



PSERC WEBINAR

Behind-the-Meter DER under Net Energy Metering X: Optimal Prosumer Decisions, Social Welfare, Cross-subsidies, and Market Potential

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Net energy metering (NEM) is one of the major driving forces behind the phenomenal growth of the behind-the-meter distributed energy resources. By charging net consumptions and crediting net productions at the same retail rate, the original implementation of NEM, *a.k.a* NEM 1.0, offers exceptional incentives for DER adoptions. However, the benefits to prosumers raise revenue adequacy concerns for the utility and equity issues of cross-subsidies by consumers without behind-the-meter generation resources. Currently, several variations of NEM 1.0, commonly referred to as NEM 2.0, have been implemented in multiple states in the U.S., and many successor proposals (NEM 3.0) are in active discussions.

This work aims to gain analytical and empirical insights into the impacts of a broad class of NEM policies on prosumer and consumer behavior, social welfare distribution, cross-subsidies of prosumers by consumers, and the market potential of DER adoptions. To this end, we propose NEM X, an inclusive parametric model that captures key characteristics of a broad class of NEM tariffs. We then obtain a closed-form characterization of the optimal consumption policy of prosumers. Under a stochastic Ramsey pricing framework that maximizes the social welfare subject to the revenue adequacy constraint of a regulated utility, the performance of NEM X is analyzed. Our results highlight a tension among achieving economic efficiency, equity between consumer and prosumer groups, and the market potential of DER adoption.

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[LINK TO WEBINAR](#)

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Lang Tong is the Irwin and Joan Jacobs Professor in Engineering and the Cornell site director of the Power Systems Engineering Research Center (PSERC). His current research focuses on energy and power systems, smart grids, and the electrification of transportation systems. His expertise lies in the intersection of data analytics, machine learning, optimization, and market design. He received numerous publication awards from the IEEE Signal Processing, Communications, and Power and Energy System Societies.

Lang Tong received a B.E. degree from Tsinghua University and a Ph.D. degree from the University of Notre Dame. A fellow IEEE, he was the 2018 Fulbright Distinguished Chair in Alternative Energy.

