

Rooftop Solar: What It Is, Where It's Going, and How Utilities Can Manage

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Major Drivers of Rooftop Solar Growth

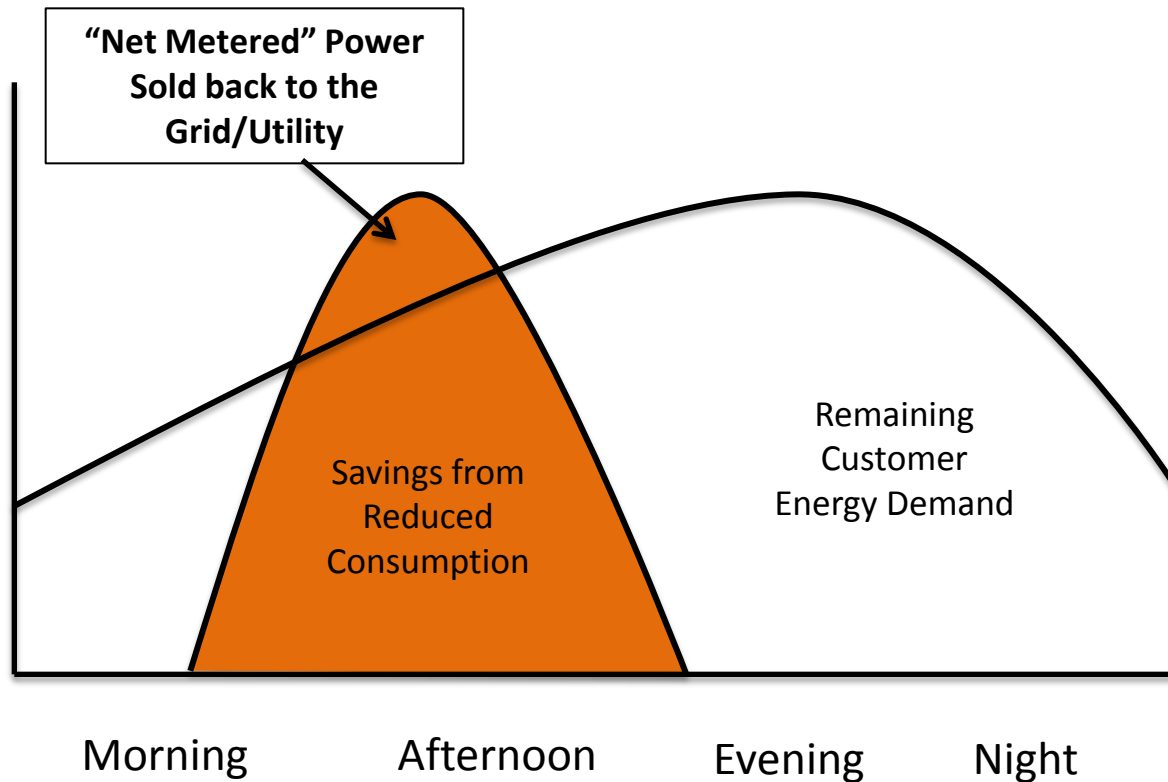
- Increasing utility rates from upswing in power plant construction and infrastructure investment;
- Significant cost reductions in solar manufacturing, particularly in China;
- Supportive policies (government/utility incentives, renewable portfolio standards)
- But most importantly...
 - **Net Metering.**



What is Net Metering?

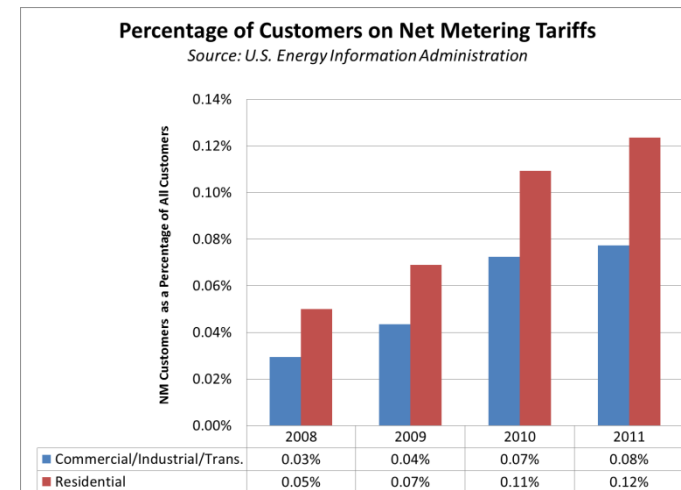
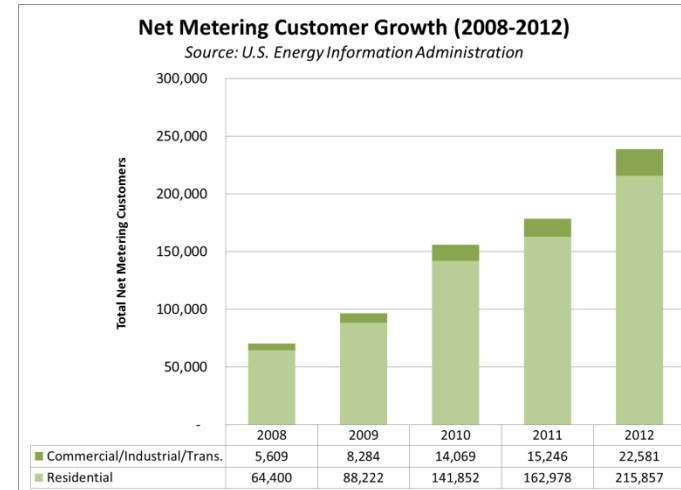
- Customers that own their own renewable energy generation can sell the power that exceeds their consumption back to the utility, typically at the retail rate.
- The utility is required to accept the power, subject to size, capacity and subscription limits.
- Vast majority of net metering customers are rooftop solar customers.
- Policy is in force in 43 states.
- For more information about policies such as net metering, please visit the Database of State Incentives for Renewables and Efficiency (DSIRE) at [dsireusa.org](https://www.dsireusa.org).

How Net Metering Works (Cont'd)

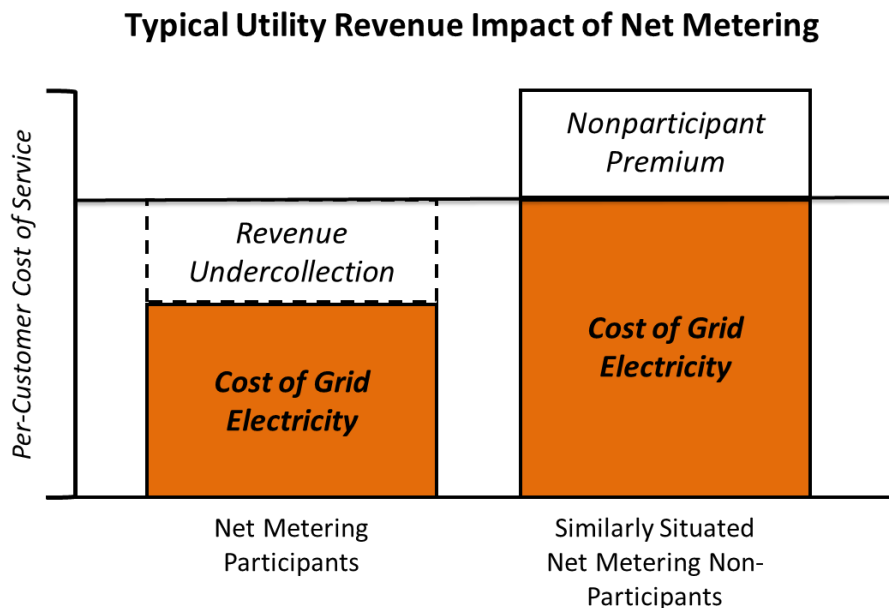


Status/Performance of Net Metering Nationwide

- Residential and non-residential net metering customers have **quadrupled** since 2008.
- However, total number of customers choosing to net meter is at or near **0.1%, or 1/1000th** of all customers.
- Nevertheless, solar PV's breakout potential could pose risks to the existing utility business model.



Utilities' View of Potential Impact of Broad-Scale Adoption of Net Metering



- While net metering customers can enjoy savings, reductions in their electric bills can often lead to utilities not recovering sufficient revenue to cover their fixed costs.
- Consequently, unrecovered fixed costs may increase for non-participants.
- Major increases in net metering could lead to reduced utility revenue and could scare away investors.

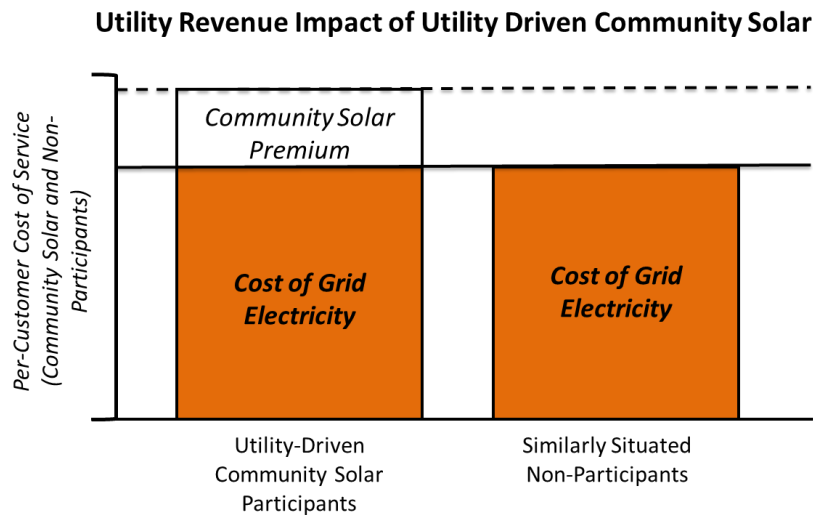


Pro-Solar, Pro-Customer Utility Responses to Rooftop Solar's "Disruptive Challenge"

- Understand what customers want and why they want solar. (e.g. environmental consciousness, desire for electric bill savings, etc.)
- Design programs that respond to those wants and needs.
- Pay for the true and comprehensive "value of solar" in order to ensure that non-participants do not shoulder an excessive burden.



Alternative #1: Community Solar



- The utility can sell “shares” of a larger solar PV system at a premium to its customers interested in paying more for solar.
- Good for customers interested in paying more to be environmentally conscious, etc.
- This can ensure that other customers do not pay for solar, and allow customers that can’t install solar to “own” solar.



Community Solar Programs Nationwide



Source: Sacramento Municipal Utility District (SMUD)



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Celebrating 25 Years

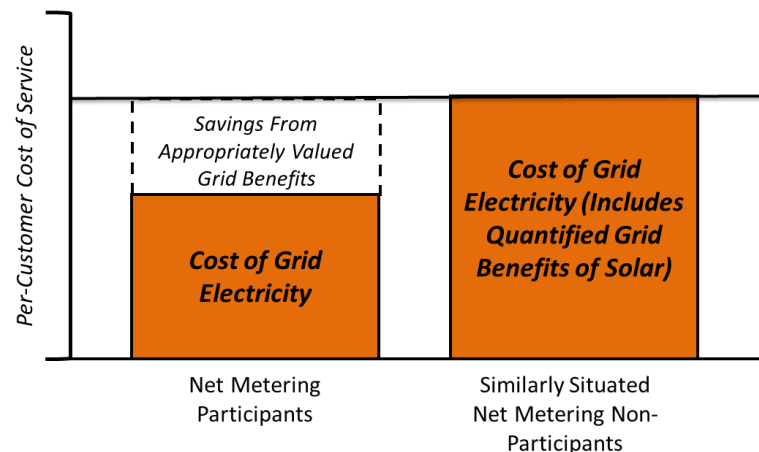
Alternative #2: A “Value of Solar” Strategy

- Instead of paying the retail rate for net metered energy, utilities can adopt strategies to pay a rate that is the sum of the costs and benefits to the grid of solar PV.
- This allows the “subsidy” to solar to be reduced to zero, as customers will be paying for the real value of solar PV.
- VOS Adopters
 - State of Minnesota, City of Austin, TX

Benefits to the Utility	Costs to the Utility
Avoided Energy Purchases	NEM Bill Credits
Avoided T&D Line Losses	Program Administration
Avoided Capacity Purchases	
Avoided T&D Investments and O&M	
Environmental Benefits—NO _x , SO _x , PM, & CO ₂	
Natural Gas Market Price Impacts	
Avoided RPS Generation Purchases	
Reliability Benefits	

Benefits and Costs of Solar to an Electric Utility.
 Source: Solar America Board for Codes and Standards (SolarABCs).

Utility Revenue Impact of Value of Solar-Based Net Metering



Reliability and Rooftop Solar

- Current rooftop solar penetrations remain very low, which reduces reliability risk associated with solar, and will remain low for a long time.
- High penetrations (15% or more, particularly on specific circuits) could require the use of grid-tied storage resources, or reliance on existing plants that can power up (ramp) quickly
- However, some studies show solar PV can provide voltage support on individual circuits



Thank You!

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