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Understanding the Impact of Private Solar and Net Metering

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Does Net Metering Adhere to the Core Principles of Rate Design?

- Equity *All customers use and benefit from the grid*
- Customer satisfaction *Majority of customers hurt by cross-subsidization created by NEM*
- Bill stability
- Revenue adequacy and stability *Private solar customers only pay for some of the energy grid services they use*
- Economic efficiency *Compensation 2-6x market price of electricity*

Net Metering: Truth v. Myth

TRUTH

- NEM customers continue to use and have a need for the energy grid.
- If you are not connected to the energy grid, you cannot buy or sell power.
- Rates can be designed in a fair, equitable, technology-neutral manner, while still protecting necessary energy grid investment.

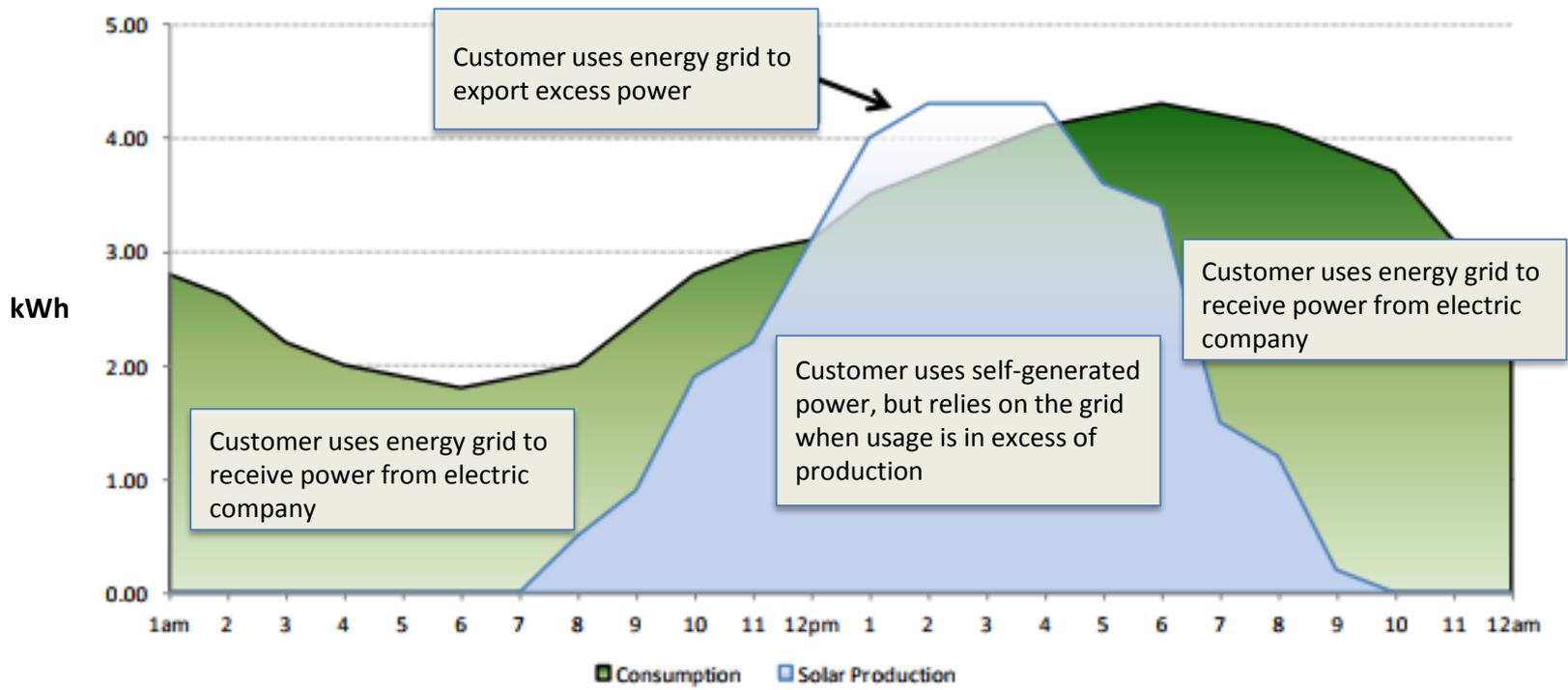
MYTH

- Owning a private solar system means you can be “off grid”.
- There are no subsidies caused by net metering. And if there are, the value of clean energy is the benefit.
- Net metering is not a problem when private solar penetration is low.
- Changes to net metering are inherently anti-solar.

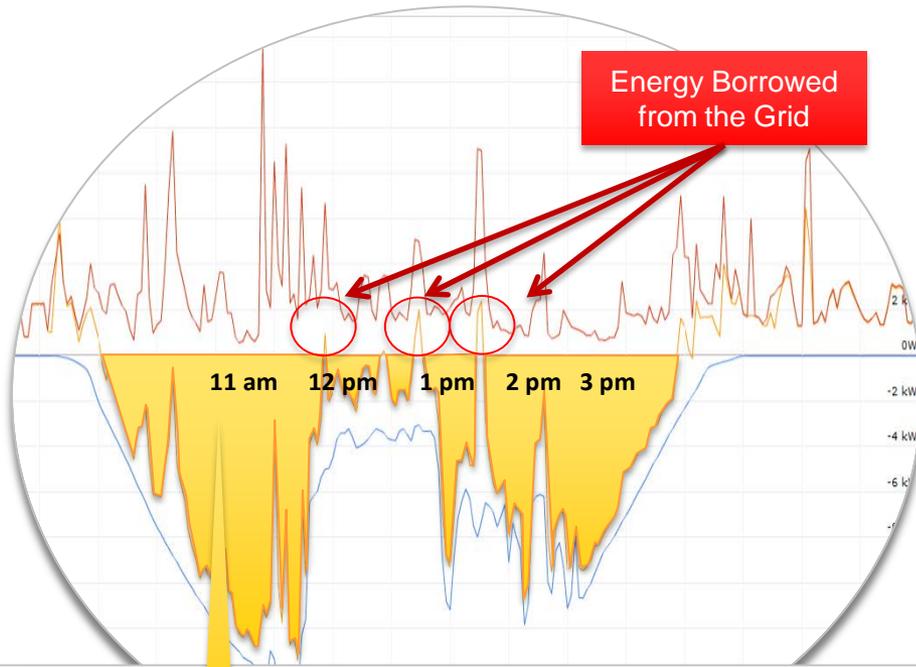
Net Metering Shifts Costs from Solar Customers to Those Without

- Traditional rate structures collect most fixed costs through variable energy charges.
- Regular investment in the energy grid is necessary to provide all customers with a reliable, resilient power system.
- Energy grid investments are FIXED COSTS.
- Under most rate design structures, net metered private solar customers do not pay enough in fixed costs.
- Private solar customers rely on the energy grid throughout the day.
- When a net metering customer's bill is "rolled back", they avoid paying fixed charges. Those costs are then transferred to customers who do not have private solar.

Private Solar Customers Rely on the Energy Grid Throughout the Day



Closer Look at Private Solar Reveals Greater Reliance on Energy Grid



Energy Profile of Private Solar Customer

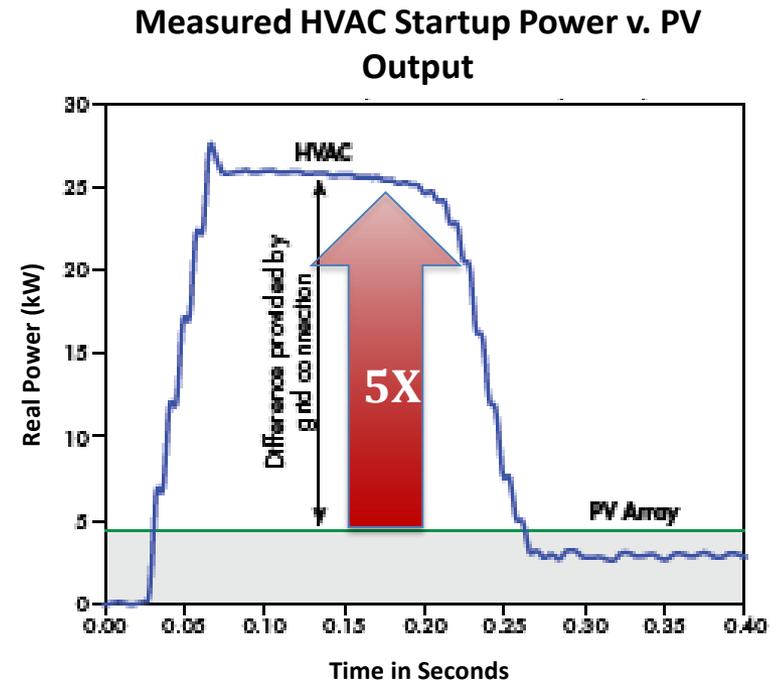
- 19 kW residential system (Avg. size is ~5 kW)
- 1-second data reveals consistent use of energy grid
- Despite large PV system, customer still uses the energy grid morning and evening, during cloud shear, and during high loading times
- For average sized systems (~5KW), reliance on the energy grid would be higher in both frequency and magnitude



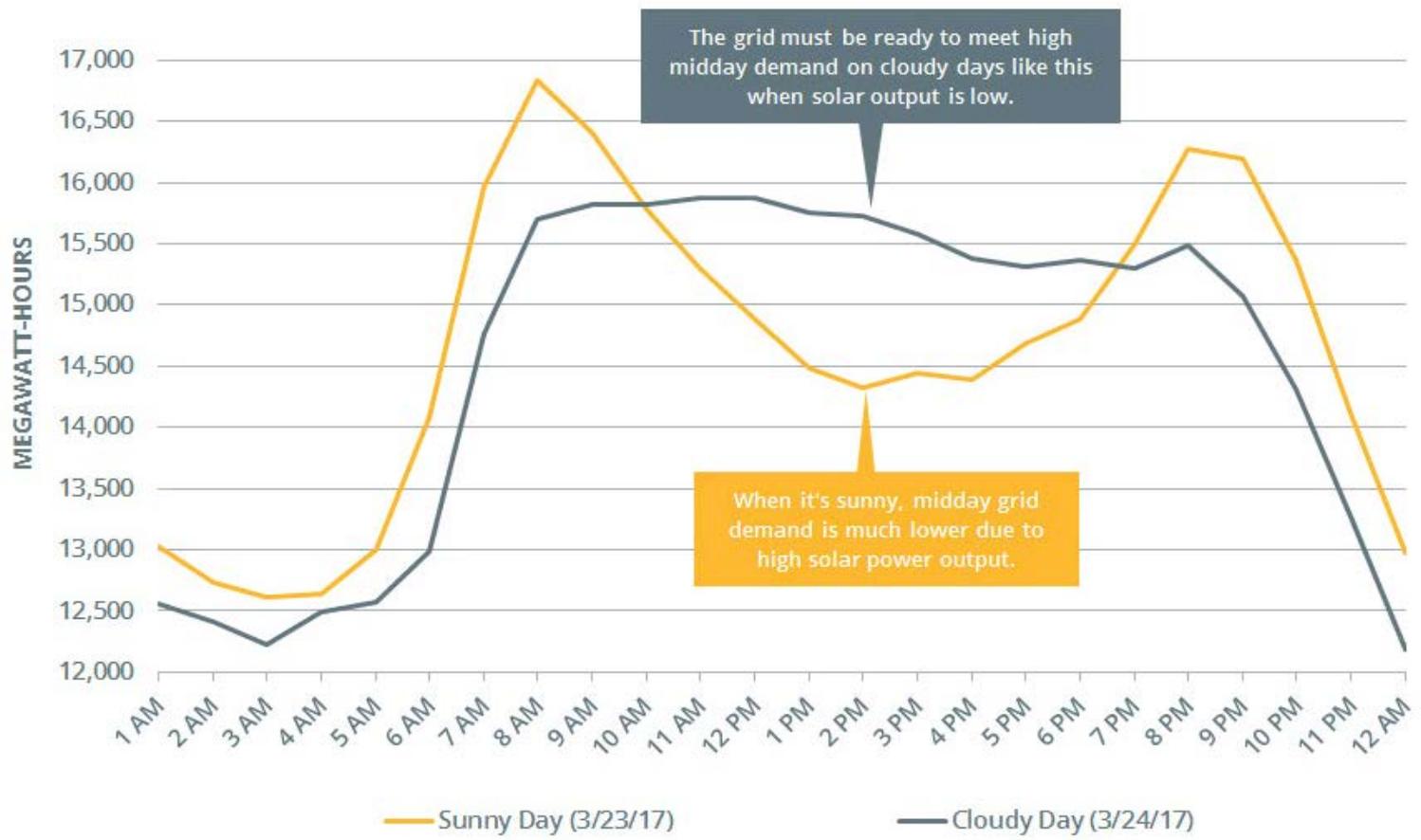
Source: Real-time customer data used with permission from PEPCO/Exelon

Start-Up Power Requirements Often Exceed PV Output

- The starting (inrush) current for a common 3-ton central air conditioner can require as much as 30 KVA of power for less than a half of a second.
- The national average for residential solar system size is 5 kW.
- This equates to a starting load that is almost 5 times the rated output of the system.
- **Without storage and over-sizing the system, these surges (transients) would cause most systems to trip without the grid to back them up.**

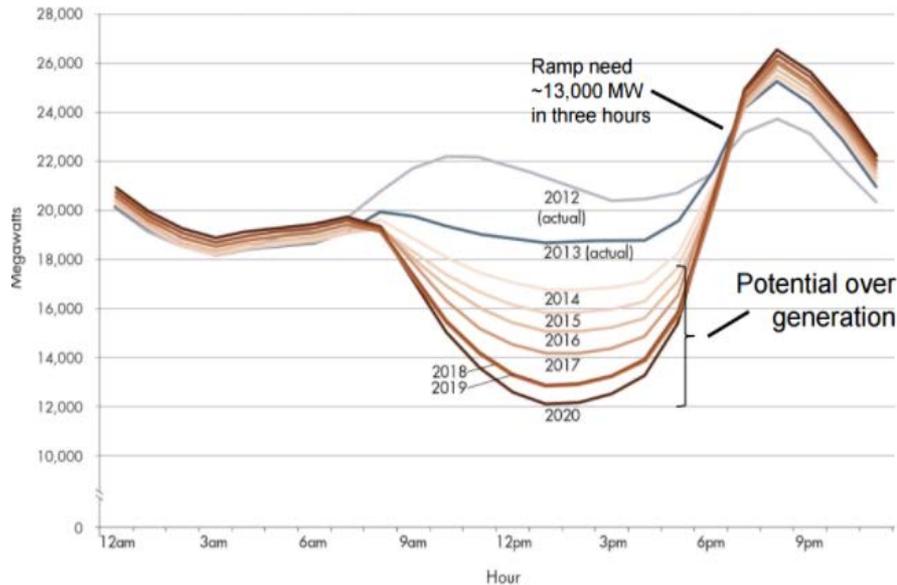


Serving Private Solar Customers Requires Managing Wide Swings in Day-to-Day Output

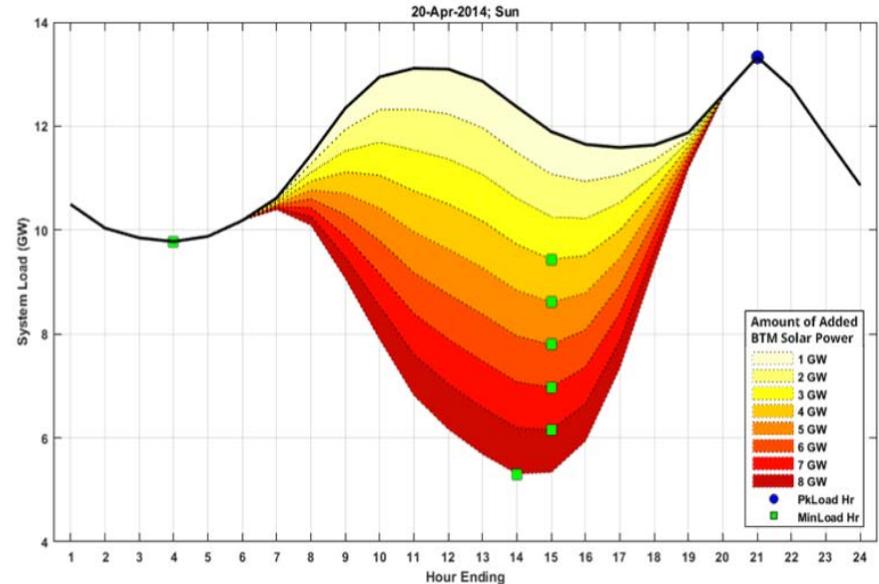


Private Solar Changes Load, Creating New Challenges for Grid Management

**California Projected Load Profile Shift
(Typical March)**



**New England Projected Load Profile Shift
(Typical Spring/Autumn)**



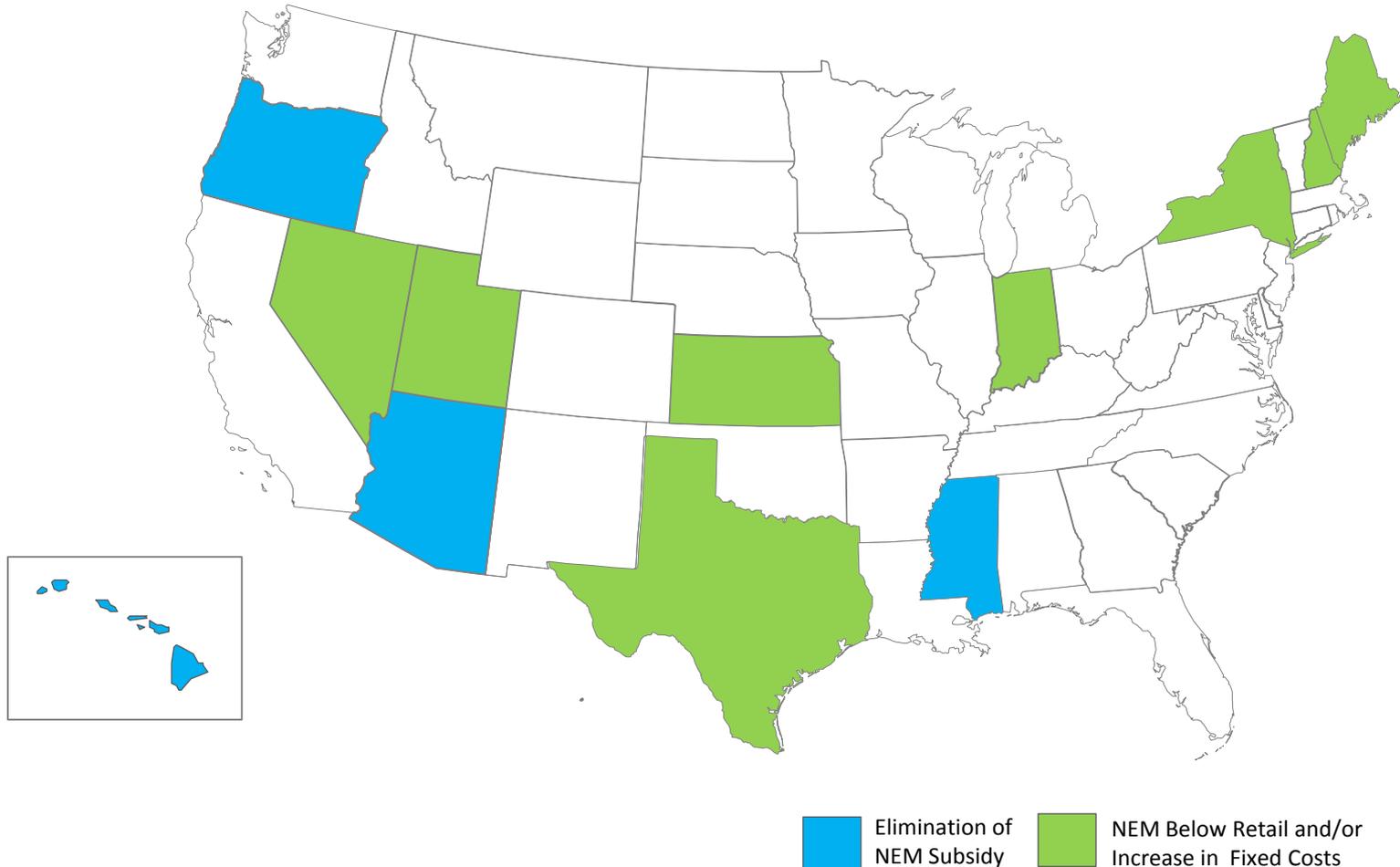
Regardless of location, private solar output changes load shapes, shifts peak energy times, and increases need for ramping and reserves – all of this puts strain on the energy grid

Private Solar & Energy Efficiency: One of These Things Is Not Like The Other



PRIMARY PURPOSE	Electricity generation for personal use or sale	Conservation to reduce energy intensity
BASIC FUNCTION	Installation of technology to generate/exchange electrons	Change of behavior to reduce generation of electrons
GRID IMPACT	Intermittent resource, can exacerbate peak	Planned reduction, can help ease or shift peak
CUSTOMER IMPACT	Creates cross-subsidy that is often regressive	Widely accessible, low barrier to entry
RELATIONSHIP TO RATE DESIGN	Rate structure needed to facilitate trade of private generation	Possible outcome of rate design

Recognizing Challenges of Private Solar & Net Metering, States are Changing Policies



Options Beyond Retail Net Metering

- Private solar rate class (Kansas)
- Reduced netting periods (Utah)
- Buy/sell arrangements – Instantaneous netting (Mississippi)
- Step down from retail to wholesale (Nevada, Maine, Indiana)
- Demand charges (Arizona)
- Increased fixed charges or minimum bill (Hawaii, Texas)
- New compensation system (Arizona, New York)