Edison Electric
INSTITUTE

Edward H. Comer
Vice President, General Counsel & Corporate Secretary

August 22, 2016

Donald S. Clark, Secretary of the Commission
Federal Trade Commission
Office of the Secretary
600 Pennsylvania Ave, N.W., Suite CC-6510 (Annex B)
Washington. , D.C. 20580

Re: Solar Electricity Project No. P161200

Dear Secretary Clark,

Attached, please find the comments of the Edison Electric Institute (EEI) in response to the "Something New Under the Sun: Competition and Consumer Protection Issues in Solar Power" Workshop held on June 21, 2016. EEI is the national trade association representing investor-owned electric power companies. EEI appreciates the opportunity both to participate in the Workshop and to file these comments to further discuss issues raised during the Workshop.

Please direct any questions about these comments to Emily Fisher (efisher@eei.org) or Adam Benshoff (abenshoff@eei.org).

Sincerely,

Edward H. Comer

cc: Phil Moeller, Senior Vice President and Chief Customer Solutions Officer, EEI

COMMENTS OF THE EDISON ELECTRIC INSTITUTE WORKSHOP IN RESPONSE TO THE FEDERAL TRADE COMMISSION SOMETHING NEW UNDER THE SUN: COMPETITION & CONSUMER PROTECTION IN SOLAR ENERGY

August 22, 2016

The Edison Electric Institute (EEI) appreciates the opportunity to provide comments in response to discussions at the "Something New Under the Sun: Competition & Consumer Protection in Solar Energy" Workshop, held by the Federal Trade Commission (FTC or Commission) on June 21, 2016. EEI is the trade association that represents all U.S. investor-owned electric companies, international affiliates and industry associates worldwide. Our members provide electricity for 220 million Americans, operate in all 50 states and the District of Columbia, and directly employ more than 500,000 workers. With more than $100 billion in annual capital expenditures, the electric power industry is responsible for millions of additional jobs. Safe, reliable, affordable and clean energy drives our economy and powers America. Importantly, EEI members own and operate the energy grid—the platform that is essential for the deployment of distributed energy resources (DER), like the private, residential rooftop solar systems that were the focus of the FTC's Workshop.

Private solar, however, is just one of many DER technologies that are changing the way that electricity is generated, transmitted and distributed. "Distributed energy resources" encompass a range of technologies, including private solar, microgrids, storage, demand response, energy efficiency and electric vehicles. As discussed in detail in EEI's pre-workshop comments, the debate concerning private solar resources in particular has not centered on the technology or a customer's right to self-generate, but on the compensation mechanism currently used by many states to encourage private solar deployment. Known as "net energy metering" (NEM), this mechanism allows solar customers to sell excess power generated by their solar array and use that credit to offset the costs of their usage when their systems are not generating electricity. Unfortunately, net energy metering typically compensates solar customers for their output at the "full retail rate," inclusive of both commodity and energy delivery service charges. As discussed in these comments, this compensation level is not linked to the actual "value" a private solar

system is providing. Rather, it allows solar customers to avoid paying for the grid services they rely on, either to deliver their power output to the grid or to power their homes—even when the sun is shining. Another drawback of net metering is that it values the output of all solar facilities—no matter the location—and compensates those facilities at the same level when, in fact, location does matter. Some parts of the distribution system can integrate solar energy at lower cost, and the value proposition, therefore, can be different. This compensation mechanism also can be especially harmful to customers who do not or cannot install private solar, as they are left to pay the costs of the distribution system used but not paid for by solar customers. As a result, this policy tends to distort the natural competitive dynamics that would otherwise occur in the solar industry,[1] and begins to create significant challenges for regulators. As more and more solar customers avoid paying for the energy delivery services they receive via this mechanism, other, non-solar, customers are allocated their costs.

State regulators across the country are actively evaluating alternatives to retail NEM, and reevaluating existing policies to ensure long-term benefits for all customers.[2] As the National Association of Regulatory Utility Commissioners (NARUC), the association of the state economic regulators who have jurisdiction over retail electricity rates and the distribution grid, recognized in its recently released *Draft Manual on Distributed Energy Resources Compensation*, the basic structure of retail electricity rates for DER needs to be reconsidered so that the essential services the energy grid provides to DER customers are appropriately recognized and priced, while at the same time compensating DER customers for the energy and other services that these resources may provide.[3] To this end, the *Draft Manual* identifies a

---

[1] Massachusetts Institute of Technology (MIT), *The Future of Solar an Interdisciplinary MIT Study*, (May 2015), http://energy.mit.edu/research/future-solar-energy/.

[2] *See e.g.*, [Arizona] Docket E-00000J-14-0023, *In the matter of the Commission's Investigation of Value and Cost of Distributed Generation*; [New York] Case 15-E-0751, *In the Matter of the Value of Distributed Energy Resources*; [Maine] Case No. 2016-00120, *Commission Inquiry Into Net Energy Billing Rules*.

[3] NARUC, Staff Subcommittee on Rate Design, *Draft Manual on Distributed Energy Resources Compensation* (July 21, 2016), at 17-19, http://pubs.naruc.org/pub/88954963-0F01-F4D9-FBA3-AC9346B18FB2. NARUC intends to finalize this Manual in November.

range of compensation approaches that states could consider in assessing key issues about DER and grid costs, compensation and the impact on retail electricity rates.

In addition, the Council of Economic Advisors (CEA) stated in a June report that the realization of the potential benefits of DER and, in particular, energy storage, requires new approaches to the pricing for electricity and grid services to create "smart markets" and a "level playing field" that allows all DER to participate in various electricity markets and be compensated appropriately for the value they provide.[4] Both the CEA report and the *Draft Manual*, issued after the workshop, confirm the importance of state regulatory authorities looking at pricing for electricity and grid services comprehensively for efficient deployment of the various competing technologies that provide energy supply, energy conservation and grid services.

In this context, despite the Workshop's focus on private solar technology, the FTC should not lose sight of the larger technological and economic forces that are causing economists, regulators and utilities to propose new pricing approaches to send the right economic price signals for the various DER technologies and other grid services beginning to compete in the marketplace.[5] Failure to consider the larger context could lead to the development of policies and programs that are inefficient, anticompetitive and would stymie the efficient development of all forms of DER.

These comments are divided into three parts. The first part identifies and corrects errors and misstatements about a range of issues discussed during the Workshop. The second part addresses concerns about state retail rate proceedings raised by some of the panelists. Finally, these comments address consumer protection concerns raised during the Workshop.

---

[4] Executive Office of the President, Council of Economic Advisors, *Incorporating Renewables into the Electric Grid: Expanding Opportunities for Smart Markets and Energy Storage* (June 6, 2016)(CEA Report) at 34, https://www.whitehouse.gov/sites/default/files/page/files/20160616_cea_renewables_electricgrid.pdf.

[5] Electric companies continue to invest in the technologies that will provide options customers want: for residential customers who want to install DG or manage their energy use using connected devices and web-based platforms; for large customers (like data centers and major corporations) that want to use renewable energy; and for cities that want electricity from more sustainable sources and to reduce their carbon footprint.

I. Some Workshop Discussions Were Predicated on Misunderstandings and Factual Errors About the Energy Grid, Private Solar and Net Energy Metering.

Some of the discussions at the Workshop, particularly those in the third panel, were distorted by what appeared to be fundamental misunderstandings of the energy distribution grid, the services that local distribution companies (LDCs) provide, how they recover prudently incurred investments in the context of state retail rate proceedings, the impacts of increased deployment of private solar on the distribution system and the impacts of NEM on non-solar customers. The following addresses these errors.

As a preliminary matter, it is important to reiterate that customers who install private solar systems continue to rely on the energy grid. In fact, many private solar customers use the grid as, or even more, intensely than other customers as they both receive power from the grid when their systems cannot meet their needs during hours of darkness and when the amount of sunlight is insufficient to produce electricity to meet their demand for power, and to send power back to the grid when their systems produce more power than they need. Installing private solar has not changed their dependency on the grid to provide a reliable supply of power at all. In fact, their solar system will not operate absent their connection to the grid because, without these constant grid transactions, private solar customers would have to invest in very costly energy storage and/or generators to supply their total energy needs.[6] The full scope of grid benefits is discussed in more detail below. As private solar energy and other DER deployment continues to grow and comprise a larger share of the energy resources on the nation's power grid, it is important to establish appropriate rate structures that assure that all customers pay for the power grid upon which they rely.

---

[6] The services provided by the grid to its users are in fact of tremendous value, as a new Electric Power Research Institute (EPRI) report that analyzes the actual cost of having a reliable electricity supply without a grid connection shows. In this report, EPRI demonstrates that a solar customer that self-produces all its electricity consumption still needs to use the grid to constantly balance generation and demand. To replace the grid services with batteries and disconnect from the grid is found to be extremely costly, further demonstrating that solar customers are in fact heavy users of the power grid. *See* EPRI, *Residential Off-Grid Solar + Storage Systems: A Case Study Comparison of On-Grid and Off-Grid Power for Residential Consumers* (Aug. 2016), http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002009150.

A. Energy and Grid Services Are Different; Conflating Them Confuses the Discussion About Appropriate Compensation for These Services and Fails to Recognize the Importance of Grid Services to DER Customers.

LDCs provide many distinct services to all customers, including private solar customers. During the Workshop, many of the presenters failed to recognize the differences between these services, particularly the distinction between energy services (the provision of electric energy) and grid services (the ability to deliver power and assure reliability by providing adequate frequency, voltage and other "ancillary" services). As noted in comments filed on June 7,[7] customers may receive energy (electricity) either from their LDC or, in some states, from a separate energy supplier, which electricity must then be delivered to their homes and businesses reliably. This delivery or "grid service" is like FedEx or UPS in some ways, in that it is distinct from the commodity being sold. Whether you are a retail customer ordering from Amazon or a small business shipping your latest creation to a new customer, you are making use of that shipping and delivery, or in this case, grid service. The same is true for a solar customer. Moreover, a retail customer returning an item to Amazon is not "unusing" the distribution services used to deliver the item in the first instance, but is in fact consuming additional delivery services. Both energy (commodity) and grid services are provided to all customers, including private solar customers. Returning solar electricity back to the grid does not negate the costs of building and maintaining the grid; in fact, it actually complicates and increases the costs of operating the grid.

To better explain the grid services that solar customers use each day, EPRI has broken down the different services that the grid provides to all customers, including private solar customers:

- Reliability: The grid serves as a reliable source of power in the event of disruptions to DER, including compensating for the variable output from private solar. The grid also provides private solar customers with a consistent frequency and obviates the need for their own backup resources.

- Startup Power: The grid provides instantaneous power for appliance and devices, like air conditioners, that require a strong flow of current when starting up; this is required for these appliances to start reliably without voltage fluctuations and may not be provided by

[7] EEI's pre-Workshop comments are attached as Appendix A.

private solar systems unless they are substantially oversized to handle the strong in-rush of current.

- Voltage Quality: Voltage from a private solar system that is not interconnected to the grid generally will have high voltage harmonic distortion, which can harm sensitive consumer end-use devices and reduce the life of appliances and other equipment.

- Energy Transaction: Interconnection with the grid allows consumers to export excess power that cannot be used instantaneously, energy that would go to waste without the grid or adequately sized on-site storage. Instead, the grid allows them to "sell" their excess power to the LDC, and then purchase power when they need it at a later time. This shifts the risk with respect to the size of the private solar system from the customer to the grid operator.[8]

Some speakers conflated the grid services provided by the LDC and the actual energy provided by the customer or implied that, because private solar customers self-supply some of their own energy needs, they do not use the grid services provided by the LDCs. Others argued that because private solar customers may provide some benefits to the grid, they need not pay for their use of the grid. As the EPRI discussion of the range of services provided by the grid to private solar customers demonstrates, these arguments and assertions are simply incorrect. It is important to understand the specific grid services being used, and the services being provided, and value each separately in order to avoid confusion and unintended consequences.

Further, the arguments ignoring or minimizing the value of the grid to private solar customers obscure real and important questions about how DER should be compensated. In addition, if private solar customers (or any other DER) are to be compensated for any benefits that they may provide to the larger energy grid, this should be done through reforms to pricing that are technology neutral so that all competing DER technologies have a level playing field. For example, the CEA Report recognized that the creation of fair markets for grid management services is critical to the development and deployment of promising new technologies, like storage.[9] States are beginning to contemplate the need to identify and price the various grid

---

[8] *See* EPRI, *The Integrated Grid: Realizing the Full Value of Central and Distributed Resources* (Feb. 10, 2014), at 16-20, http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002002733.

[9] *See* CEA Report, *supra*, n.4.

services that are increasingly being used to support the introduction of new DER in order to create efficient markets for such services. These efforts can help identify the precise benefits, if any, that various technologies can provide at specific locations on the grid.

B. Utilities Are Actively Investing In Grid Modernizations To Support Private Solar and other Distributed Technology Deployment.

The distribution grid is a complicated and interrelated system that is designed and operated to assure that there is sufficient electricity delivery capability to reliably supply each individual customer.[10] New digital technologies and low-cost communications systems now enable this system to cost-effectively handle multidirectional power flows. Private solar and other DER technologies make it important for the grid to be able to control and manage these operations efficiently.[11] Utilities across the country are already investing in new sensors, smart inverters, wireless and other communications systems and other technologies to manage and more fully integrate DER into the system and avoid common integration pitfalls, which can include local overvoltage and loading issues on distribution feeders, frequency instability and a lack of stabilizing inertia, among others.[12] Making these investments, which has been termed "grid modernization," is essential to realizing the full potential benefits of DER. Understanding the value of those services to all grid customers, specifically to private solar customers, is critical to developing a sustainable and viable grid.

These investments, as well as the costs associated with the continued operation and maintenance of the distribution grid, have always been paid by all users, and are allocated to different user

---

[10] Contrary to Professor Wara's assertions during the Workshop, the distribution grid is not "run with paper and pushpins."

[11] Because of the interconnected nature of the transmission and distribution systems, DER interconnections create the potential for power to flow from the distribution system back into the transmission system and for the distribution system to more significantly contribute to system dynamics in response to disturbances. *See* EPRI, *The Integrated Grid: A Benefit-Cost Framework* (Feb. 2015), at 4-4, http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002004878.

[12] *See* EPRI, *supra*, n.8 at 12-13.

classes (e.g., residential, commercial or industrial) based on a cost-causation principle. Several Workshop panelists implied that LDCs should no longer be able to recover these costs from private solar customers (or other retail electricity customers) because the costs of the system are "fixed" or "sunk." The panelists never really addressed how rates are designed to allocate these costs among users of the grid, however, nor did they explain why private solar users are any different from all other generators of power that pay for grid costs. In a rate making context, the term "fixed" costs specifically refers to the costs incurred by the LDC to meet its obligation to provide electricity on demand to all customers 24 hours a day 365 days a year, which is how the system is designed, planned and operated.[13] These costs include constructing, maintaining and operating the transmission and distribution systems, as well as back office and support activities (e.g., customer support and billing services).[14] These costs are deemed "fixed" only because they do not change based on a specific customer's usage, not because the infrastructure is already in place.

Further, the Workshop discussions seemed to imply that utilities are in some way continually recovering the costs of the entire electric grid from customers. This is not the case. In reality, any investment in grid infrastructure is included in rate base once it is used and useful, and then depreciated over its remaining useful life. Grid assets traditionally have been considered very long-lived assets with long depreciation lives. From a ratemaking perspective, this approach spreads the cost of the asset over time as the asset is "used" thereby reflecting the fact that the asset provides value over many years and promotes intergenerational equity between customers using the asset at different times. Once the costs of these capital investments have been recovered, if the asset still has some remaining useful life, customers no longer pay for that asset

[13] This means the system must be able to serve all customers at the time of system peak – which usually is around dinnertime for virtually every electric system.

[14] As NARUC notes in the Draft Manual, the term "fixed costs" has a separate meaning in the context of retails ratemaking: "[t]he rate base and authorized revenue requirement is "fixed" by the state regulator for the period covered by the rates case. This "fixed" amount is then allocated to the different classes before being calculated into the billing determinants that decide an individual's bill." NARUC, *supra*, n.3 at 23.

even though the asset may continue to be fully functional and provide service to customers.[15] The customer pays only for the operation and maintenance costs required to keep the asset in service for customers.

C. Private Solar Customers Are Meaningfully Different from Customers That Only Use Less Electricity; They Increase the Cost and Complexity of Operating a Reliable Energy Grid.

Some Workshop participants argued that private solar customers use "less" electricity and, therefore, should pay less for the grid services they receive. However, this is a flawed argument because private solar customers continue to use the grid all the time and in new and complex ways that require new investments in order to provide the continued safe and reliable operation of the system. The analysis of how much a private solar customer uses grid services does not relate simply to how much more or less electric energy is being delivered. Rather, private solar customers use the grid at all times and in new ways that impose additional costs on the grid; they derive real value from it, and therefore should be required to pay their fair share of the costs associated with that usage. Moreover, failure to require private solar customers to pay their fair share unfairly shifts those costs to lower income non-private solar customers.[16]

In a recent report to the U.S. Department of Energy, the Institute for Electrical and Electronics Engineers (IEEE) recognized that intermittent, renewable distributed generation, like private solar facilities, creates many new issues for the operation of the energy grid. These include:

---

[15] The goal of asset depreciation schedules is to set this cost recovery over the entire useful life of the asset.

[16] Customers who generate some of their own electric energy and sell surplus energy over the grid are operationally very different from other residential customers and more like some commercial and industrial (C&I) customers, many of whom also self-supply some portion of their energy needs. Retail electricity rates for C&I customers are designed differently than rates for residential customers, typically with energy and demand elements, so as better to address both the customers' needs and their use of the energy grid. Separate treatment provides more equitable treatment for all customers. Separate rate classes for private solar customers are an option that some state commissions may explore as they move to address DER compensation. Separate rate classes for different kinds of customers has long been a way that state public utility commissions (PUCs) try to balance the equities among different kinds of energy consumers.

voltage increases and fluctuations, reverse power flows, line and equipment loading increases, increased losses, decreased power factors, current and voltage imbalance, undesired and increased voltage changes, temporary overvoltage, harmonic distortion, increased tripping, and voltage and transient stability, even at the distribution level.[17] The severity of these issues is a function of many factors, including the private solar penetration level. As penetration levels increase, LDCs will be required to make investments in new technologies, including smart inverters, dynamic volt-VAR control utilizing distribution equipment and DER units where cost-effective, limiting or curtailing the output of DER units, demand response, utilizing advanced protection systems and, potentially, storage.[18]

As IEEE notes, the more advanced these solutions are, the more complex and expensive they are to implement.[19] Again, consistent with the principle of cost causation that underpins retail ratemaking, private solar customers that increase the costs of operating the distribution energy grid should be required to help pay for these costs. The burden of these increased costs should not be shifted to other customers.

D. While Private Solar and Other DER Could Provide Benefits to the Grid Depending on Their Location, Studies Assessing the Benefits of Private Solar Are Inconsistent with Traditional Regulatory Approaches Used to Determine Appropriate Compensation for other Generators, Including Large-Scale Solar Generators.

During the Workshop, many participants referenced studies about the value that private solar can bring to the energy grid, but generalizations and projections of anticipated future savings do not provide an efficient or equitable pricing system. DER, including private solar, have the potential

---

[17] IEEE, IEEE Report to DOE on QER Priority Issues (Sept. 5, 2014), at 15-16, http://www.ieee-pes.org/images/files/pdf/IEEE%20QER%20Report%20September%205%202014%20HQ.pdf.

[18] As the CEA Report notes, increasing the amount of variable generation on the grid is associated with greater demand for grid management services to address ramping of both electricity demand and renewable generation. These also impose costs on the grid. *See* CEA Report, *supra*, n.4, at 2-3.

[19] *See id*., at 17-18.

to provide some benefits not just to the customers who install them, but to other customers through their reliable and cost-effective integration into the distribution grid.[20] This is another area where the differentiation between "energy" and "grid services" is important, as DER may provide value in offsetting or replacing the *commodity* sold, but may not necessarily offset or replace the *grid services* needed. There are circumstances where DER may provide benefits by avoiding grid investments, but the potential for such benefits depends heavily on their location on the distribution system, the time period in which generation is provided (i.e., coincidence of generation output with peak electric system usage, which can be at night on some distribution networks), the type of distribution system in place (i.e., networked or radial), the extent to which these resources are controllable/dispatchable and other factors.[21] Much of this depends upon whether and how the deployment of these systems is integrated into the planning and operation of the grid.[22] To date, the location of private solar systems has been largely a function of customer interest and has not generally taken into account whether particular locations would bring benefits or add costs to the operation of the grid. Many utilities across the country are developing approaches that will support targeted DER development in areas where DER could provide benefits to the grid.

---

[20] *See, e.g., EPRI, supra,* n.8, at 25 (noting that DER can contribute to the capacity and ancillary services that are needed to operate the grid); *see also,* Susan F. Tierney, Analysis Group, *The Value of "DER" to "D": The Role of Distributed Energy Resources in Supporting Local Electric Distribution System Reliability* (Mar. 30, 2016), at 5, http://www.analysisgroup.com/uploadedfiles/content/news_and_events/news/value_of_der_to%20_d.pdf.

[21] The time at which the private solar system produces energy is also relevant to any assessment of potential benefits. Private solar output that does not coincide with the overall system peak provides fewer benefits. *See* EPRI, *supra*, n.8, at 27. Time-based pricing can be an important way to shift generation to times of peak demand and to reduce peak demand overall. *See* CEA Report, *supra*, n.4 at 27-28.

[22] *See* EPRI, *supra*, n.11, at 4-2; *see also* E3, *The Benefits and Costs of Net Energy Metering In New York*, prepared for: New York State Energy Research and Development Authority and New York State Department of Public Service (Dec. 11, 2015) (finding, among other things, that the value of private solar systems to the larger energy grid and other customers depended on whether deployment is targeted instead of being "random or untargeted (i.e., current business-as-usual)," at 5-6, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BF4166D6E-CBFC-48A2-ADA1-D4858F519008%7D.

According to EPRI, "the extent to which DER deployment can beneficially or adversely impact the distribution system depends on the characteristics of the DER technology as well as those of the grid to which it is interconnecting."[23] Any analysis of the potential benefits provided by private solar requires a specific analysis of where and how they are being deployed. Indeed, EPRI recommends a circuit-by-circuit approach for assessing the impacts of DER on the energy grid.[24]

Therefore, while providing general information about the potential benefits of private solar to the energy grid,[25] most studies performed to date are inadequate for assessing any actual benefits that may be provided by any particular private solar installations. Instead, these studies depend upon speculative estimates of potential benefits in the future, an approach totally inconsistent with the fact that rates for grid services are currently based upon costs actually incurred.

Moreover, many of these studies include an assessment of externalities, like emission reductions as estimated by the social cost of carbon, or macro-economic development or job impacts, when defining the benefits of distributed solar to the grid. However, none of these studies attribute the same kinds of benefits to other energy resources that provide identical benefits in terms of clean energy, jobs, etc., and thus result in a distorted pricing system that is biased in favor of private solar to the detriment of competitive sources of power that can provide precisely the same benefits, often at lower costs.[26]

---

[23] EPRI, *supra*, n.11, at 4-10.

[24] *See id*.

[25] *See* Tierney, *supra*, n. 20, at 14.

[26] Under some state programs, like California's A.B. 32 and the Regional Greenhouse Gas Initiative, a carbon price is applied in a technology-neutral way that is independent of retail rates by requiring all emitting resources to buy allowances equal to their carbon emissions. The price of the allowances in each regime is a factor of the number of allowances available, not the "value" of the reductions achieved.

Finally, any discussion about potential compensation for the benefits to the distribution grid provided by private solar generation must distinguish between value and cost. Studies that find that private solar facilities provide potential value to the distribution grid tend to imply that private solar customers should be compensated based on this value. While such "value" studies should help guide planning and investment decisions, in a regulated environment, rates for distribution investment are set to recover costs from customers, not to capture the full value of delivering electricity. Utility regulators simply do not price commodities that are basic needs, like water or electricity, in this fashion. If they did, the price of power would be astronomical, given that virtually every industry relies on electricity to create their own "value" and electricity providers would be entitled to claim a portion of that value and be compensated accordingly. Moreover, it is entirely unclear how any benefits from private solar customers would accrue to non-solar customers if compensation was based on value instead of costs. And, as noted previously, paying for "value" or "benefits" for only distributed solar would distort the competitive balance against other power suppliers or users who provide comparable benefits, but are not rewarded for them.[27]

E. Studies Have Found that Net Energy Metering Shifts Costs to Non-Solar Customers.

During the Workshop, many participants discussed NEM and its impacts on non-solar customers. Some panelists argued that NEM does not shift costs onto non-solar customers and cited studies in support of this assertion. A closer assessment indicates that these studies do find that NEM does shift costs onto non-solar customers. Importantly, NARUC, which represents the state economic regulators with jurisdiction to address these issues, also has recognized this cost shift and the impacts on non-solar customers.[28] NARUC's *Draft Manual* encourages state regulators to assess how this cost-shifting can be minimized.

---

[27] In the past, utility regulators allocated a share of the savings to utilities that entered into new arrangements that saved customers money.

[28] *See* NARUC, *supra*, n. 3, at 23, 31, 32, 34, 35, 37 and 44.

At the Workshop, participants referenced a recent Brookings meta-analysis of five studies assessing the cost-shift caused by NEM.[29] They argued that the Brookings report indicated that there was no cost-shift. However, these participants—and the Brookings report itself—mischaracterize the findings of these reports, which found that there was a cost-shift, but argued that this cost-shift is offset by other "values" provided by private solar customers who get the benefit of NEM. Given that many of these studies include avoided social costs, which are not currently part of the retail rate structure and which may benefit populations that are distinct from the customer base that funds the costs of the electric distribution system, this attempt to "net" diffuse societal benefits against specific, customer-incurred costs is inappropriate and fails to address the fact that private solar customers are not paying for their share of the grid costs or for their usage of the grid when they are compensated at the full retail rate.

Further, the Brookings report did not fully capture the range of studies assessing the impacts of NEM. In particular, the report did not discuss one of the first studies to quantify the magnitude of the NEM subsidy and resultant cost shift, a report by Energy+Environmental Economics (E3) for the California Public Utilities Commission (CPUC) in 2013.[30] As noted in an op-ed, published on Brookings website, "the E3 study estimated that NEM would result in a cost shift of *$1.1 billion annually by 2020* from NEM to non-NEM customers if current NEM policies were not reformed in California. A cost shift of this magnitude-paid for by non-NEM customers-was unacceptable to California regulators. As a result, California regulators set to work to reform rates in their state; many other states followed suit and conducted similar investigations into the magnitude of the NEM subsidy."[31]

---

[29] *See* Mark Muro and Devashree Saha, *Net Metering is a Net Benefit*, Brookings Report (May 23, 2016), https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/.

[30] E3, *California Net Metering Ratepayer Impacts Evaluation* (Oct. 28, 2013), at 6, http://www.cpuc.ca.gov/General.aspx?id=8919.

[31] Lisa V. Wood, *Why Net Metering Results in a Subsidy: The Elephant in the Room* (June 13, 2016)(emphasis in original), https://www.brookings.edu/opinions/why-net-energy-metering-results-in-a-subsidy-the-elephant-in-the-room/#_ftn1. See also note 1, *supra*.

Both the Brookings report and some of the Workshop participants focused on a different E3 study, one addressing the cost shift in Nevada, arguing that this study demonstrated that there was no cost shift. In 2014, E3 performed a study for the Nevada PUC assessing the cost shift. This study found that NEM provided a $36 million benefit to non-solar customers—if the costs of utility-scale, universal solar were $100 per MWh. The study also found that this benefit turned into a cost shift of $222 million from NEM to non-solar customers over the life of the assets if the costs of universal solar were $80 per MWh. In 2016, these costs are closer to $40 per MWh.[32] In fact, on August 17, 2016, E3 provided an updated study to the Nevada PUC, which once again confirmed the cost shift, at approximately $36 million per year, associated with the previous Nevada NEM rate structure.[33]

F. Reformation of Retail Rates Is Appropriately Accomplished by States and Public Utilities Commissions Actively Exploring These Issues, Not Antitrust Regulators.

Throughout the Workshop, some participants called for an open, participatory process to evaluate appropriate compensation for private solar and issues related to cost shifts from NEM customers to non-solar customers. In fact, this is exactly what is taking place as legislatures and/or utility commissions in 46 states were actively reviewing existing solar and grid policies at the end of 2015.[34]

---

[32] In fact, what the E3 study provided was a sensitivity analysis, defining the cost shift relative to the costs of utility-scale solar projects. The lower the costs of utility-scale generation, the higher the cost shift from NEM to non-solar customers. *See* E3, *Nevada Net Energy Metering Impacts Evaluation* (July 2014), at 19, http://puc.nv.gov/uploadedFiles/pucnvgov/Content/About/Media_Outreach/Announcements/Announcements/E3%20PUCN%20NEM%20Report%202014.pdf.

[33] "Overall, for the state of Nevada, NEM generation is a costlier approach for encouraging renewable generation than utility-scale renewables. This is mainly due to utility-scale solar PPA prices having dropped precipitously in recent years, greatly lessening the costs avoid by NEM generation, while distributed solar costs have not dropped commensurately." *See* E3, *Updated Nevada Net Energy Metering Impacts Evaluation* (Aug. 2016), at 16, http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-8/14179.pdf.

[34] North Carolina Clean Energy Technology Center, *The 50 States of Solar: 2015 Policy Review and Q4 Quarterly Report* (Feb. 2016), http://www.mc-group.com/wp-content/uploads/2016/02/50sosQ4-FINAL.pdf.

State legislatures and economic regulators have jurisdiction over these issues, and there is no indication that these proceedings are anything other than transparent, participatory and on the record. Indeed, private solar companies have been actively involved in proceedings before PUCs and legislatures. And Solar City Board member Nancy Pfund, who participated in the Workshop, noted that this one solar company alone has 60 professional government relations staff that monitor and participate in these proceedings.

These proceedings are examining a range of possible options for utility rate structures, compensating private solar customers and addressing the cost shift caused by NEM. This is precisely why NARUC is working on the *Draft Manual*, which is a compendium of options for states to consider as they examine how to compensate DER generally, including private solar. When NARUC held a workshop to discuss the *Draft Manual* at the end of July, the Solar Energy Industries Association (SEIA), which represents many providers of private solar systems, was an active participant in these discussions, as were state regulators, representatives from utilities and consumer groups.

Clearly then, existing state processes are inclusive, open, transparent and functioning and should be allowed to run their course. States are best equipped to address issue related to retail rates, customer equity and compensation for energy and distribution services. Different approaches may make sense in different jurisdictions, as evidenced by NEM reform efforts in California, Hawaii, Nevada and New York.

II. Net Energy Metering Was Designed as a Temporary Subsidy; Efforts to Reform This Subsidy in the Interests of All Customers Are Not Anticompetitive.

At the Workshop, discussions during the panel addressing competition assumed that any changes to a state's NEM policy were "anticompetitive." These discussions failed to acknowledge that NEM was designed, largely by state legislatures and sometimes state regulators, as a subsidy to "jump start" the deployment of a certain amount of private solar and was clearly implemented as an exception to normal retail rates and compensation provided to other distributed resources. State legislation authorizing NEM often included a cap on the number of customers to total capacity that could participate in the NEM program—clear recognition that NEM was intended

as a temporary subsidy, not as a permanent approach to rates for private solar customers.[35] States can choose to create subsidies to further public policy objectives; but once created, it would be a perversion of antitrust law to say that a state can never choose to revisit, limit or end a subsidy, or that any such action would be considered anticompetitive.

As mentioned, many states are exploring the cost shift between private solar and non-solar customers associated with NEM. In addition, there is growing recognition that the NEM subsidy is overly generous as it can exceed the installed cost of a private solar system.[36] When coupled with substantial federal and state tax incentives, the NEM subsidy can go well beyond what would be needed to encourage private solar deployment.[37] This problem is only exacerbated as the installed costs for private solar facilities continue to fall. There is nothing anticompetitive about states choosing to revisit NEM and the size of the NEM subsidy in light of concerns about impacts on non-solar customers and new information about the size of the NEM subsidy relative to the costs of private solar generation.

Finally, some of the Workshop participants indicated that there was a role for antitrust enforcement because states' review of NEM and consideration of alternatives for compensating private solar generation and other DER must be directed at inhibiting private solar generation. These assumptions fail to consider the larger context of all DER. The CEA Report and the *Draft Manual* demonstrate that private solar generation is only one of many new technological developments that are causing utilities, states and others to call for a reformation of pricing for grid services and energy to ensure that all new technologies affecting the distribution system—central generation, private solar generation, demand response, efficiency, storage and more—are able to participate and compete in the most efficient manner. While private solar advocates may want to maintain their competitive advantage, antitrust enforcement must be cognizant of the

---

[35] *See id*. at 15-16.

[36] *See* Robert Borlick and Lisa Wood, *Net Energy Metering: Subsidy Issues and Regulatory Solutions, IEI Issues Brief: Executive Summary* (Sept. 2014), at 2, http://www.edisonfoundation.net/iei/Documents/IEI_NEM_Subsidy_Issues_EXECSUMMARY.pdf.

[37] *See id.*

larger technological and structural changes that are encouraging a reconsideration of distribution services and distributed generation pricing issues and certainly should not be focused on the promotion of a single technology at the expense of all other potential competitors, particularly as the need for new pricing systems is emerging. Antitrust enforcement also should not harm or disadvantage the development of other DER by supporting an artificial competitive advantage for one type of DER. Moreover, neither the FTC, nor DOJ, nor the federal courts are suited to make pricing evaluations for the energy grid. State regulators and legislators are best positioned to address these issues.

III. The FTC Should Advise Consumers of Potential Changes in Pricing Affecting Private Solar Investment and Be Vigilant in Customer Education and Protection.

The final panel at the Workshop addressed consumer protection issues. Many participants advocated for providing more standardized information to potential solar customers, both when they are considering private solar options and when they are entering into contracts with the providers of private solar systems. More standardization would ease customer confusion, lessen opportunities for fraud and make it easier for state and federal regulators to educate customers.

In addition, while the states have a key role in customer protection, the FTC should take a more proactive role in consumer education and protection. Specifically, because the Workshop has made clear that there is a vigorous state-by-state debate over NEM and distribution pricing approaches, the FTC should work to inform consumers that existing rate approaches may change and that rate levels themselves are subject to market forces (e.g., the price of electricity in wholesale markets) that may impact the financial benefits of a solar investment over time.

We urge the Commission to supplement the information on its website to note that retail electricity rates and the subsidies provided to private solar customers are subject to change. The most objective approach is to encourage customers interested in private solar to check with their PUC or State Attorney General for the most up-to-date information about electricity rate structures as they affect private solar customers.

Appendix A

Edison Electric
INSTITUTE

Edward H. Comer
Vice President, General Counsel & Corporate Secretary

June 7, 2016

Donald S. Clark, Secretary of the Commission
Federal Trade Commission
Office of the Secretary
600 Pennsylvania Avenue N.W., Suite CC-5610 (Annex B)
Washington D.C., 20580

Re: Solar Electricity Project No. P161200

Dear Secretary Clark,

In advance of the Federal Trade Commission's (FTC) June 21, 2016, "Something New Under the Sun: Competition and Consumer Protection Issues in Solar Power" Workshop, the Edison Electric Institute (EEI) hereby submits these comments addressing competition and consumer protection issues that may arise when electricity customers choose to install private solar photovoltaic panels to generate some of their own electricity. EEI is the national association of shareholder-owned electric power companies.

These issues are being actively addressed in state legislative, regulatory and enforcement proceedings across the country. We strongly encourage the Commission to take full account of these state activities in its deliberations.

EEI appreciates the opportunity to participate in the workshop and to submit these comments.

Sincerely,

Edward H. Comer
Vice President, General Counsel & Corporate Secretary

cc: Phil Moeller, Senior Vice President, EEI

701 Pennsylvania Avenue, NW | Washington, DC 20004-2696 | 202-508-5000 | www.eei.org

Comments of the Edison Electric Institute
Something New Under the Sun:
Competition and Consumer Protection Issues in Solar Power
A Federal Trade Commission Workshop

Solar Electricity Project No. P161200

June 7, 2016

In advance of the workshop on solar power that will be held by the Federal Trade Commission (FTC or Commission) at the end of June, the Edison Electric Institute (EEI) submits these comments addressing competition and consumer protection issues that may arise when electricity customers choose to install private (often rooftop) solar photovoltaic (PV) panels to generate some of their own electricity. EEI appreciates the opportunity to participate in the workshop and to submit these comments. The FTC has an important role to play in understanding the competitive dynamics of electricity markets and in protecting consumers that are being marketed to install distributed generation (DG) systems, like private solar PV.

EEI is the association that represents all U.S. investor-owned electric companies, international affiliates and industry associates worldwide. Our members provide electricity for more than 220 million Americans, operate in all 50 states and the District of Columbia, and directly employ nearly 500,000 workers. Investing more than $100 billion, on average, in annual capital expenditures, the electric power industry is responsible for millions of additional jobs.

Safe, reliable, affordable, and clean electricity powers the economy and enhances the lives of all Americans. EEI's members include the local distribution companies (LDCs) that interconnect customers' private solar PV generators to the larger power grid and then continue to provide them a range of services. The interconnection, delivery, and support services that LDCs provide are essential for customers who install private solar systems. Our members also include companies that produce and sell electricity at wholesale and retail and that have a strong interest in fair competition with private solar generators and in achieving efficient electricity prices for their customers.

This workshop provides an opportunity for the FTC to shine a light on the competitive distortions sought by some members of the distributed solar industry. Taking advantage of the enthusiasm for more environmentally-friendly alternatives in many aspects of our lives, some members of the solar industry seek rules that would increase their companies' profits at the expense of equally environmentally-friendly, but more efficient, alternatives and would subsidize private solar consumers at the expense of those less well-off.

In all states, retail customers have the right to self-generate, or produce their own power.[1] Customers have long been able to buy back-up generators and/or to purchase private solar systems or other forms of private generation. For example, commercial and industrial customers (C&I) have installed combined heat and power (CHP) systems that have allowed them to produce their own electricity for years. As of 2015, over 82.7 gigawatts (GW) of CHP capacity exists at more than 4,400 C&I facilities across the country.[2] For most customers, however, electric companies produce and deliver power at far less cost and with far greater reliability to individual customers than private generation options.[3]

The debate over current net metering policies is not a debate over the right to self-generate. Customers have that right. Rather, the retail net metering policy debate is an economic debate about the price electric companies and their customers are required to pay for generation from

---

[1] Not all states allow retail net metering or direct sales from private solar customers to others, but customers in these states may install solar panels to generate electricity for their own use.

[2] Department of Energy, *Combined Heat and Power Technical Potential in the United States* (Mar. 2016), at p.5, http://www.energy.gov/sites/prod/files/2016/04/f30/CHP%20Technical%20Potential%20Study%203-31-2016%20Final.pdf

[3] *See* Electric Power Research Institute (EPRI), *The Integrated Grid: Realizing the Full Value of Central and Distributed Energy* Resources (Feb. 2014), http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002002733&Mode=download.

customer-based, private solar systems and the price private solar customers pay for their use of the power grid.[4]

I. The Current State of the Electric Power Industry

Today, a profound transformation is underway across the United States as the way energy is produced and used is changing due to changes in technology, policy, and customer demands. The electric power industry is transitioning to cleaner generation sources and leading the way on renewables and next generation nuclear power. We also are building smarter energy infrastructure, and our investments are making the power grid more dynamic and more secure for all customers. We are providing customers with solutions to meet their energy needs and are partnering with leading innovative companies and start-ups to ensure that customers can take advantage of new technologies.

This transformation comes on the heels of another: significant competition in the power sector. As a result of a series of actions at the state and federal level, there is more competition in the power sector than ever before. Today, two-thirds of the U.S. population is served by wholesale regional electricity markets run by regional transmission organization (RTOs) or independent system operators (ISOs)(collectively, RTOs). RTOs deliver reliable electricity through competitive market mechanisms. *See* FERC Energy Market Primer at 58.[5] Many states and the District of Columbia have adopted retail electricity competition, which allows customers to choose their electricity supplier. In 2014, competitive suppliers served nearly 60 percent of the customer demand for power in the areas where they operate. *See* COMPETE Report at 2.[6] From

---

[4] There is a subsidiary issue of whether customers have the right to purchase electricity from third-party companies that build systems on the customer premises and sell or deliver power. This issue is related to state policies regarding retail competition, not the right to self-generate.

[5] Federal Energy Regulatory Commission (FERC), Division of Energy Market Oversight, *Energy Primer: A Handbook of Energy Market Basics* (Nov. 2015) (FERC Energy Market Primer), http://www.ferc.gov/market-oversight/guide/energy-primer.pdf.

[6] Philip R. O'Conner and Erin M. O'Connell-Diaz, COMPETE, *Evolution of the Revolution: The Sustained Success of Retail Electricity Competition* (July 2015) (COMPETE Report),

2003 to 2013, the amount of power competitive suppliers sold directly to end-use customers grew dramatically even in an era of overall flat growth in electricity consumption: 181 percent for C&I customers and 673 percent for residential customers, which accounts for 20 of every 100 kilowatt hours sold in the contiguous United States. *See id.*

Even in states that do not offer customer choice, power prices are based on the cost of the services necessary to provide electricity on demand and are reviewed by the Federal Energy Regulatory Commission (FERC) and state public utility commissions (PUCs) to ensure that they are just, reasonable, and not discriminatory. State regulators also compare the cost of power generated by electric companies to competitive alternatives to determine avoided costs under the Public Utility Regulatory Policies Act (PURPA).

A. Electric Companies are Building Smarter Infrastructure Using New Technologies

The power grid efficiently delivers reliable and safe energy so that customers get the electricity they need. The owners and operators of the power grid work to maintain and improve grid security, reliability, and resiliency. Our security strategies are constantly evolving and are closely coordinated with federal, state, and local governments.

The continued deployment of digital smart meters—nearly 65 million have been installed in nearly half of all U.S. households to date—is one key building block of a more secure and more dynamic power grid. In addition to smart meters, increased deployment of power grid-level sensors is providing increased visibility at the sub-feeder level, allowing for more granular operational capabilities. Investments like these that hasten the integration of new technologies, such as universal, large-scale wind and solar, private wind and solar, energy storage, micro grids, and other devices in customers' homes and businesses, are another. Electric companies are partnering with developers and startups to deploy a range of new technologies to better serve their customers.

---

http://competecoalition.com/files/COMPETE%20White%20Paper_Evolution%20of%20Revolution_Final.pdf.

B. Electric Companies Are Creating Energy Solutions Customers Want

New technologies increasingly enable energy personalization, and many customers want more flexibility and want to be more engaged in managing their energy use. Electric companies are changing the way services are provided to customers to individualize them: for residential customers who want to install DG or manage their energy use using connected devices and web-based platforms; for large customers (like data centers and major corporations) that want to use renewable energy; and for cities that want electricity from more sustainable sources and to reduce their carbon footprint.

Today, electric companies are working with C&I customers that are seeking reliable renewable energy to meet their sustainability goals. Even sophisticated corporate buyers have found renewable development complicated, time-consuming, and potentially risky. For this reason, EEI member companies, the World Wildlife Fund (WWF) and World Resources International (WRI) created the Utility-Corporate Buyer Collaborative in 2015.[7] This Collaborative is aimed at helping electric companies provide their customers with cost-effective renewable electricity.

Electric companies also help customers save energy. In fact, their investments in energy efficiency (EE) saved enough electricity to power 14.7 million U.S. homes for one year and avoided the generation of 107 million metric tons of carbon dioxide in 2014.[8] Electric utility EE expenditures totaled nearly $7.3 billion in 2014. *See id.*

C. Electric Companies Are Quickly Expanding Clean Energy Supplies

In just 10 years, the mix of sources used to generate electricity has changed dramatically—today we are adding significant amounts of natural gas, wind, and solar as we steadily retire coal-based

---

[7] EEI, WWF and WRI, *Creating Renewable Energy Opportunities, Utility-Corporate Buyer Collaborative Forum* (June 2016), http://buyersprinciples.org/wp-content/uploads/Utility-Corporate-Buyer-Collaborative-Forum-Strategic-Insights.pdf.

[8] Institute for Electric Innovation (IEI), *Electric-Utility Customer-Funded Energy Efficiency Savings, Expenditures, and Budgets (2014)*, IEI Issue Brief (Nov. 2015), p. 2, http://www.edisonfoundation.net/iei/Documents/IEI_2015USEnergyEfficiency_2014Exp_FINAL.pdf.

power plants. Coal's share of total net electricity generation dropped from 50 percent in 2005 to 34 percent in 2015.[9] One-third of all electricity generated in 2015 came from zero-emitting resources, including nuclear, wind, solar, hydropower, and other renewables. *See id.* As a result of these changes in the generation mix, as well as other environmental requirements and increased energy efficiency, the power sector has significantly decreased its greenhouse gas (GHG) emissions. At the end of 2015, the sector's GHG emissions were nearly 21 percent below 2005 levels.[10]

Electric companies[11] are responsible for virtually all of the wind, geothermal, and hydropower in the country and about 60 percent of all U.S. solar capacity.[12] Analysts expect another record year for solar power. Electric companies expect to install nearly three times as much solar in 2016 as they did in 2015, with the goal of bringing cost-effective solar to customers.

An important factor in the increased use of clean energy is the dramatic decline in the costs of using cleaner resources to generate electricity. New drilling technologies have expanded supply and reduced natural gas prices, so that power from gas generation often displaces power from coal. And prices for renewable power have also declined significantly over the past 10 years.[13]

---

[9] *See* DOE, Energy Information Agency (EIA), *Annual Energy Outlook 2016, Early Release, Table: Electricity Supply, Disposition, Prices, and Emissions* (May 2016), http://www.eia.gov/forecasts/aeo/data/browser/#/?id=8-AEO2016&cases=ref2016~ref_no_cpp&sourcekey=0.

[10] *See* EIA, Monthly Energy Review (May 2016), http://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf.

[11] In this instance, "electric power companies" includes investor-owned utilities, public power, rural electric cooperatives, and independent power producers.

[12] EEI (2016). Data collected from EIA, SEIA, GTM, SMI.

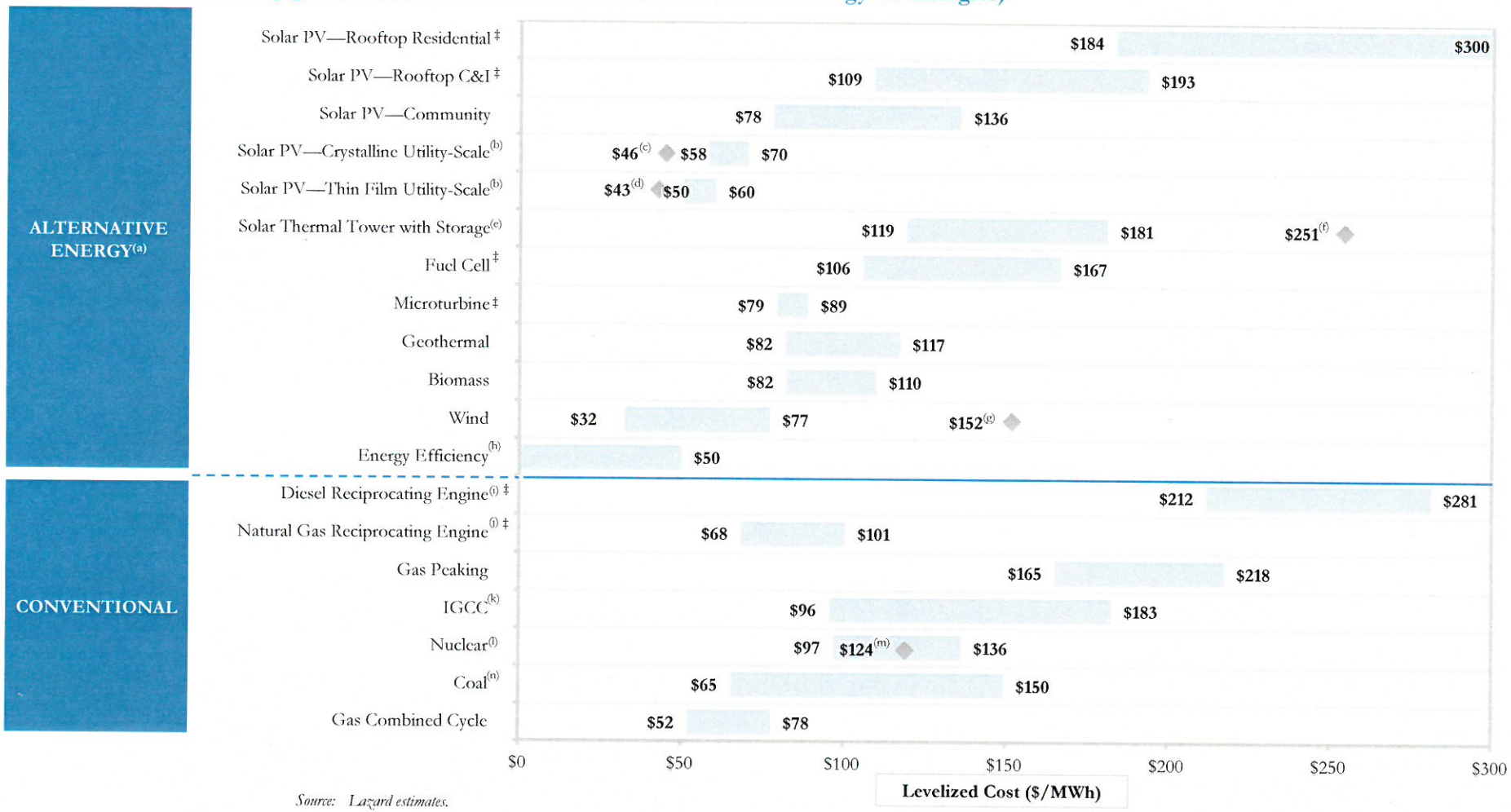
[13] *See* Renewable Energy Policy Network for the 21st Century, *10 Years of Renewable Energy Progress*, http://www.ren21.net/Portals/0/documents/activities/Topical%20Reports/REN21_10yr.pdf.

The least costly renewables are those used to generate electricity at a larger scale. In many places and at some times during the day, large-scale renewables can compete with traditional natural gas-based generation, which sets marginal prices in most electricity markets. However, despite the large cost decreases for solar panels, private residential PV solar remains one of the most expensive types of electricity. See Fig. 1. As the graphic below demonstrates, universal, or large-scale solar generation is significantly less expensive than private rooftop residential solar.[14]

[14] *See also* Bruce Tsuchida et al., Brattle, *Comparative Generation Costs of Utility-Scale and Residential-Scale PV in Xcel Energy Colorado's Service Territory* (July 2015), http://brattle.com/system/publications/pdfs/000/005/188/original/Comparative_Generation_Costs_of_Utility-Scale_and_Residential-Scale_PV_in_Xcel_Energy_Colorado%27s_Service_Area.pdf?1436797265.

Unsubsidized Levelized Cost of Energy Comparison

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under some scenarios; such observation does not take into account potential social and environmental externalities (e.g., social costs of distributed generation, environmental consequences of certain conventional generation technologies, etc.) or reliability-related considerations (e.g., transmission and back-up generation costs associated with certain Alternative Energy technologies)



Source: Lazard estimates.

Note: Here and throughout this presentation, unless otherwise indicated, analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost for both conventional and Alternative Energy generation technologies. Assumes diesel price of ~$2.50 per gallon, Northern Appalachian bituminous coal price of ~$2.00 per MMBtu and a natural gas price of ~$3.50 per MMBtu for all applicable technologies other than Natural Gas Reciprocating Engine, which assumes ~$5.50 per MMBtu. Analysis does not reflect potential impact of evolving regulations/rules promulgated pursuant to the EPA's Clean Power Plan. **See following page for footnotes.**

‡ Denotes distributed generation technology.

Copyright 2015 Lazard.

No part of this material may be copied, photocopied or duplicated in any form by any means or redistributed without the prior consent of Lazard.

The solar PV panels used for both private and universal solar are the same. The high costs of private solar are primarily due to high installation costs and low capacity factors. Universal solar is significantly less expensive because of economies of scale—a medium-sized solar power plant is 60 megawatts (MW), which is 10,000 times larger than the typical 6 kilowatt (kW) rooftop system.[15] Large-scale solar also is less expensive because of the much higher capacity factors (and, therefore, greater actual electricity output) achieved by ground-mounted projects with panels that are able to rotate and track the sun.

II. Net Metering: Pricing Private Solar at Retail Rates

The intent of the original net energy metering policies, which date as far back as the early 1980s, was to incent early adoption of small wind turbines and solar panels at a time when these technologies were expensive and electric companies only had analogue meters. These programs were small, almost always capped as to the number of customers or capacity allowed to participate. Given the metering technologies available at the time, they adopted a simple approach of spinning the meter forward during times when the customer relied upon the grid for power and backward when the system was exporting power onto the grid.[16] The programs were intended to help jump-start the amount of electricity generated using renewables, not to shift the significant costs of operating, maintaining, and enhancing the power grid from one group of customers to another as net metering at the retail price does today.

Customers who install private solar systems continue to rely on the power grid.[17] In fact, private solar customers use the grid more intensely than other customers: they both receive power from

---

[15] In some states, like New York, individual private solar customers are permitted to aggregate their generation for regulatory purposes.

[16] Analogue meters could only run forward and back; they could not record time of use. Today's smart meters are capable of measuring purchases and sales and time of use with little, if any, additional cost.

[17] Private solar, or other DG, customers who wish to truly disconnect from the power grid and not utilize grid services are not and should not be required to pay for the grid. However, most solar customers do not disconnect from the grid because of the extremely high cost of storage,

the grid when their systems cannot meet their needs (because the sun is not always shining), and they send power back to the grid when their systems produce more power than they need. Private solar systems require voltage support from the grid to power a household, even when they provide all the electricity a customer uses.[18] As a practical matter, private solar customers are taking power from the grid and sending it back every day. As we look to a future where DG resources, such as private solar, continue to grow and comprise a larger share of the energy resources on the nation's power grid, it is critical that the customers who own these resources help pay for the power grid upon which they rely.

A. <u>There are Fundamental Problems with Retail Net Metering</u>

In order to understand the problems with net metering at retail rates, it is important to first understand how residential electricity rates are designed. For a host of cost, technology, and policy reasons, residential retail rates historically have been designed to recover the majority of the costs of residential service on the basis of energy consumption, with most of the fixed costs and capacity related costs rolled into a volumetric charge. This residential retail rate, which generally remains constant regardless of the time when the electricity is used, includes the cost of the power generation, as well as a number of otherwise fixed costs associated with delivering the power from the generation source through the grid to the customer. These services, which are necessary to provide electricity upon demand to any customer who wants it, include constructing, maintaining, and operating the transmission and distribution systems, providing balancing, voltage, and frequency response services, and support activities (e.g., customer support and billing services).

---

their desire for back-up power when the sun in not shining, reliability, and other factors. *See* EPRI, *supra*, n.1.

[18] As EPRI has noted, "the grid provides instantaneous power for appliances and devices such as compressors, air conditioners, transformers, and welders that require a strong flow of current ("in-rush" current) when starting up. This enables them to start reliably without severe voltage fluctuation. Without grid connectivity or other supporting technologies, a conventional central air conditioning compressor relying only on a PV system may not start at all unless the PV system is oversized to handle the in-rush current." EPRI, *supra*, n.1, at 18.

A typical residential electricity customer consumes, on average, about 1,000 kWh per month and pays an average monthly bill of about $110.[19] About half of that bill (i.e., $60 per month) covers charges related to the non-energy services provided by the power grid. Because of the simple volumetric residential retail rate design, a private solar customer inherently does not pay for some of the fixed costs of these grid services they use. If, in addition, the customer is paid the retail rate for electricity sold back to the power grid, the customer, perversely, will be *paid* the amounts intended to pay for the fixed costs of grid services, even though the customer is consuming, not providing, grid services. This creates two problems in the context of retail net metering: (1) above-market payments to private solar customers and (2) cost shifting among customers.

B. Retail Net Metering Pays Private Solar Systems Higher than Competitive Prices for Power

Electric distribution companies are required to procure and/or provide electricity to all customers who request service in their territories, regardless of how much or how little electricity these customers need. In a large majority of the country, electricity generators operate in competitive wholesale markets where the price of power is determined through competitive power markets. This wholesale market cost of generation is then passed directly on to customers. In non-competitive or vertically integrated states, generation prices are regulated by state PUCs, where they are a function of the cost of service for that generation unit plus a reasonable rate of return. Such PUCs, however, are fully aware of the costs of alternative sources of electricity through their determination of avoided costs. In both instances, the power generation charge, or wholesale power rate, is just one component, which, as previously noted, typically is less than half of the final retail rate.

Retail net metering policies, however, require electric companies to pay an above-market price, the all-in retail rate, for private solar generation that is not used by the customer—and this cost is eventually paid by all customers who have not opted for private solar. The cost difference is

[19] IEI, *Issue Brief, Value of the Grid to DG Customers*, pp. 3-4 (Oct. 2013).

significant.[20] Instead of the competitive or cost-based price that electric utilities pay for all other solar power, which is usually around 5 cents per kWh, private solar customers are paid anywhere from 12 to 20 cents per kWh. There is no difference between the actual solar power provided, just the location of the PV panels with respect to the customer meter.[21] Because the electric company is required to buy this power when it is generated and there is no cost-effective means currently available to store power, it will have to forgo purchasing less expensive market-priced power in order to maintain reliability. This harms other suppliers, including other solar suppliers that can and do provide electricity at lower cost.

Retail net metering requires non-rooftop solar customers to pay significantly above-market prices for solar power that could otherwise be purchased or generated by their electric company for roughly one-third to one-half of the price. This is not only inefficient but anti-consumer, as it provides one particular source of generation—high-cost private rooftop solar—with a distinct competitive pricing advantage.[22] A net metering policy that paid private solar customers either the competitive wholesale price for power or the electric company's avoided cost of producing that power would be much more equitable for non-solar customers and be more consistent with competitive market principles.

Electricity prices also can be quite volatile over the course of a day, as well as vary seasonally. Rather than reflecting those price changes, retail net metering simply treats all energy the same, regardless of the time of day when it was produced. In most states, the time at which solar

---

[20] The cost of PV has fallen more than 80 percent in the last five years—with further projected decreases—but the retail price paid to private solar customers has not been adjusted to reflect these decreases. *See* Lazard, *Levelized Cost of Energy Analysis - Version 9.0* (Sept. 2015), https://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf

[21] Technically, solar power is less valuable if it is variable and not able to be dispatched by a system controller.

[22] Thus, it is not surprising that consumer organizations like the American Association of Retired Persons (AARP) oppose retail net metering. *See* AARP, *The Policy Book: AARP Policies 2015-2016*, ch.10, Distributed Generation and Net Metering, http://policybook.aarp.org/the-policy-book/chapter-10/subsub066-1.2034759.

production peaks is not the same time as when the system demands, and price, for power are the greatest. Typically, private solar systems will produce excess solar energy that is exported back to the power grid in the middle of the day when the price of that energy is lower and will use grid-supplied power in the evening when the price is higher, without having to pay the pricing differential on the electricity produced and consumed. This not only distorts market prices, but it also drives inefficiencies by incentivizing customers to site rooftop solar to maximize production, as opposed to maximizing the market value of the electricity. In order to address this concern, electric companies have proposed time-of-use rates, whereby the energy component of the bill tracks more closely with the competitive price of power at a specific time of day.

C. Retail Net Metering Forces Non-Solar Customers To Pay Grid Costs for Private Solar Customers

Private solar customers rely on the utility grid all the time, but do not share equitably in the costs of operating and enhancing the grid like other customers. Retail net metered customers generally are credited for the electricity they sell to the grid, with their electric meter essentially spinning backwards to provide a credit against the electricity that these customers must buy from their electric company at night or during other periods when their electricity use exceeds their private solar system's output. By way of illustration, a private solar customer can size a solar array to become a "net-zero" consumer, meaning that over the course of the year the system is producing as much energy as the customer uses. Of course, on a day-to-day basis, the customer is not a net-zero consumer of grid services, but is using the grid all the time. In effect, these customers are using the grid as a "free battery," although no actual storage of energy occurs. Unlike other commodities, and in the absence of specific energy storage technologies such as large-scale batteries, which remain very expensive at this time, electricity must be used when it is produced.

As a result, during the day, private solar customers use the power grid to export excess electricity for use by other customers, and, during the night, private solar customers use the grid to import electricity from other generation resources into their homes. Moreover, they rely on the grid to smooth out peaks and valleys in their generation profile due to the variability of distributed

generation, including rooftop solar. And, if there is a failure with their solar system, private solar customers can rely on the grid to meet their full power needs and can call their electric companies for support.

It is important to remember that net-metering customers are not sharing equitably in the costs of any of these services—not the cost of operating and upgrading the power grid, not the cost of metering and billing services, and not the cost of voltage and other support services. In fact, they are actually being paid for the grid services that they are using. These costs are recovered from the remaining non-private solar customers who are part of that same residential customer class. Recently, the Nevada PUC found the cost shift in that state to be approximately $16 million annually.[23] The California PUC commissioned a similar study, which estimated that, by 2020, approximately $1.1 billion would be shifted annually from private solar to non-private solar customers under California's retail net energy metering construct.[24] That same study also found that non-solar customers are less affluent than the private solar customers they are subsidizing, which raises additional equity issues. *See id.*

This preferential treatment of private solar, therefore, creates an unfair cost shift as the costs of providing grid services to private solar generators are passed through and recovered from all other non-solar customers. This is why consumer groups like AARP oppose retail net metering.

III. Competition Issues

The goal of any antitrust review is to protect competition, not competitors. To protect competition, the FTC assesses whether potentially exclusionary conduct has occurred, which requires consideration of the existence of market power as well as any barriers that would prevent competitors from entering the market. While some have speculated that antitrust may

---

[23] Public Utilities Commission of Nevada, Modified Final Order, *Application of Nevada Power Company d/b/a NV Energy for Approval of a Cost-of-Service Study and Net Metering Tariffs*, Docket Nos. 15-07041, 15-07042, February 17, 2016.

[24] E3, *California Net Energy Metering Ratepayer Impacts Evaluation* (Oct. 2013), http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=4292.

have a role to play in expanding the use of private solar systems,[25] the actual record does not bear this out.

A. Myth: Customers Installing Private Solar Face Barriers

Electricity end-use customers have always had the right to install their own generation to meet their own electricity needs.[26] Long before solar PV entered the market, some electricity customers chose to install backup generators, CHP systems, and other generation options to meet some or all of their electricity needs.

Electric companies are required by law to interconnect smaller renewable generators and purchase their power as a result of the passage of PURPA. While electric suppliers and distribution companies are obligated to provide and deliver affordable, reliable power to all customers, customers are not and have not ever been required to purchase a minimum amount of electricity from their suppliers. However, customers are expected to pay a just and reasonable price for the company facilities and services that they use.

While there is a very public retail net metering debate about the price paid to private solar generators for solar power sold back to the grid and the price of grid and other services used by private solar customers, there are no structural or regulatory barriers to installing private DG solar panels for one's own use.

---

[25] *See, e.g.,* Jon Wellinghoff and Steven Weissman, *The Right to Self-Generate As A Grid-Connected Customer,* ENERGY L.J. (Nov. 16, 2015).

[26] As noted previously, whether customers have the right to install private solar is separate from whether they have a right to be paid the retail rate for electricity sold back to the grid or the right to sell power directly to others.

There are no licensing laws or similar state approval requirements for private solar generators or the companies that sell or lease them the solar panels.[27] Almost all other providers of power, including distribution companies, are subject to regulatory review, which entails applications and ongoing reporting requirements at either or both the state and federal levels. But, this is not the case for private solar generators or the companies that provide the solar PV panels.

Similarly, states do not require new private solar systems to demonstrate that there is a need for new market entrants. In fact, states and the federal government have created a number of incentives and subsidies to encourage and increase the amount of private solar. These incentives and subsidies help those interested in private solar by closing the economic gap between private solar and larger-scale universal solar power plants.

The interconnection of solar panels to electric company distribution systems requires assurances that the connections are safe and consistent with utility operations.[28] Therefore, it can take time to actually interconnect new private solar systems safely and reliably. With the advent of new smart technologies, distribution companies continue to learn more about the physical operations of the distribution system and the impact of substantial additions of distributed generation. FERC and state commissions are conducting proceedings to expedite interconnection and electric companies are making concerted efforts to reduce wait times and streamline application processes. For example, EEI member companies in California, where there is a large and growing number of private solar customers seeking interconnection every year, have made significant efforts to streamline the process, moving to a more automated, web-based application,

---

[27] Contractors who install private solar systems may have to obtain the appropriate state or local license and some construction permits may be required, but private solar customers need not seek a license to have the solar panels installed on their homes.

[28] High solar penetration "introduces issues such as the nature, cost, and impact of interconnection, voltage stability, frequency regulation, and personnel safety." IEEE, IEEE Report to DOE on QER Priority Issues (Sept. 5, 2014), at p. 22, http://www.ieee-pes.org/images/files/pdf/IEEE%20QER%20Report%20September%205%202014%20HQ.pdf.

simplifying requirements, and increasing coordination among the various state and company actors.[29] These efforts have brought interconnection times down to a matter of days. Interconnection is not a barrier to entry. Solar companies that chose to exit Nevada did so in response to changes in net metering policy, not concerns about delays in interconnection. Indeed, a Solar Electric Industries Association (SEIA) report released in January found that residential solar grew by 50 percent in each of the last four years.[30] And, the solar industry more recently announced that there are one million different solar installations nationwide—each requiring its own interconnection.[31] This number is a huge achievement for all involved.

B. Distributed Generation Relies on Electric Company Services and Is Not Generally In Competition With Them

Electricity service relies on a complex system of infrastructure that falls into two general categories: (1) generation and (2) transmission and distribution.[32] The provision of transmission services is regulated by FERC and the provision of distribution services is regulated by state PUCs. The rates paid by customers for distribution services are set by state regulators, consistent with the costs of providing these services.

Private solar generation does not replace the transmission and distribution services provided by the LDC to all retail customers.[33] In fact, as discussed above, customers who install solar panels

---

[29] *See, e.g.*, Kristen Ardani and Robert Margolis, National Renewable Energy Laboratory, *Decreasing Soft Costs for Solar Photovoltaics by Improving the Interconnection Process, A case Study of Pacific Gas and Electric*, NREL/TP-7A40-65066 (Sept. 2015).

[30] SEIA, *Solar Market Insight 2015 Q4*, http://www.seia.org/research-resources/solar-market-insight-2015-q4.

[31] SEIA, *Million Solar Strong,* http://www.seia.org/campaign/million-solar-strong.

[32] In reality, generation, transmission, and distribution work together in many complex ways to assure the reliability of electric service.

[33] If sited appropriately and if the LDC has visibility into and control over how and when a distributed generator produces electricity, the distributed generator can provide some benefits to the transmission and distribution system in terms of deferred upgrades. To date, however, few

continue to rely on the distribution system to provide them power when their systems are not generating electricity and to absorb and re-distribute any electricity generated that is not needed by the private solar customer. As a result, distributed generation supplements the generation of electricity, but does not replace the other services that the LDC provides.

Moreover, many electric distribution companies in the U.S. do not generate electricity. Many states and D.C. have implemented some form of retail competition. In these states, customers choose their own electricity providers, and LDCs are not allowed to own generation. By definition, then, these distribution companies do not compete with private solar generation.

In states that have not opted for retail competition, PUCs regulate the costs of the generation that is provided to customers. In addition, in these states, vertically integrated electric companies must also get approval from their PUCs to build new generation, so they cannot independently decide to install new generation in an effort to drive private solar out of the market.

Importantly, private solar has flourished in both states that do and do not participate in competitive markets. For example, North Carolina does not have retail choice, but has seen dramatic deployment of private solar in recent years. In 2015, 1,134 MW of solar capacity was installed, the second largest amount in the nation.[34]

C. Paying Private Solar Generation Above Market Rates is Inefficient and Harms Consumers

The combination of retail net metering and higher retail electricity rates, along with significant subsidies, has driven the expansion of distributed solar nationally. Five states—Arizona, California, Hawai'i, Massachusetts, and New Jersey—account for almost 80 percent of the private solar generation in the U.S. What these states have in common is not abundant solar

---

existing distributed generators have installed the technology and communications equipment to realize these potential benefits.

[34] *See* SEIA, *State Solar Policy, North Carolina*, http://www.seia.org/state-solar-policy/north-carolina. SEPA does not separate installed capacity figures into private and universal categories.

resources, but higher retail electricity rates, retail net metering, and significant subsidies—all of which enable solar companies to sell or lease systems at prices much higher than systems in neighboring states with lower pricing. While this may help solar companies, it harms other lower-cost generation sources by reducing purchases from them.

Electric companies believe that private solar customers should be paid the competitive rate for their electricity and that these customers—if they continue to use the power grid for back-up power and to sell energy back—should share the costs of operating and enhancing the grid like all other customers. Importantly, this would not impinge on the customers' right to only pay for net electricity demanded. The original regulatory incentive for the solar customer—net metering—would remain unchanged. What would change would be the amount the customer is paid for energy sold back to the power grid. Seeking to pay competitive rates to private solar customers who sell power back to the grid is not anticompetitive or exclusionary behavior.

The competitive price is the price the market determines is appropriate or regulators determine is the lowest available in the market.[35] There are many reasons why the FTC should be in favor of a competitively determined rate.

Allocating the fixed costs of the power grid among different customers and different uses is complicated. State PUCs, which have jurisdiction over these issues and have been setting and reviewing electricity rates for 100 years, are experts in this area. Many state PUCs are looking at a variety of possible options, including net metering at a more competitive rate, demand charges, or creating separate rate classes for private solar DG customers. Any eventual modification of retail net metering policies does not represent anticompetitive behavior, but rather a logical response to the growing maturity of the technology.

Regardless of the rates that states decide private solar customers should pay for the grid and be paid for electricity sold back to the grid, states retain the right to incentivize increased

[35] Applying PURPA or similar state laws, utility commissions regularly determine this "avoided cost" based on reference to competitive conditions.

deployment through a variety of other means that do not directly distort competitive pricing. Federal and state governments and regulators have many mechanisms to promote clean generation, including private solar, and do so through tax incentives, subsidies, and other means that less directly affect prices and competition.

IV. Consumer Protection

The decision to purchase or lease a private solar system, a major purchase by any definition, can be a complex and potentially confusing process for customers who rarely, if ever, have experience in such transactions. These private solar systems typically cost tens of thousands of dollars and involve lease agreements that can last 20 to 30 years. The cost, complexity, and time commitment involved certainly warrant the FTC's attention to ensure that customers receive clear, accurate information to allow them to make informed decisions. While the Commission will surely receive excellent information from others who are truly the experts in this arena, there are a few issues that bear mentioning.

First, it is critical that consumers receive understandable, accurate information. As an industry, we have learned time and again the importance of transparency and customer education to the success of rolling out new technologies. This held true during the inception of energy efficiency programs and continues to hold true today as we roll out smart meters and other newer technologies. Targeted customer education by those with the information, presented in a clear and accurate way, enables customers to make informed decisions and appreciate the entirety of the transaction before making an installation decision. This is particularly important in the context of private solar because government policies and regulations that affect the value of a purchase or lease decision are not likely to be static, especially for 20 or 30 year lease terms.

Early on, many solar leasing companies estimated electric company rates would increase at an unrealistic 10-30 percent annually, which is unsupported by any realistic, factual analysis. Currently, uncertainty about the future of net metering policies raises a serious potential to mislead or deceive customers. This uncertainty already has become an issue in Nevada, where the PUC has openly questioned whether private solar sellers and marketers disclosed the direct

impact that recently enacted legislation could have on programs such as net metering.[36] Nevada is not an isolated case. Almost half of the states passed electric policy legislation in 2015, often relating to solar pricing issues, and several states this year specifically considered legislation related to whether to extend net metering caps and/or change net metering policies.[37]

In order to address some of these concerns, Arizona recently passed consumer protection legislation requiring certain disclosures around the terms, conditions, and total cost of the private solar contract or lease, including the tax incentives, the financing obligations, the potential for regulatory changes both in rates and programs, and the assumptions about future electric rates used to determine the savings projections for private solar customers.[38] The Arizona legislation will help customers better understand some of the complexities they should consider and that private solar is not free even if the fuel is free.

The FTC's own website also provides a helpful tool for customers interested in private solar in the Solar Power for Your Home guide.[39] Of particular note, the guide discusses the role that renewable energy certificates (RECs) play in determining what truly is and is not clean energy or green power. This is an excellent example of an issue where a large majority of customers do not understand that if they do not retain the RECs, they cannot be compensated for the renewable

---

[36] Nevada PUC Order, *supra*, n.23.

[37] Solar leasing companies and their representatives have aggressively lobbied state legislatures and executives in these states. *See e.g.,* Fortune, *"Why Nevada Legislators (Plus Leo Dicaprio) Visited Telsa's Gigafactory,"* March 17, 2016, http://fortune.com/2016/03/17/nevada-legislators-tesla-gigafactory/; *see also,* The Washington Times, *"As Renewable Energy Debate Heated Up, Firms Doubled Lobbying,"* July 7, 2015, http://www.washingtontimes.com/news/2015/jul/7/ap-renewable-energy-firms-ramp-up-lobbying-in-mass/; *see also,* The Arizona Republic, *"SolarCity Funded Clean-Energy Advocacy Group that Targeting Arizona Utility Regulators,"* December 12, 2015, http://www.azcentral.com/story/money/business/energy/2015/12/13/solarcity-funded-group-targeted-arizona-utility-regulators/77105808/.

[38] Arizona SB 1465.

[39] *See* https://www.consumer.ftc.gov/articles/0532-solar-power-your-home. However, even this site does not fully advise consumers as to the potential risks and potential policy changes that could affect them.

attributes of the private solar systems that they may own or lease and, perhaps more importantly to many, the power that they use cannot be characterized as renewable energy. The REC situation creates a potential for misleading information and confusion in violation of the Commission's own advertising guides and can result in dissatisfaction for those customers seeking the environmental benefits.[40]

Finally, as the FTC looks at private solar through the lens of consumer protection, it is important to recognize that consumer protections are inherent in the electric power industry, which remains a heavily regulated business. Regulatory oversight by state PUCs remains highly focused on consumer protection, providing a clear and well understood process for customers and consumer advocates to participate to achieve desired goals. Customers know precisely where to go in the event that they have a complaint about a regulated electric company or LDC.

At the end of the day, when customers make the decision to lease, finance, or purchase a solar generation system, they are making a significant and long-term financial decision. Our work with large C&I customers demonstrates that there are many complexities and risks in the long-term purchasing of renewable power that residential customers are unlikely to understand.

There is great potential to mislead and deceive residential customers interested in a private solar system. EEI itself has received e-mails marketing solar from the "U.S. Solar Department" with an official-looking emblem. We see marketing that strongly implies solar is "free," that solar generators are "off the grid," and that promotes "going solar" without disclosing that the solar leasing company retains REC ownership. We are pleased that SEIA has improved its consumer guides to highlight some of these problems, but we would note that its guides have no real enforcement mechanisms for companies that engage in deceptive marketing, other than expulsion from SEIA.

We urge the FTC to look closely at consumer protection matters to ensure that marketing information is not false, deceptive, or misleading.