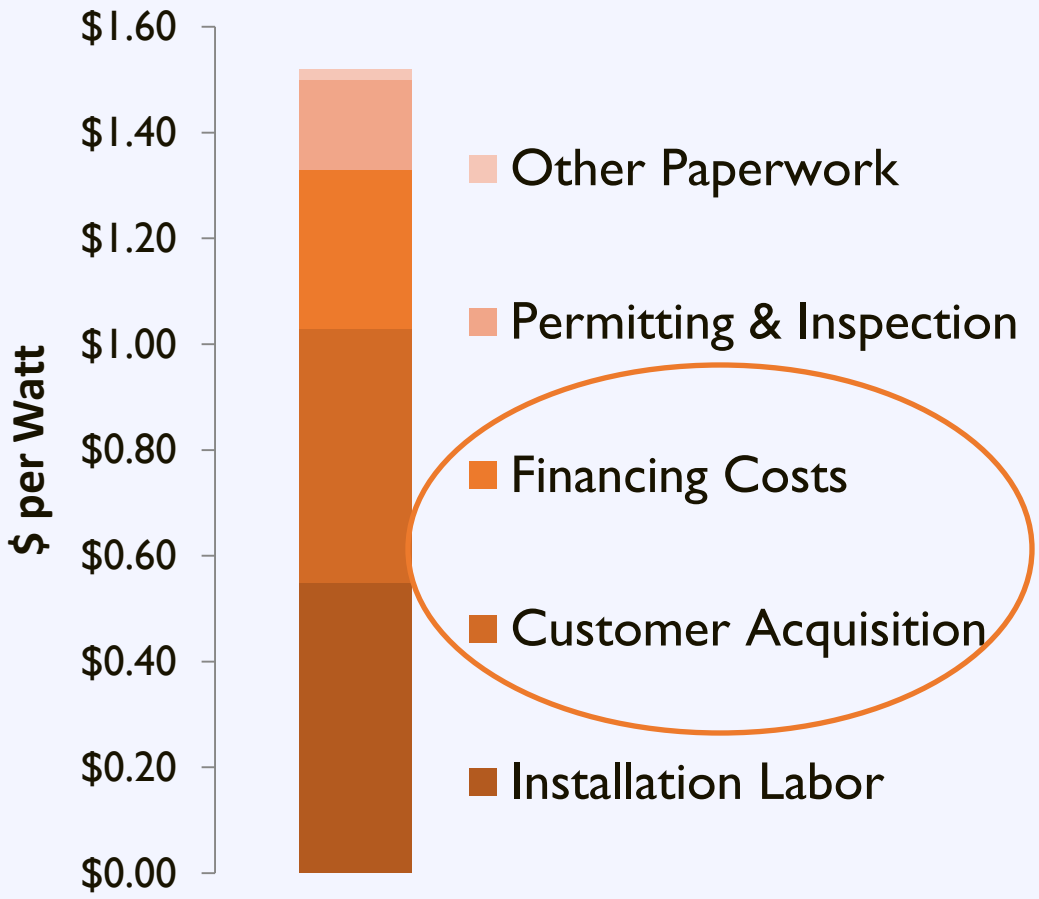
Net Energy Metering (NEM)



Ongoing or previous discussions in 24 states

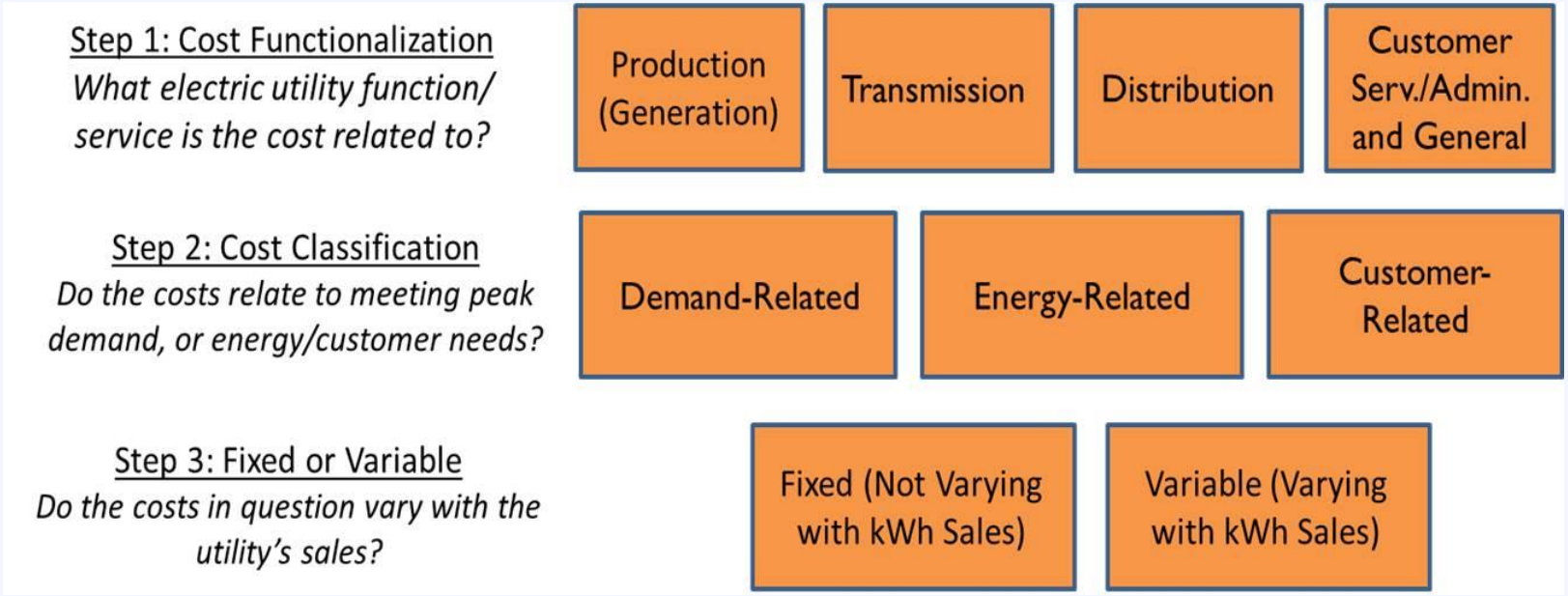
Source: Modified from DSIRE's 2013 Net Metering Map. (2014).

Soft Cost Impacts of NEM



- Changes to NEM could:
  - Impact customer acquisition & marketing costs
    - Charges reduced payback
    - Increased customer education
  - Increase Financing costs
    - Greater perceived risk by investors
    - Reliance on taxpayer funded or volatile incentives

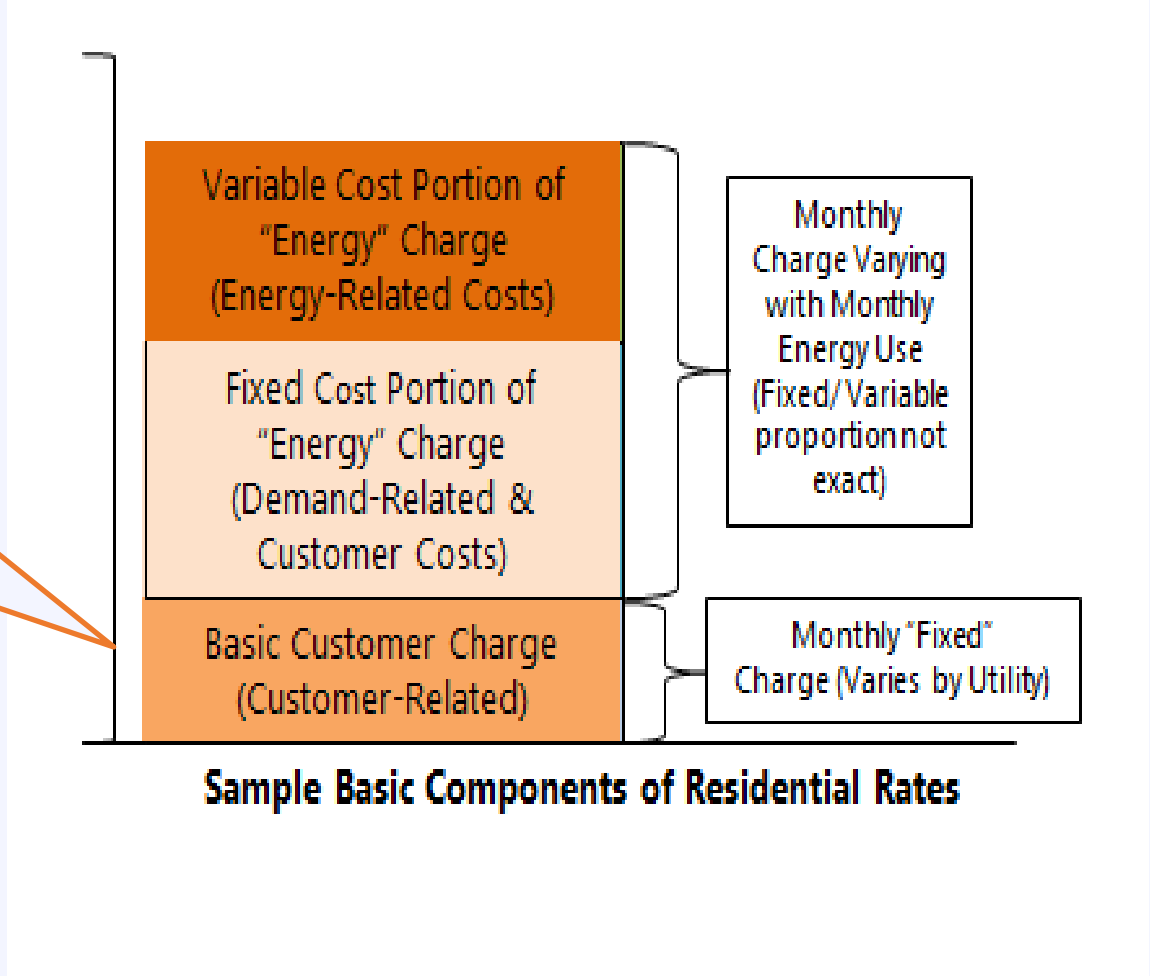
Utility Cost Classification



Source: National Association of Regulatory Utility Commissioners (NARUC) Cost Allocation Manual, 1992. Available for purchase only.

Net Metering and Utility Costs

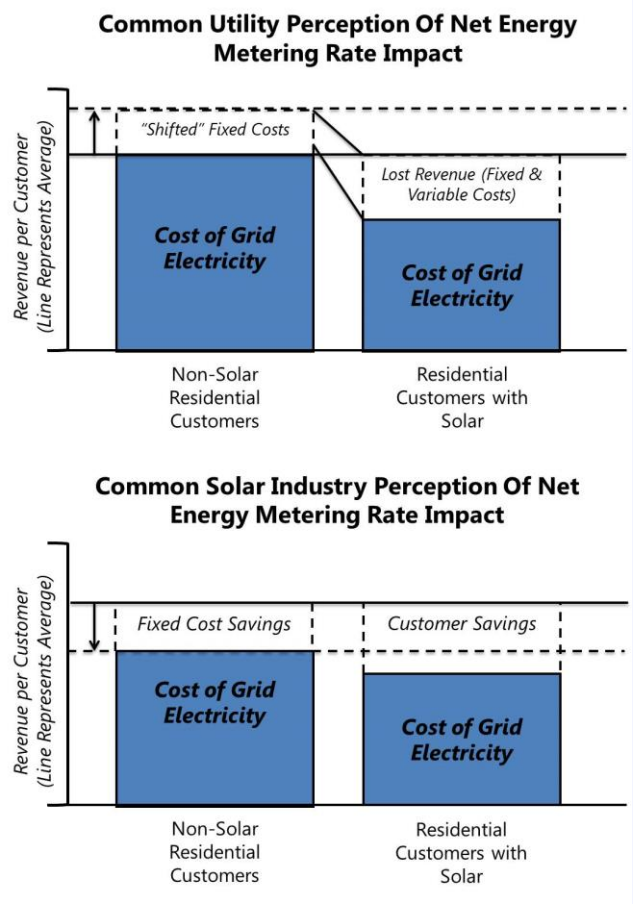
Not all fixed costs are captured by the basic customer charge



Dueling Views of Solar/NEM Rate Impact

All parties agree that more solar is good, but to stakeholders, net metering is:

- (Utilities/Allies) Unfair for a subset of customers that cannot "afford" it, and shifts costs to these customers because the "value of solar" is *less* than the retail rate.
- (Solar Advocates/Industry) Not enough at the retail rate, because the "value of solar" *meets or exceeds* the retail rate



Non-Solar Cost Shifting?

- Using solar cost-benefit analysis (CBA) is very useful for understanding the locational (and overall) value of PV for planning/IRP purposes.
- However, make sure to consider non-solar cost shifts and any that might result from NEM
- Examples of well-known (and broadly supported) non-solar cost shifts include:
  - Non-cost effective low income discount and efficiency programs
  - Industrial customer load "retention"/growth discounts
  - Discounts for senior citizens (or use of "medical baselines" in California)
  - Offering the same rates in areas with different "load densities" (e.g. for rural and urban customers)
  - Rates at average cost (instead of at the time-of-use).

A Cleaner, Clearer Approach: Focusing on *Objective* Utility Costs

Utility Cost Category	Fixed or Variable?	Examples
Demand-Related	Partially fixed, partially variable (varies with customer demand)	Share of power/"production" plant, T&D infrastructure costs.
Energy-Related	100% variable (varies with customer energy usage)	Share of power/"production" plant, T&D infrastructure costs, cost of fuel, other purely variable costs of producing each kWh of energy.
Customer-Related	Unavoidable, by definition	Cost of metering, billing, service drops, the purely unavoidable share of the distribution system.

Source: NARUC Utility Cost Allocation Manual, 1992.

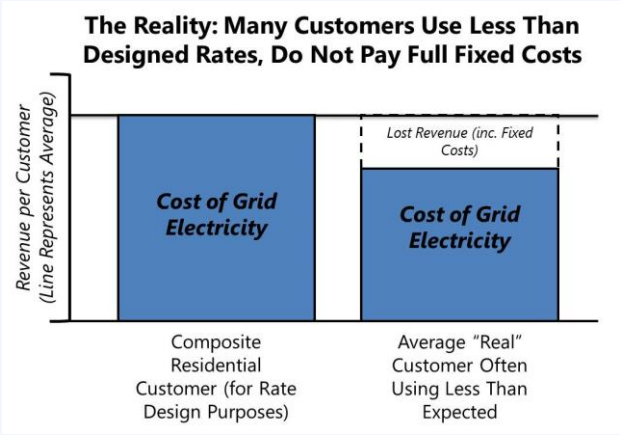
Regulatory & Rate Design Approaches for a Distributed Energy Age

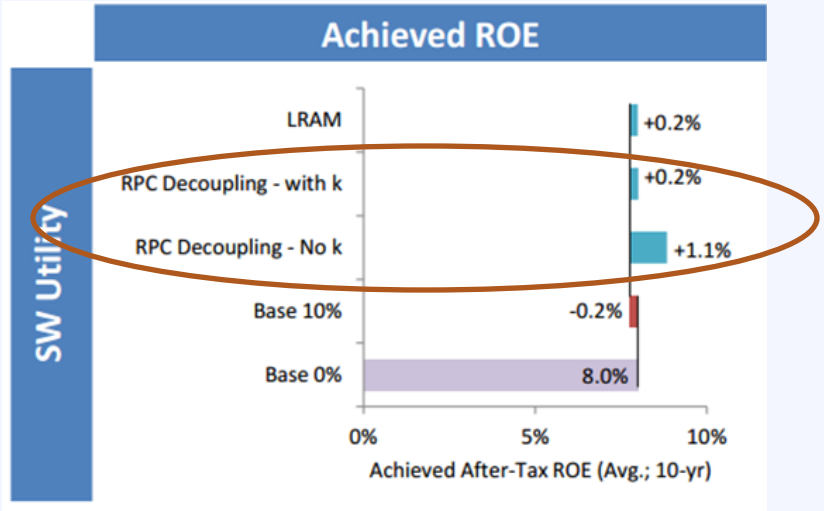
It is possible to keep retail NEM for the long term while raising net metering program caps, but with a three-step cost recovery approach:

1. Revenue Decoupling (With An Adjustable Return on Equity)
2. A "minimum monthly contribution"/minimum bill (assessed for all customers)
3. Rates that reflect the varying cost of electricity at different times of use

Step One: Utility Revenue Decoupling

- Without special shareholder incentives, non-utility owned distributed energy resources (DER) can (and has) reduced utility earnings.
- Applying a decoupling adjustment to all customers' rates (a great many of whom are using less and detracting from earnings) will:
  - Strengthen a utility's ongoing financial position;
  - Provide some breathing room with investors questioning their creditworthiness; and
  - Help them prepare for new roles (as a grid integrator or DER provider) and investments (in DER and intelligent grid infrastructure)

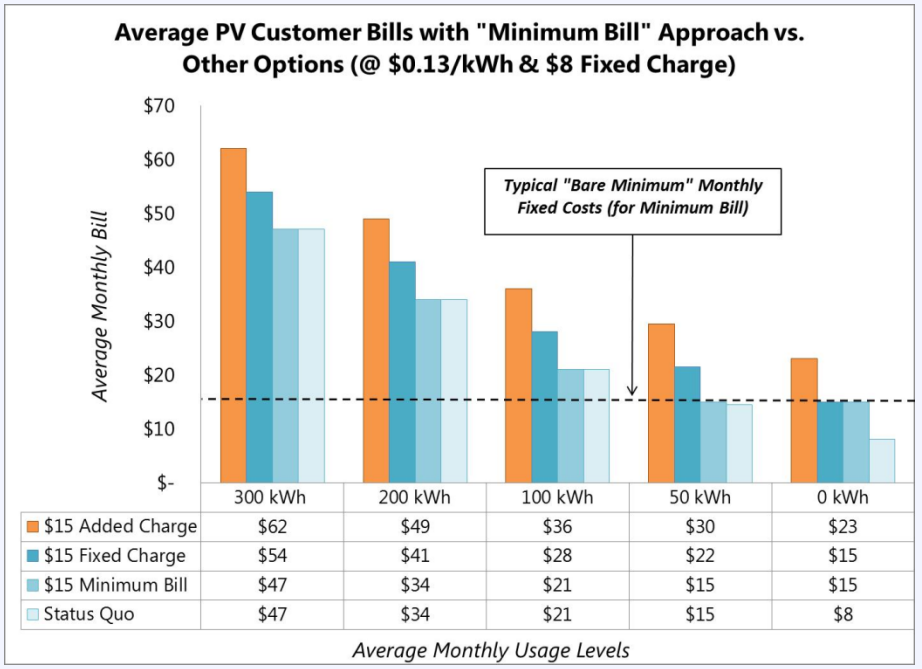




Source: Lawrence Berkeley National Laboratory analysis of utility net metering impacts (link)

Step Two: A Minimum Monthly Contribution/Bill

- While many customers must pay fixed "facilities" charges *regardless of their energy usage* (and thus can discourage certain forms of energy conservation), a minimum bill is a flexible "floor" for a utility bill that accounts for customer energy usage as well.
- A minimum bill captures critical **customer-related** revenue associated with fixed costs not varying at all with demand and energy needs that the utility must incur (e.g. metering, portions of the distribution system)
- Unlike fixed charges, flexible minimum bills ensure (along with decoupling) that customers do not overpay for these costs when NEM policies change.



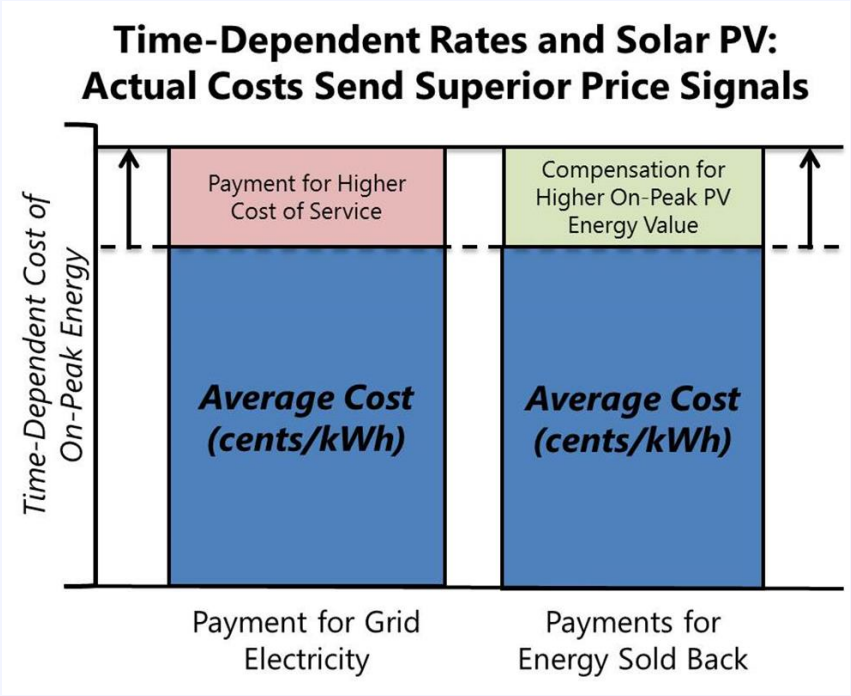
	300 kWh	200 kWh	100 kWh	50 kWh	0 kWh
$15 Added Charge	$62	$49	$36	$30	$23
$15 Fixed Charge	$54	$41	$28	$22	$15
$15 Minimum Bill	$47	$34	$21	$15	$15
Status Quo	$47	$34	$21	$15	$8

Source: Presentation at Solar Power International 2014, 22 October 2014

For an invaluable resource on utility costs, please see the National Association of Regulatory Utility Commissioners' (NARUC) *Electric Utility Cost Allocation Manual* (1992, available here.

Step Three: *Default* (& Volumetric) Time of Use Pricing

- Many customers who use electricity more evenly than others can create cost shifts
- Instead of using demand-based charges, utilities can design energy (kWh) charges that reflect time of use pricing that capture **demand and energy-related costs of service.**
- Thus, utilities can then pay an appropriate price for solar entering its system, while charging an appropriate price for the energy the customer cannot self-generate



Source: Presentation at Solar Power International 2014, 22 October 2014

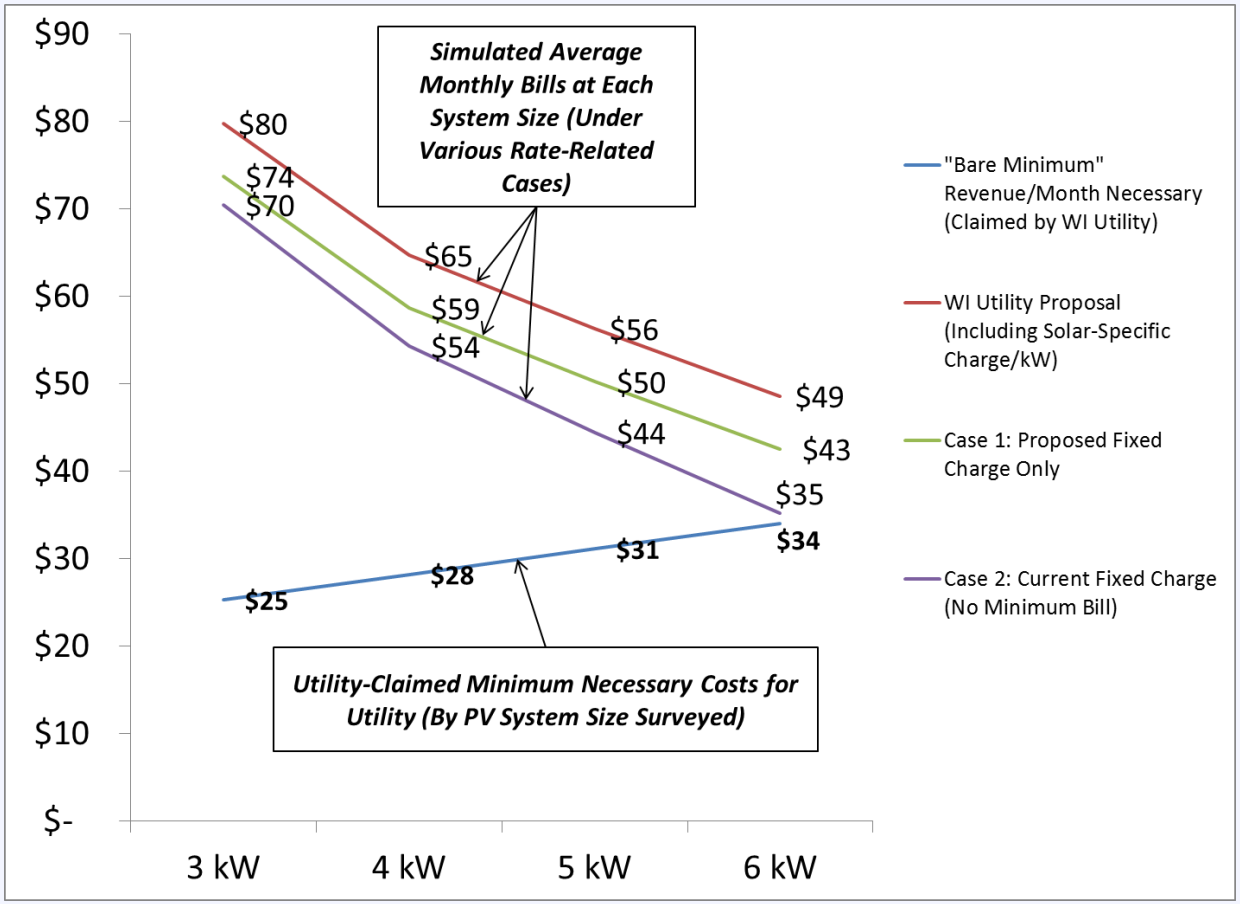
Our Three-Step Approach: Matching it to Utility Costs

Aspect of Proposed Cost Recovery Approach	Utility Costs Recoverable	Potential Residential "Billing Determinants"	Applicable Customers
Revenue Decoupling	Demand, Energy & Customer-Related	$/kWh, $/Customer/Month)	**All solar and non-solar customers**
Minimum Monthly Contribution/Bill	Customer-Related (or Demand-Related also, depending on design)	$/Customer/Month	
Default Time-of-Use Pricing	Demand-Related (or Energy-Related, if on-peak "energy" costs exceed retail rates)	$/kWh	

Case Study: Wisconsin NEM Debate

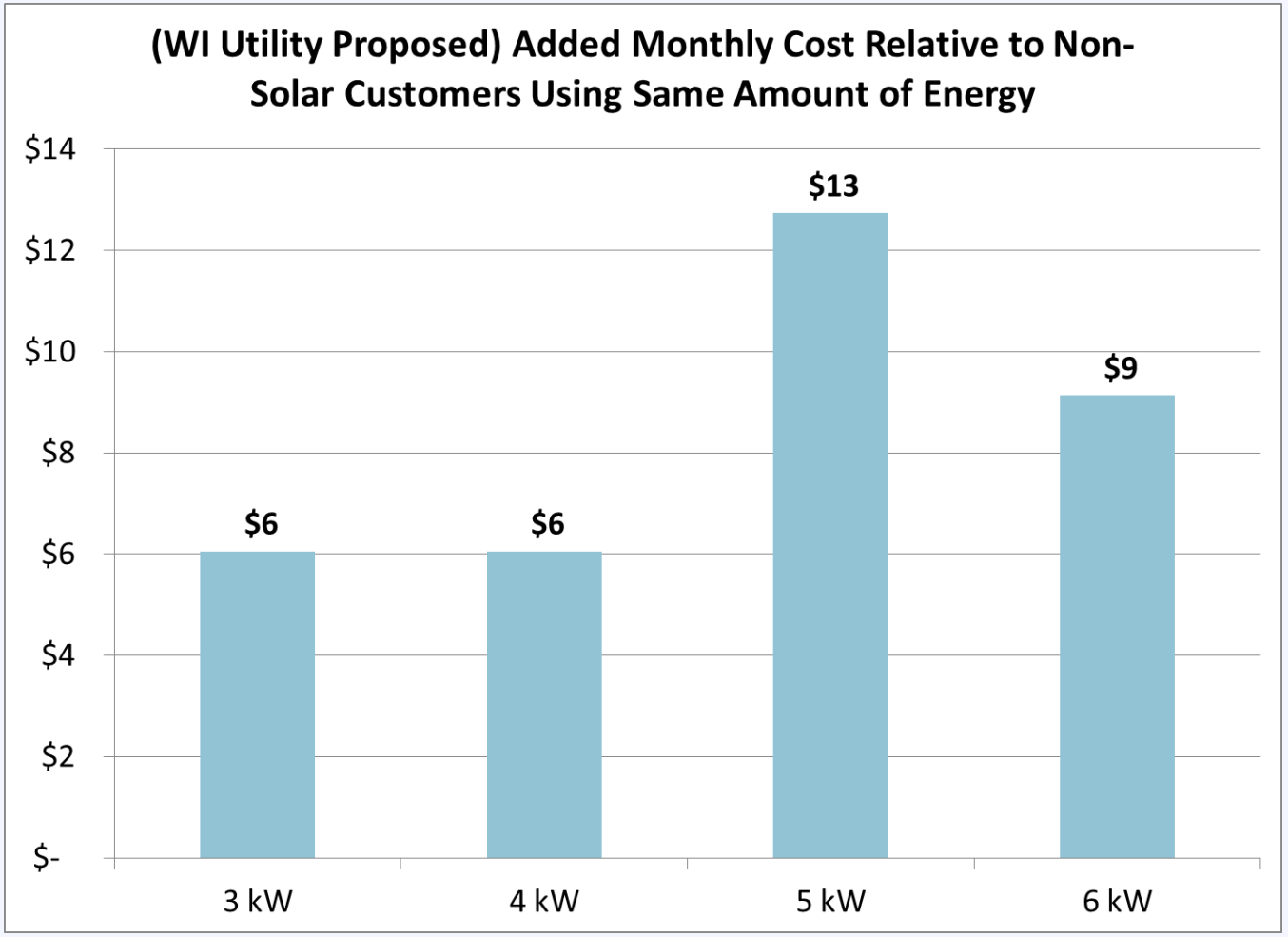
- We Energies, Madison Gas & Electric, and the Wisconsin Public Service Corporation proposed to:
  - Increase the fixed charge all customers pay
  - Apply added fixed cost charges to residential NEM customers, claiming that these customers do not pay their "bare minimum" costs, *and* disallow use of third-party owned systems for NEM customers
- However…
  - Our modeling of average (simulated) Milwaukee customers shows that a higher fixed charge was unnecessary to recover this utility's stated minimum necessary revenue.
  - In fact, the same non-solar customer using the same amount of energy would pay much less per month *than a solar customer*
    - Principle: If purpose is to ensure PV customers pay their "fair share", they should not pay significantly more than a customer with a similar usage pattern.

Case Study: Wisconsin NEM Debate



Source: NCCETC Case study to come. Analysis utilizes simulated load data and NREL's System Advisor Model

Case Study: Wisconsin NEM Debate



Source: NCCETC Case study to come. Analysis utilizes simulated load data and NREL's System Advisor Model

Other Policies Aligned with Cost Recovery

Tariff or Standard-Offer Contracts Model

- Customers provided fixed rate for all production
- Equitable "Value of Solar" rate
- Unclear tax implications

Target High-Value Installations

- Use of emerging technology to use distributed PV to offset grid investments
- Differentiated incentives
- Rhode Island System Reliability Solar Distributed Procurement Pilot

Virtual Net Metering and Community Solar

- Utility-sponsored programs can expand access PV and achieve state targets
- Lessens interconnection, metering and labor costs
- Customer engagement

Rhode Island Pilot Program: http://sos.ri.gov/documents/publicinfo/omdocs/minutes/6154/2014/36919.pdf
Vermont SPEED Standard Offer Policy: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=VT36F

Soft Cost Reductions

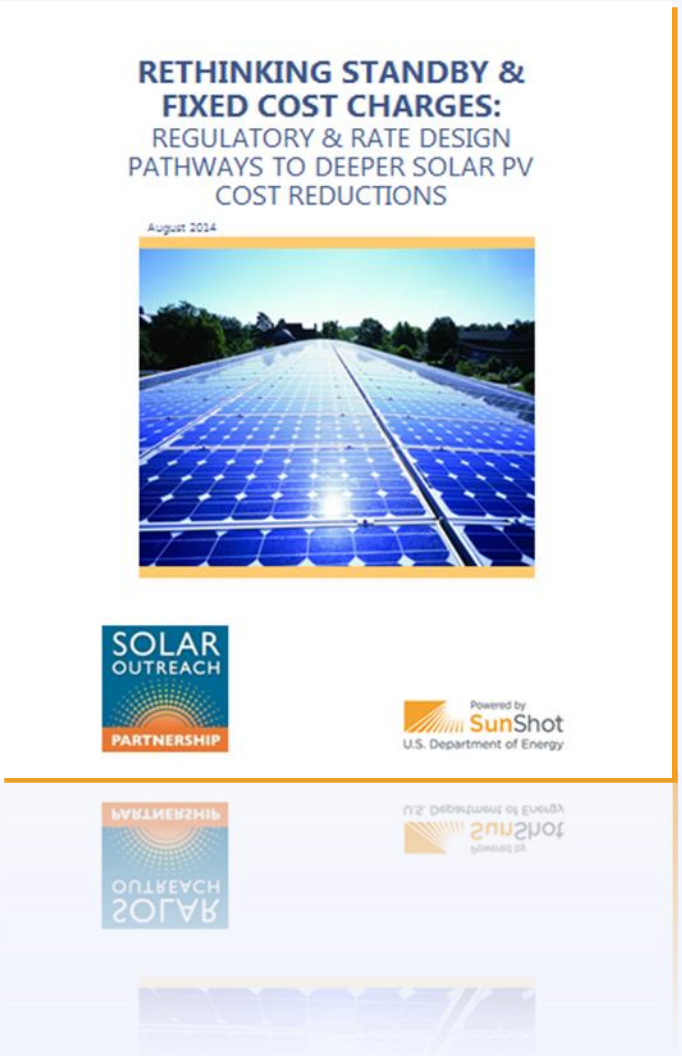
- Equitable Fixed Cost Recovery- Stable and transparent
- Tariff Structure- 100% of output sold -> investor reassurance
- Virtual Net Metering- Larger systems with lower $/W, new loan products

- Equitable Fixed Cost Recovery – Encourage consumers and prevent erosion of savings
- Virtual Net Metering- Pathway for additional customers

Suggested Best Practices

- Reform all rates, not just solar customer rates.
  - Important to look holistically at all of the cost shifts "baked in" to customer rates (since many are much larger than NEM);
- Ensure that actual customer billing data backs up requests to change net metering rules;
- Develop many rate options for solar customers, rather than forcing them onto specific rate schedules; and
- Develop an approach that matches with utility & PV interests.

Our SolarOPs Report



Rethinking Standby and Fixed Cost Charges: Regulatory and Rate Design Pathways to Deeper Solar PV Cost Reductions

Available here

Cost-Free, Custom Half-Day Solar Workshops for Local Governments

The NC Clean Energy Technology Center, the home of the (DSIRE) project, is funded to offer cost-free half-day workshops on solar policy for local governments.

Workshops cover 1) what solar policies already exist in your community, 2) policies that are proven to cut the cost of solar and 3) how much money enacting those policies will save taxpayers and customers and how many jobs they could create.

Please contact Jim Kennerly (jdkenne2@ncsu.edu) or Autumn Proudlove (afproudl@ncsu.edu) to sign up today!

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Questions?

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03/12/14 – Utility Community Solar

04/16/14 – Job and Economic Impact of Solar

05 – 08/14 – Solar Permitting & Inspection Webinar Series

09/17/14 – Solar for All: Minimum Costs to Local Governments and Maximum Solar for Their Communities