

# Encouraging rooftop solar without creating cross- subsidies

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# NEM was designed to stimulate the infant rooftop solar industry

Customers were credited on their bill at the retail rate for power they exported to the grid

And they paid the retail rate for power they imported from the grid

Rooftop solar penetration grew rapidly due to NEM, falling solar panel prices, state and local incentives, and the 30% federal income tax credit

NEM succeeded in stimulating the rooftop solar industry; it's no longer an infant industry

# NEM introduced a cross-subsidy between customers that continues to grow

The problem arose because the residential rate structure was largely volumetric in nature and it did not mirror the cost structure of generating and delivering electricity to customers

Typically, NEM customers reduced their energy consumption by 50% but did not lower their peak demand by very much

- And they remained connected to the grid 24/7
- The fixed cost to serve them did not go down

Thus, when NEM customers lowered their consumption by 50%, the recovery of costs to serve them went down by nearly 50%, but actual costs of serving them went down by a much lower percentage

The shortfall in revenue from NEM customers is being recovered from other customers.

Non-NEM customers were adversely affected by an amount equal to the NEM cross-subsidy

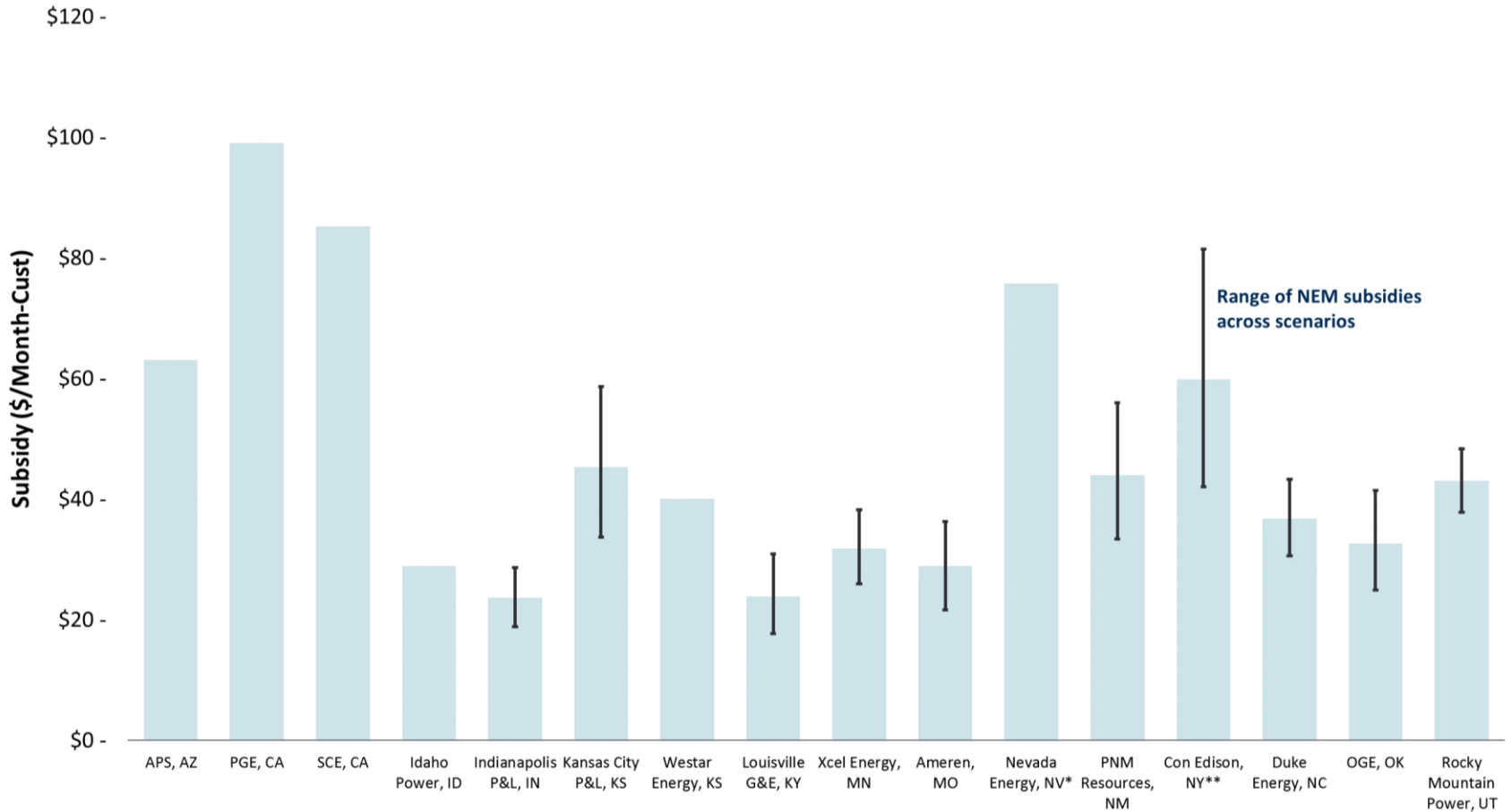
They did not know that they were subsidizing the NEM customers because rate increases include effects of NEM, at least not explicitly

They were often less affluent than NEM customers

This cannot go on forever

# NEM cross subsidies exist just about everywhere else

Source: "Quantifying Net Energy Metering Subsidies," Sanem Sergici, Yingxia Ying, Maria Castaner and Ahmad Faruqi, unpublished paper, April 2019.



Note: \*NEM subsidies exclude inter-class cross-subsidy except for Nevada Energy (NV). \*\*NEM subsidy does not reflect the NY VDER tariff.

# How can the NEM cross-subsidies be minimized?

The most common way is to create a separate rate class for NEM customers

- This has been done in Arizona, California, Idaho, and Kansas
- It's being considered in Montana

For the new NEM class, introduce a separate rate that reflects the cost structure of generating and delivering electricity

This would typically be a three-part rate with a fixed charge, a demand charge, and a time-of-use energy charge

Such rates are commonly used for commercial and industrial customers and will probably become the norm for all customers in the future

# Should existing NEM customers be excluded?

In most industries, there is no grandfathering

If Joe Smith bought a gas guzzler when the price of gasoline was very low, and the price of gasoline rose, it rose for everyone, including Joe Smith

- Joe was not given a credit on the price of gasoline equal to the price hike; he had not purchased a forward contract

NEM customers probably made their long term investment thinking that the rate design would never change

- As a practical matter, they have been grandfathered elsewhere to prevent a public outcry

# The value of energy efficiency is not considered in designing rates

The cleanest kWh is the one that is never consumed (and thus never produced)

The second-cleanest kWh is the one that is produced through renewable energy resources, such as solar

Value of energy efficiency is not used in designing rates

Energy efficiency is incentivized by providing financial incentives for installing high efficiency appliances and lights



# Should the value of solar be considered in the design of rates?

Rates are based on cost of service for public utilities

- Cost of service-based rates maximize economic efficiency and promote equity between customers
- They keep cross-subsidies between customers to a minimum

Value of service can be considered in Integrated Resource Planning and influence the role that solar can play in creating a long range clean-energy portfolio

But it cannot eliminate the need for cost-based pricing which is vital to preserving equity between customers and promoting economic efficiency

# Conclusions

SMUD has reached the 5% of peak demand target with its NEM program and ~25,000 customers are being served through that policy

The primarily-volumetric method of collecting revenues from NEM customers means that non-NEM customers are subsidizing NEM customers by paying higher electric rates because the utility has to recover from them the fixed costs of providing safe and reliable electric service

SMUD should reconsider its NEM policy by changing the rate structure for NEM customers

# References

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# Presenter Information



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Ahmad Faruqi is an internationally recognized authority on the design, evaluation and benchmarking of tariffs. He has analyzed the efficacy of tariffs featuring fixed charges, demand charges, time-varying rates, inclining block structures, and guaranteed bills. He has also designed experiments to model the impact of these tariffs and organized focus groups to study customer acceptance. Besides tariffs, his areas of expertise include demand response, energy efficiency, distributed energy resources, advanced metering infrastructure, plug-in electric vehicles, energy storage, inter-fuel substitution, combined heat and power, microgrids, and demand forecasting. He has worked for nearly 150 clients on 5 continents, including electric and gas utilities, state and federal commissions, governments, independent system operators, trade associations, research institutes, and manufacturers.

Ahmad has testified or appeared before commissions in Alberta (Canada), Arizona, Arkansas, California, Colorado, Connecticut, Delaware, the District of Columbia, FERC, Illinois, Indiana, Kansas, Maryland, Minnesota, Nevada, Ohio, Oklahoma, Ontario (Canada), Pennsylvania, Saudi Arabia, and Texas. He has presented to governments in Australia, Egypt, Ireland, the Philippines, Thailand, New Zealand and the United Kingdom and given seminars on all 6 continents. He has also given lectures at Carnegie Mellon University, Harvard, Northwestern, Stanford, University of California at Berkeley, and University of California at Davis and taught economics at San Jose State, the University of California at Davis, and the University of Karachi.

His research been cited in Business Week, The Economist, Forbes, National Geographic, The New York Times, San Francisco Chronicle, San Jose Mercury News, Wall Street Journal and USA Today. He has appeared on Fox Business News, National Public Radio and Voice of America. He is the author, co-author or editor of 4 books and more than 150 articles, papers and reports on energy matters. He has published in peer-reviewed journals such as Energy Economics, Energy Journal, Energy Efficiency, Energy Policy, Journal of Regulatory Economics and Utilities Policy and trade journals such as The Electricity Journal and the Public Utilities Fortnightly. He is a member of the editorial board of The Electricity Journal. He holds BA and MA degrees from the University of Karachi, both with the highest honors, and an MA in agricultural economics and a PhD in economics from The University of California at Davis, where he was a research fellow.

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