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# Understanding the Impact of Private Solar and Net Metering

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October 18, 2017

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

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- 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

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## 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

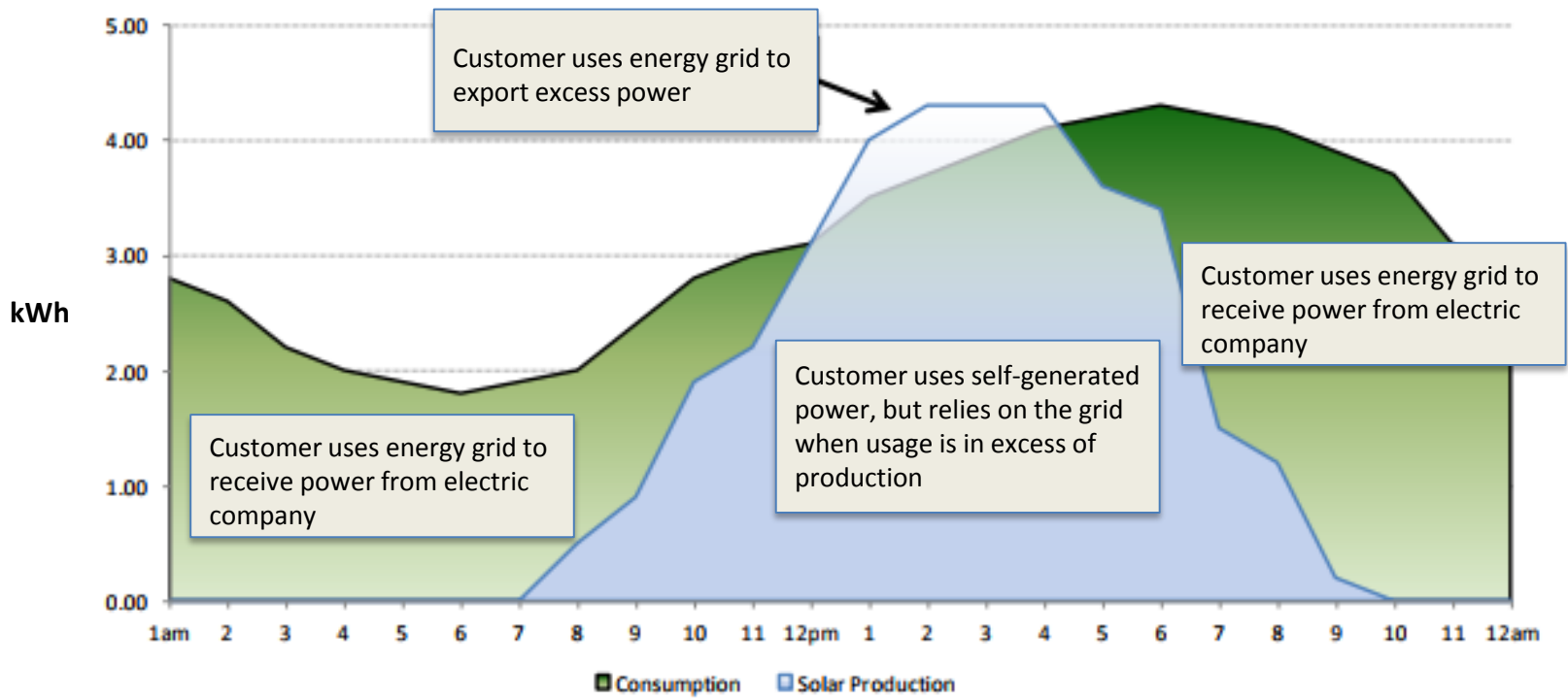
- Owning a private solar system means you can be “off grid”.
- There are no subsidies caused by net metering. And if there are, the value of clean energy is the benefit.
- Net metering is not a problem when private solar penetration is low.
- Changes to net metering are inherently anti-solar.

# Net Metering Shifts Costs from Solar Customers to Those Without

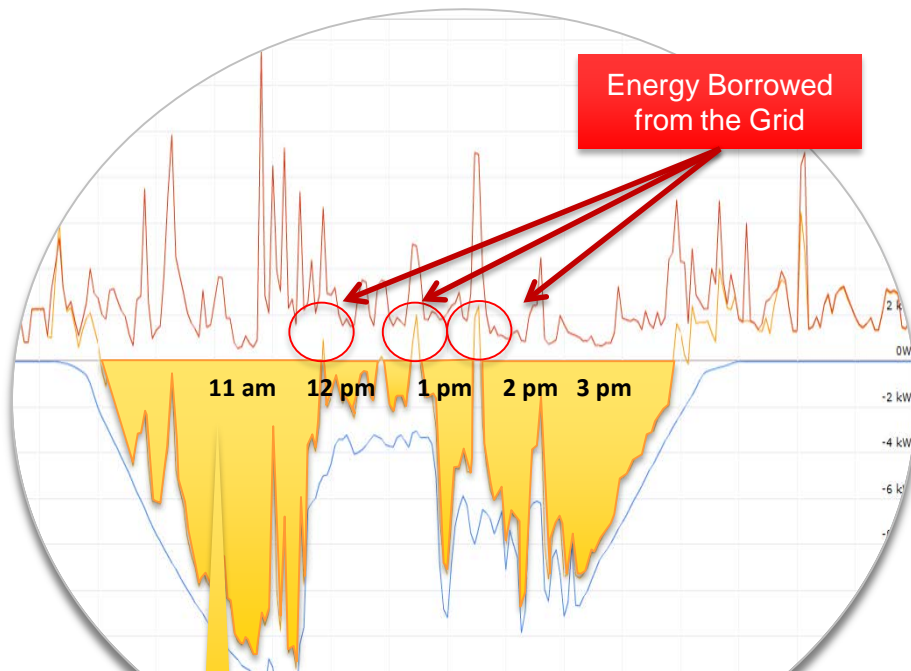
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- Traditional rate structures collect most fixed costs through variable energy charges.
- Regular investment in the energy grid is necessary to provide all customers with a reliable, resilient power system.
- Energy grid investments are FIXED COSTS.
- 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

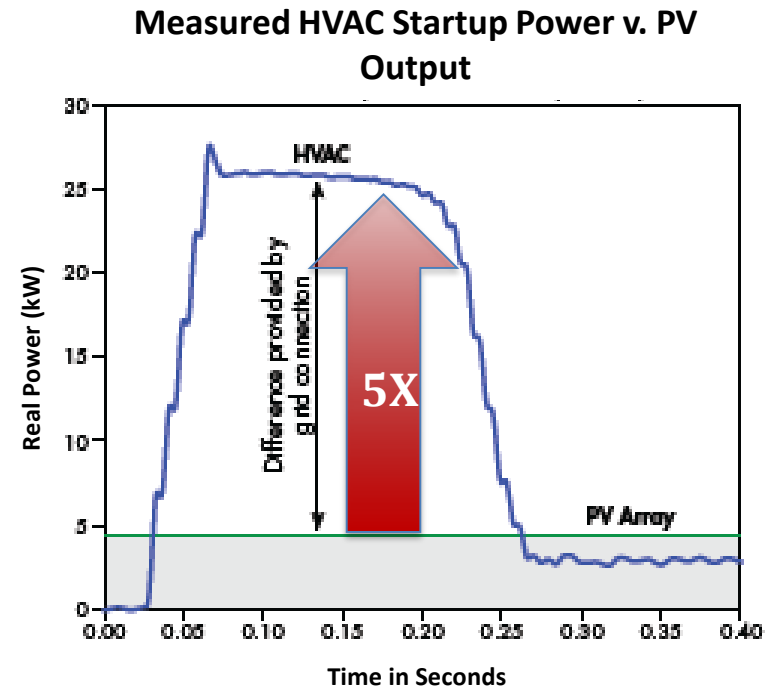
- 19 kW residential system (Avg. size is ~5 kW)
- 1-second data reveals consistent use of energy grid
- Despite large PV system, customer still uses the energy grid morning and evening, during cloud shear, and during high loading times
- For average sized systems (~5KW), reliance on the energy grid would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



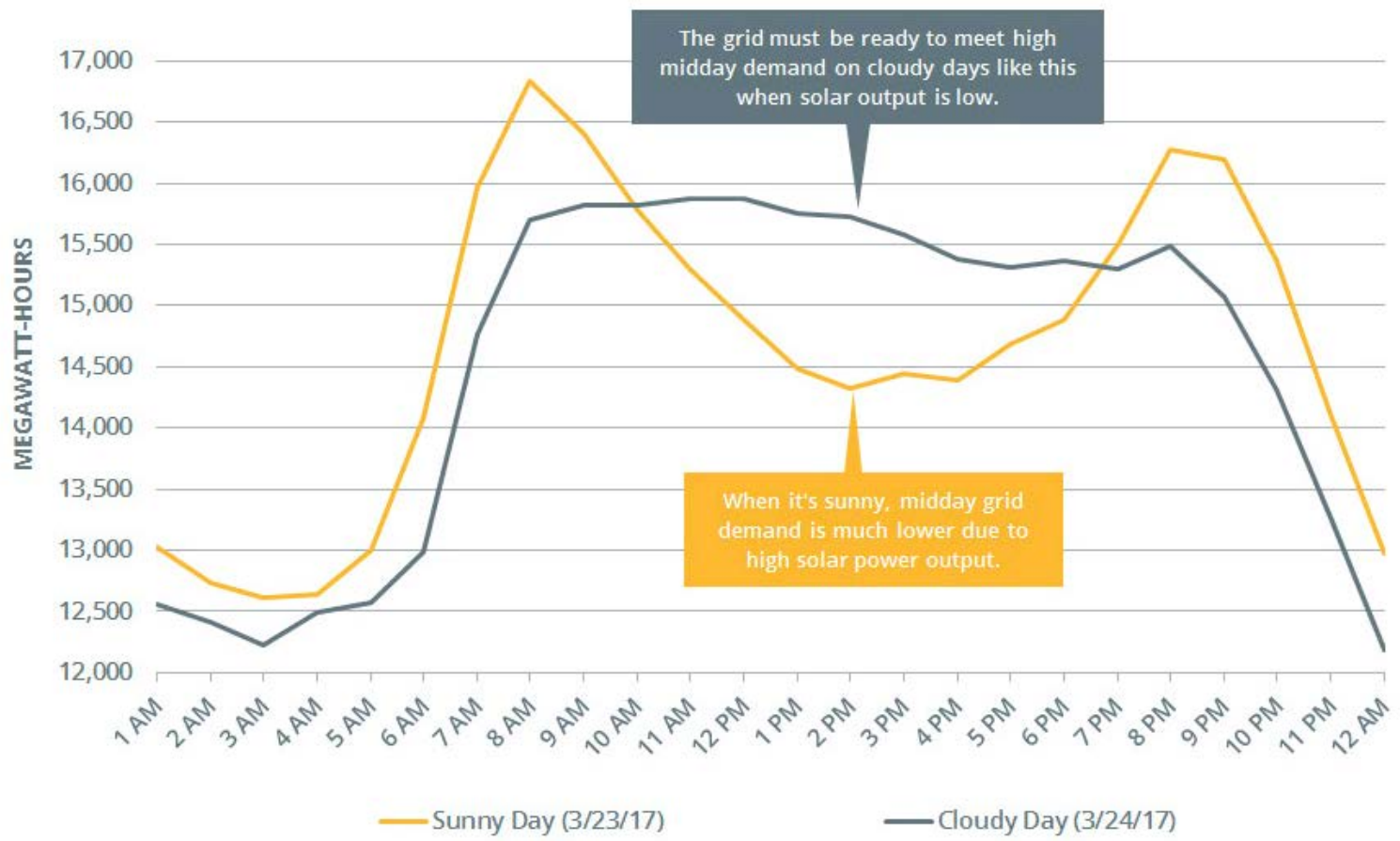
Source: Real-time customer data used with permission from PEPCO/Exelon

# 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.**



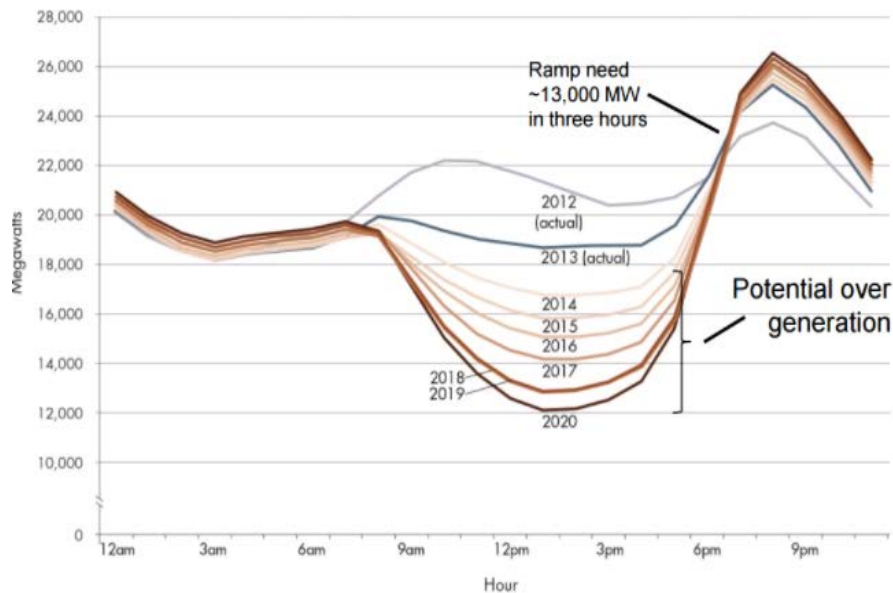
# Serving Private Solar Customers Requires Managing Wide Swings in Day-to-Day Output



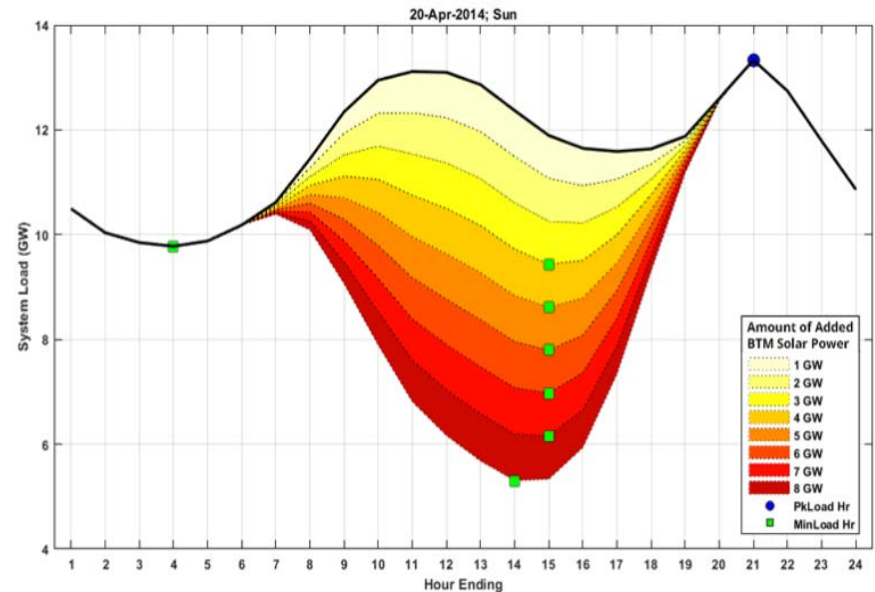


# Private Solar Changes Load, Creating New Challenges for Grid Management

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

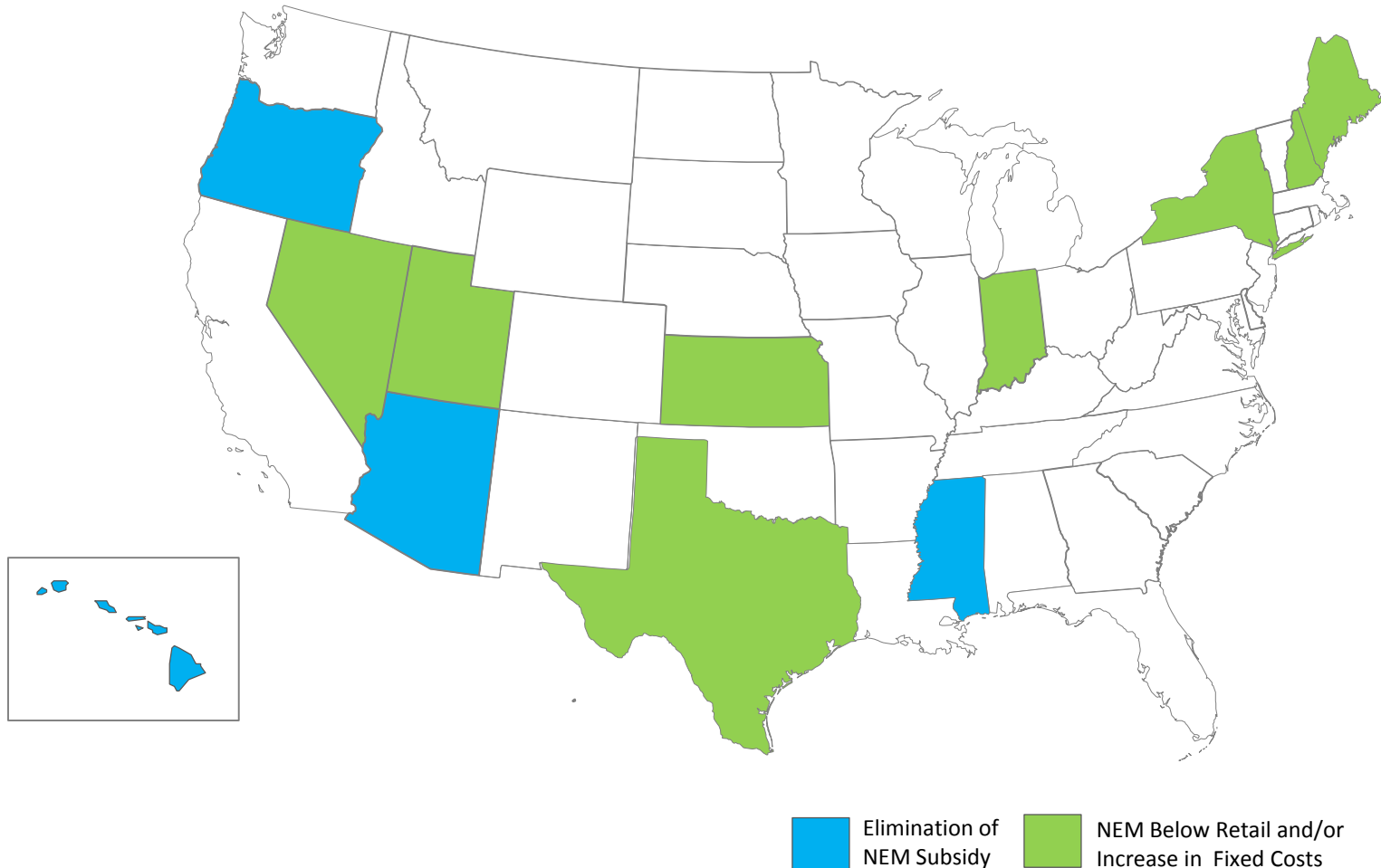
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PRIMARY PURPOSE	Electricity generation for personal use or sale	Conservation to reduce energy intensity
BASIC FUNCTION	Installation of technology to generate/exchange electrons	Change of behavior to reduce generation of electrons
GRID IMPACT	Intermittent 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

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# Options Beyond Retail Net Metering

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- 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)