

North America

Alternative Energy | Solar Power

Utilities Nationwide Adjust Rate Designs to Meet Changing Customer Demand

Increasing Levels of Residential Solar PV Leading to New Customer Rate Policies

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Policy Brief

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Key Takeaways:

- Utilities are increasingly pursuing rate design reform to earn revenue as kilowatt-hour demand growth flattens
- Residential solar PV installation growth is supported by installation cost declines, further impacting utility revenues
- The fixed charge and net energy metering NEM compensation debate will continue as utilities fight for sustained revenue streams and cost-of-service recovery

Entities Mentioned:

- Arizona Corporation Commission
- Arizona Public Service Company
- California Public Utilities Commission
- Madison Gas & Electric
- Minnesota Department of Commerce
- Minnesota Public Utilities Commission
- Pacific Gas & Electric
- Wisconsin Electric Power Company (WE Energies)
- Wisconsin Public Service Commission

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[Solar Energy Compensation Arguments Intensify as Utilities Aim to Recover Fixed Costs](#)

Utility Rate Design Shifting to Cover Fixed Costs

Utility revenues are traditionally tied to delivered electricity. However, increasing levels of distributed generation (DG) resources and flattening overall energy demand growth – kilowatt-hours (kWh) – have disrupted this revenue stream. Despite a slowing kWh demand growth, momentary system peak demand – kilowatts (kW) – continues to grow. To address this, many utilities are reconsidering their rate structures to recover costs incurred to provide service and build-out for peak demand. Such rate considerations have included increasing-block pricing (IBP), time of use (TOU) rates, demand charges, and increased fixed charges (Figure 1). The IBP and TOU structures aim to recover costs from high-use customers, and those that demand more energy during peak – mid- to late-afternoon – times.

Figure 1 – Electricity Rate Plan Structures and Charges

| Plan | Summary |
|----------------------------|--|
| Increasing-Block Pricing | The Increasing-Block Pricing (IBP) structure sets higher energy rates for customers as they increase usage above a baseline amount over a billing period. This structure can vary significantly in amount of pricing blocks and block-rate assignment. <i>Ex: California’s Pacific Gas & Electric uses the IBP structure</i> |
| Time of Use | Time of Use (TOU) energy rates vary depending on the time of day and season, and aim to better reflect the real-time costs of generation and transmission. These rates are generally lowest during low demand, off-peak times – 9pm to 8am – and increase during partial-peak and peak times between 8am and 9pm. <i>Ex: Arizona Public Service (APS) offers two TOU plans</i> |
| Demand Charge | Demand charges are based on the customer’s highest average energy use – often over a 15-minute period – during a billing period (typically one month). This charge is often applied to larger business or commercial customers, and, for customers with high momentary energy use, it can make up a significant portion of a bill when compared to a lower-peak, more consistent user. While this charge was previously limited by metering technology, advanced metering infrastructure (AMI) improvements have facilitated its adoption. <i>Ex: Wisconsin’s WE Energies employs a demand charge for customers with greater than 10,000 kWh of energy use per month.</i> |
| Fixed Charges/Minimum Bill | Utilities use fixed charges to recoup various non-energy costs. However, these charges can be netted to zero for solar photovoltaic (PV)-owning customers in months of high on-site generation. To avoid this, some utilities use a minimum bill charge and carry-forward bill credits in months of net-positive on-site generation. <i>Ex: APS charges \$0.70 per kW to solar customers; PG&E charges a minimum bill</i> |

Source: EnerKnol Data, state websites

Utilities can also recover costs from solar PV customers with surplus power generation through net energy metering (NEM). NEM is the long-standing rate structure – offered in 43 states – that allows solar PV owners to feed surplus produced electricity back to the grid and receive compensation for doing so. When a solar PV customer’s generation is higher than consumption in a given month, the customer is often given either – depending on the state – a volumetric (energy use) bill credit, a cash credit at the full retail rate, or a cash credit at a lower “avoided cost” or wholesale rate. Retail rate compensation is

an attractive incentive for solar customers to pursue NEM, however this rate can cause utilities to not recover some transmission and distribution (T&D) costs, which are often included in the retail rate. Utilities in high residential solar penetration states of California and Arizona – PG&E and Arizona Public Service (APS) – offer NEM customers wholesale rate compensation. Similar to the demand charge, the need for advanced metering infrastructure is one factor that can limit wide-scale NEM adoption.

Utilities in AZ and CA compensate NEM customers at the wholesale rate

An alternate rate design for solar PV owners, the value of solar tariff (VOST) methodology is based on how much solar power is worth to the utility, its ratepayers, society, and the environment. Under the VOST, customers with solar PV are billed for full energy use at their retail rate and given bill credits for produced energy at a fixed VOST rate. On April 1, 2014, the Minnesota Public Utilities Commission (PUC) approved the Minnesota Department of Commerce’s finalized VOST methodology (Docket No. E-999/M-14-65), making Minnesota the first state to implement this new solar energy compensation methodology.

Minnesota approved the first state-wide VOST methodology on April 1, 2014

Residential Solar PV Leading to Lost Utility Revenues

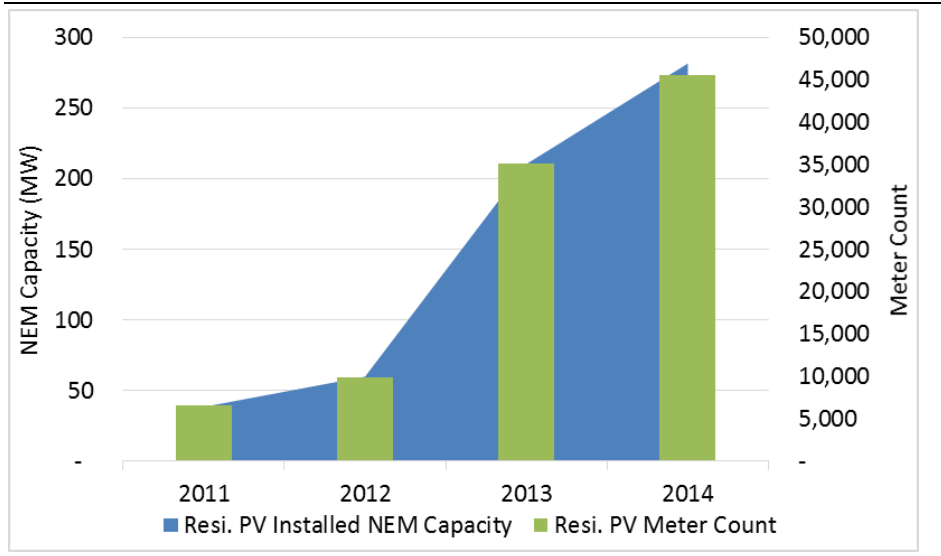
Currently, 43 states and Washington D.C. use NEM to compensate utility customers for their surplus on-site energy generation. However, utilities will continue to assess respective NEM and rate policies as customers continue to install net-metered PV capacity and sell energy back onto the grid. Rate design reform by utilities is ongoing in many states, especially those with high levels of customer-sited DG. Arizona and California are leading solar PV states and have utilities with ongoing rate design considerations, but utilities in the relatively low solar-PV state of Wisconsin are also addressing the issue.

Arizona’s Largest Utility Fighting for High Fixed Charge

The Arizona Public Service Company (APS) – the state’s largest utility – offers a variety of residential rate plans, including a “standard” 4-tier IBP structure, two TOU plans, and a demand response plan; each approved in July 2012, and in effect since April 2013. APS also offers experimental electric vehicle TOU and various renewable net billing and net metering plans. Fixed charges, such as environmental benefits, various administrative costs, and a lost fixed recovery charge (LFRC) make up approximately 15 percent of a summer bill, according to APS. The Arizona Corporation Commission (ACC) approved the new LFRC fixed charge in 2012 to partially cover cost of the state’s 22 percent reduction in electricity sales through energy efficiency improvement goal by 2020. If customers continue to offset energy charges with on-site solar PV generation (Figure 2), APS may turn to increased LFRC or other charges to recoup lost revenue.

APS utilizes a lost fixed recover charge

Figure 2 – Arizona NEM Capacity and Meter Count*



Source: EnerKnol analysis of EIA data

*EIA data from a statistically chosen sample of electric utilities in the United States

In addition to customer-wide fixed charges, APS has lobbied for residential solar PV NEM reform, mainly through a fixed bill charge. In November 2013, the Arizona Corporation Commission (ACC) approved a fixed fee of \$0.70 per kW for solar rooftop owners effective January 1, 2014. The rate adds up to an average of \$5 per month, and is much lower than the APS-proposed options of a fixed monthly charge of approximately \$50 per month, or a bill credit for energy generated at the Southwest (Palo Verde) hub wholesale rate. Although rate design will be discussed at length over the next years, APS will likely have to wait until July 1, 2016 – its next rate case – to amend its net metering design.

The lower wholesale rate, as opposed to retail rate NEM compensation is arguably more appropriate, as NEM customers are simply providing electricity back to the grid, but not the T&D and other utility services.

California Utilities Employ a Minimum Bill Charge

Similar to APS, California’s largest utility, Pacific Gas & Electric (PG&E), generally offers residents a 4-tier IBP or combined IBP/TOU plan. PG&E does not break-out as many billing line-items as Arizona’s APS; however, the utility does include public goods programs and nuclear decommissioning charges to cover costs of current and previous operations.

To recover T&D costs, PG&E also issues a minimum bill charge of \$4-5 per month to all residential customers. Also, NEM customers are billed a monthly minimum charge in months of surplus electricity generation. However, these are primarily billed on an annual “true-up” basis for volumetric energy use. Under Assembly Bill (AB) 920, NEM customers can receive payment or retain credit for excess power generated over the year, through the “net surplus compensation” program. The payment compensation rate is based on a 12-month average of spot market (wholesale) prices, not the retail rate. The

California’s PG&E uses a minimum bill charge for NEM customers

change to an annual NEM true-up bill necessitates customers to closely monitor their monthly bills – despite not being charged – to keep track of their electricity production/consumption levels to avoid a potentially high end-of-year bill.

California’s Assembly Bill (AB) 327 calls for the California PUC to develop a NEM successor tariff that (1) ensures customer-sited distributed generation continues to sustainably grow; (2) is based on costs and benefits of the renewable generation facility; and (3) has benefits to all customers and the electrical system, with approximately equal costs. The new tariff draft is due by December 31, 2015 and will be implemented on either July 1, 2017, or when the state reaches its 5 percent NEM cap.

Wisconsin Utilities Increasing Fixed Costs

In Wisconsin, Madison Gas & Electric (MG&E) and Wisconsin Electric Power Company (WE Energies) currently offer residential customers flat-rate or TOU electricity rate plans. These rates include a fixed “Customer” or “Facilities” charge. On January 31, 2014, MG&E and WE Energies requested significant fixed charge increases for their customers. The charge increases were accompanied by a reduced energy charge. In November 2014, the Wisconsin Public Service Commission (PSC) approved fixed charge increases for all MG&E and WE Energies residential customers. In 2015, the monthly fixed charge for MG&E customers rises from approximately \$10 to \$19, and WE Energies customers’ fixed charge will rise from approximately \$9 to \$16 per month.

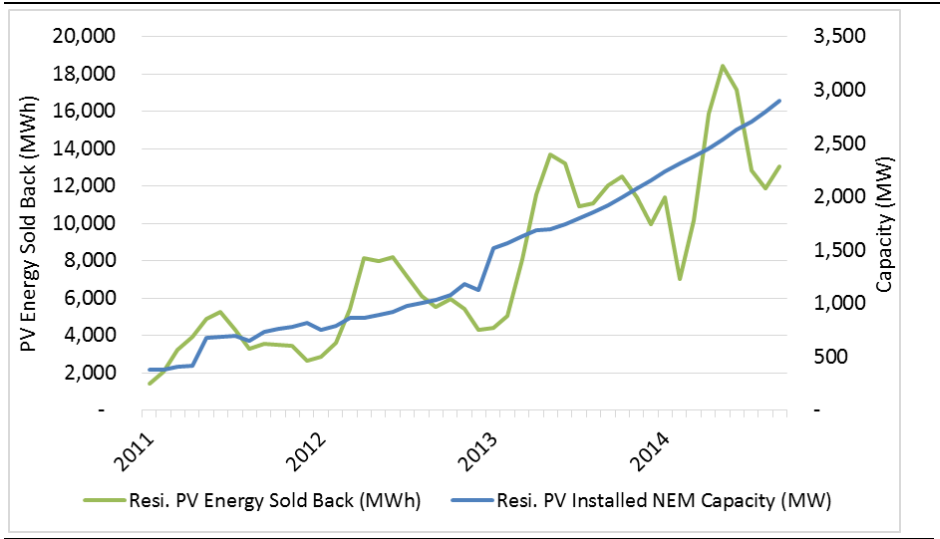
Wisconsin utilities raise fixed charges despite low relative residential solar PV levels

Customers who use less net energy – possibly those with solar PV – would see a higher relative bill increase than customers with higher net energy use. Both utilities have NEM programs that compensate customers approximately 30 percent of the retail rate for net surplus energy.

Rate Design Reform to Continue with DG Growth

Residents in many states will continue to install on-site generation as technology costs sustain a downward trend. However, unfavorable utility rate structures – high fixed costs and reduced NEM rates for surplus power – can hurt project economics. The fixed charge and NEM compensation debate will continue as NEM installations grow (Figure 3) and utilities fight for sustained revenue streams and cost-of-service recovery. Also, if utilities turn to increasing fixed charges and reducing energy costs, customers will have a reduced incentive to save energy or invest in energy efficiency projects.

Figure 3 – Residential PV Installed NEM Capacity and Energy Sold Back*



Source: EnerKnol analysis of EIA data

*EIA data from a statistically chosen sample of electric utilities in the United States

Potential rate design solutions, including VOST, minimum bills, and reasonable fixed charges can offer balanced benefits and costs to both utilities and solar PV customers. However, with continuing kW peak demand growth and kW-h demand flattening through DG and energy efficiency, utilities will be challenged with building and maintaining infrastructure with diminishing revenue streams.

Disclosures Section

RESEARCH RISKS

Regulatory and Legislative agendas are subject to change.

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