Institute for Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

June 7, 2016

Federal Trade Commission
Office of the Secretary
400 7th Street SW
5th Floor, Suite 5610 (Annex B)
Washington, DC 20023

Dear Federal Trade Commission:

The Institute for Policy Integrity at New York University School of Law[1] ("Policy Integrity") respectfully submits the following comments for Something New Under the Sun Workshop. Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity has extensive experience advising stakeholders and government decisionmakers on the rational, balanced use of benefit-cost analysis, both in federal and state level practice.

We are grateful for the Commission's consideration of these comments. Please do not hesitate to contact us if you have any further questions.

Sincerely,

Burcin Unel, Ph.D.
Senior Economist
Institute for Policy Integrity
burcin.unel@nyu.edu
(212) 992-6285

[1] No part of this document purports to present New York University School of Law's views, if any.

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Introduction

As distributed energy resources ("DER") are becoming increasingly common, the debate on how customers with such systems should be compensated is intensifying. More states are undertaking initiatives to evaluate their current policies, especially the policies directed at solar distributed generation such as net metering. As the Federal Trade Commission ("Commission") noted in the announcement notice for Something New Under the Sun Workshop, determining the correct rate for net metering is a complex issue.[2] Ideally, customers should pay for the full cost of the services they receive from the grid, including the externalities, and should receive compensation for the full value they contribute to the grid. Further, as distributed generation continues to grow steadily across the country, it is important to implement a framework that can be used consistently in different states and for different DER, not just solar distributed generation. Finally, as resource choices that can balance demand and supply increase, and utility scale renewables become more common, a consistent formulation that could provide a true value comparison among different alternatives is needed. Therefore, we applaud the Commission's efforts to organize a workshop to explore the issues that dominate the policy debates related to the solar distributed generation.

Below are our responses to select questions posed by the Commission. The responses provided here are based on Revesz and Unel (2016), which provides a discussion of the history of net metering and a background analysis for the Avoided Costs plus Social Benefit approach discussed below. It also discusses the limitations of such approaches, and provides detailed explanations as to why a move towards more dynamic and granular rate structures is needed for a socially optimal DER policy.[3]

Is net metering good policy? At the retail rate? At a different rate?

At its core, the idea of compensating a product or a service at the prevailing retail price like net metering does is not an economically unsound idea. In fact, that is what happens in perfectly competitive markets in the absence of externalities. In such markets, there are many buyers and sellers, none with any market power. Thus, they all buy and sell the product at the same market clearing price. So, if a new producer decides to sell one more unit of the product, the price that she would get in a perfectly competitive market for that unit would be that prevailing market clearing price. Accordingly, the argument that a kWh of electricity produced and sent to the grid by a distributed generator should be compensated at the retail rate is grounded in basic principles of perfectly competitive markets.

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[2] Notice announcing Something New Under the Sun: Competition and Consumer Protection Issues in Solar Power, A Federal Trade Commission Workshop, at 2.

[3] Richard L. Revesz & Burcin Unel, (2016) Managing the Future of the Electricity Grid: Distributed Generation and Net Metering 60-65 (Institute for Policy Integrity, Working Paper No. 2016/1, 2016), *Harvard Environmental Law Review, Vol. 41, No. 1, 2017 forthcoming,* available at http://policyintegrity.org/publications/detail/managing-future-electricity-grid.

In a perfectly competitive market, however, the market clearing price also equals the production cost of the last unit sold in the market. In other words, the retail price in these markets is the cost that would be incurred by another firm that would end up producing that marginal unit in the absence of the new producer. Essentially, the retail price in a perfectly competitive market is also the "avoided cost" of production. Thus, in a perfectly competitive market, the seemingly different argument that a distributed generator should be compensated at the avoided cost would actually lead to the same result as net metering. In other words, if the electricity market was a competitive market with no externalities, net metering – the practice of reimbursing a producer at the prevailing retail price – would be the right policy.

However, the complex structure of electricity markets and the inefficiently designed retail electricity tariff makes the seemingly simple application of this basic economics principle more demanding. While the market determined retail rate in perfectly competitive markets is the marginal cost of production, the same is not true for the retail electricity prices. Many retail electricity tariffs use inefficiently designed flat volumetric per kWh rates as determined by state public utility commissions. These rates are intended to cover not only the variable costs of generating electricity itself, but also other fixed costs including transmission, and distribution expenses as well as including a reasonable rate of return for the utilities.[4]

The efficiency problems created by the interaction of net metering policies and inadequate retail rate designs are preventable if regulators moved towards more sophisticated rate designs that follow more closely the well-accepted principles that were laid out by Bonbright.[5] Such rate designs should be unbundled – with each component such as generation, distribution and transmission valued and priced separately – and more cost-reflective,[6] so that costs are recovered in a fashion that is similar to the way they are incurred based on the unit of their drivers. For example, energy generation costs that vary with the volume of energy used should be recovered using volumetric charges, and the fixed system costs that do not vary with the amount or the time of energy consumption should be recovered using fixed and time-invariant charges. Similarly, distribution network charges should be carefully designed.[7] If the highest electricity capacity a customer needs at a particular time period is driving the need for further distribution infrastructure investment, charges that are specific to that time period based on the customer's contribution to these cost drivers should be imposed. To ensure that already incurred

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[4] TOM TANTON, AM. LEGISLATIVE EXCH. COUNCIL, REFORMING NET METERING: PROVIDING A BRIGHT AND EQUITABLE FUTURE 5 (MARCH 2014), *available at* HTTPS://WWW.ALEC.ORG/APP/UPLOADS/2015/12/2014-NET-METERING-REFORM-WEB.PDF.

[5] JAMES C. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES 383–84 (2nd ed. 1988).

[6] AHMAD FARUQUI, BRATTLE GRP.,THE GLOBAL MOVEMENT TOWARDS COST-REFLECTIVE TARIFFS, (May 14, 2015), available at http://www.brattle.com/system/publications/pdfs/000/005/172/original/The_global_movement_toward_cost-reflective_tariffs__Faruqui_EUCI.pdf?1431628764.

[7] Toby Brown, Ahmad Faruqui, & Léa Grausz, *Efficient Tariff Structures For Distribution Network Services*, 48 ECON. ANALYSIS AND POL'Y 139 (2015).

network costs are recovered fairly, a charge based on connected load could be imposed.[8] To avoid any type of cross-subsidization, volumetric energy charges should be designed to reflect the variation in locational and temporal changes in the cost of energy generation as well as transmission and distribution.

If the tariffs are more cost-reflective so that the volumetric charges reflect only the volumetric social costs of providing energy at a particular location and time, and the full cost of externalities, then reimbursing distributed generation using this rate would not affect the cost recovery of a utility, and would resolve any cost shifting concerns. Further, using this rate would properly reward distributed generation for the environmental and health benefits it provides due to avoided emissions, as well as for the avoided generation capacity investments.

Also, if distribution network charges are based on each user's contribution to total system costs, overall system efficiency would be improved, even when net metering is used. For example, consider a network tariff in which network costs are recovered using a two-part tariff that includes a basic fixed charge for connected load[9] and a coincident peak demand charge per-kW that is based on a customer's maximum demand during the distribution network's peak period. Individual connected load charges allow the already incurred basic network costs to be distributed fairly across different customer classes based on the amount they contribute to the system costs.[10] A coincident peak maximum demand charge that is properly designed would provide incentives for customers to reduce their kW demands, especially during distribution system peak periods, giving customers more incentives to install distributed generation systems that would help with their load during such periods.[11] Such designs would allow utilities to recover their distribution network costs while rewarding distributed generation to the extent that it helps delays future distribution capacity expansions. It is crucial that such designs not be confused with un-nuanced increases in fixed charges that applied only to a subset of customers, which can indeed hurt the deployment of DER. [12]

Well-designed cost-reflective pricing structures would improve economic efficiency. Such structures will ensure that customers take into account the true costs of electricity at that particular time and location when making decisions about electricity consumption. Hence, the observed market outcome will be a socially desirable one. Second, these new rate

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[8] AHMAD FARUQUI, BRATTLE GRP., THE CASE FOR INTRODUCING DEMAND CHARGES IN RESIDENTIAL TARIFFS, (June 25, 2015), http://www.ksg.harvard.edu/hepg/Papers/2015/June%202015/faruqui%20panel%201.pdf.

[9] FARUQUI, supra note 6.

[10] IGNACIO PEREZ-ARRIAGA & ASHWINI BHARATKUMAR, MIT CTR. FOR ENERGY AND ENVIRON. POLICY RESEARCH, A FRAMEWORK FOR REDESIGNING DISTRIBUTION NETWORK USE-OF-SYSTEM CHARGES UNDER HIGH PENETRATION OF DISTRIBUTED ENERGY RESOURCES: NEW PRINCIPLES FOR NEW PROBLEMS (Oct. 2014).

[11] AHMAD FARUQUI & RYAN HLEDIK, THE BRATTLE GRP., SALT RIVER PROJECT, AN EVALUATION OF SRP'S ELECTRIC RATE PROPOSAL FOR RESIDENTIAL CUSTOMERS WITH DISTRIBUTED GENERATION 19 (2015).

[12] NAÏM R. DARGHOUTH ET AL., LAWRENCE BERKELEY NAT'L LAB., LBNL- 183185, NET METERING AND MARKET FEEDBACK LOOPS: EXPLORING THE IMPACT OF RETAIL RATE DESIGN ON DISTRIBUTED PV DEPLOYMENT at 16-20 (2015), available at HTTP://EMP.LBL.GOV/SITES/ALL/FILES/LBNL-183185_0.PDF.

structures will ensure that market price is actually signaling the true value of electricity to society and therefore can guide investments to where they would be most valuable to society.[13] A cost-reflective tariff would compensate distributed generators at a higher price when it is costlier to generate electricity or at locations where the grid is congested, and would drive more targeted investment.

It is important to note that not all DER are created equal, and they can provide different values at different times and locations. Therefore, it is important to provide a pricing framework that can consistently be used for all types of DER, without favoring one over the other *ex ante.* Installing solar panels in specific areas that are closer to those areas requiring additional capacity can provide ten times more capacity value than installations averaged across a whole service territory.[14] Investing in wind turbines may be more valuable in areas where the demand is late peaking as that is when wind production also peaks.[15] Some DER may not provide desired benefits in certain areas,[16] so reallocating funds to more effective resources in those areas may be necessary to achieve clean and reliable energy goals in the least-cost manner. Overall, having the right price signals would direct all types of DER investments to where and when they are most needed, not just distributed solar generation, ensuring an efficient allocation of resources.

A consistent formula would lead to higher valuation for types of DER that are most needed in one location compared to other areas, which would in turn drive more investment for those kinds of resources, ensuring that the right type of DER is deployed to right location. Further, the granular and the dynamic nature of this approach would allow it to be used consistently across all energy resources to provide the right signals for a socially desirable outcome—regardless of whether energy resources are centralized or distributed, small-scale or utility-scale, or emitting or non-emitting—and unlock the full value of all energy resources.

Does cross-subsidization of one form or another always occur when retail rates are based only on volumetric charges and are time-invariant? Does cross-subsidization caused by net metering differ in any way from other forms of cross-subsidization inherent in regulated retail rates?

Cost recovery using flat volumetric rates with low fixed charges creates a mismatch between the way in which costs are incurred and how they are recovered. This mismatch gives rise to the possibility of cost shifting among different customer groups when one

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[13] Severin Borenstein & James Bushnell, *The U.S. Electricity Industry After 20 Years of Restructuring*, 7 ANN. REV. ECON. 437, 455–4457 (2015).
[14] MICHAEL A. COHEN, PAUL A. KAUZMANN & DUNCAN S. CALLAWAY, ECONOMIC EFFECTS OF DISTRIBUTED PV GENERATION ON CALIFORNIA'S DISTRIBUTION SYSTEM 16 (Energy Inst. At Haas, Working Paper No. 260, 2015), available at http://ei.haas.berkeley.edu/research/papers/WP260.pdf.
[15] Joseph Cullen, *Measuring the Environmental Benefits of Wind-Generated Electricity*, 5 AM. ECON. J.: ECON. POL'Y 107 (2013).
[16] Eduardo Porter, *Climate Change Calls for Science, Not Hope*, N.Y. TIMES (Jun. 24, 2015) http://www.nytimes.com/2015/06/24/business/combating-climate-change-with-science-rather-than-hope.html.

group lowers their consumption for any reason, whether it is a result of distributed generation, energy efficiency, or personal preference. If a group of customers decide to conserve energy by running their air conditioners less often, for example, they reduce their volumetric consumption. The revenue generated by volumetric charges is no longer high enough to recover the utility's costs. If the fixed costs that have already been incurred can no longer be recovered from this group of consumers, the utility ends up having to raise the volumetric rate for all the customers to make up for the difference during the next rate case. Thus, with net metering, while customers who own solar panels essentially get credited for the output they produce at the retail rate by being billed for a lower "net" volume of electricity consumption, customers without distributed generation systems end up having to make up the difference to ensure that all fixed costs can be recovered.[17]

Further, the extent of cost shifting impacts of net metering varies with the underlying rate design in a particular jurisdiction. For example, in California where the retail electricity rates use an increasing block pricing design, utility interests claim that the consequences of cost shifting are exacerbated by the fact that many net metered customers are also high-usage consumers subject to higher utility rates and, prior to installing on-site generation, accounted for a sizeable portion of utility revenue.[18] In 2013, the top one-quarter of households by energy consumption accounted for one-half of utility billings.[19] The vacuum created by the reduction in the grid-supplied electricity consumption of these customers as a result of net metering was substantial. In California, prior to installing solar or wind units, metered customers were charged rates equivalent to 154% of the basic cost-of-service, but paid rates equivalent to 88% of this cost afterward.[20]

It is important to note that, this is not the only type of cross-subsidization that results from having flat volumetric rates that do not vary with time and location. As a result of such rates, consumers do not receive the correct price signals about the true cost of proving energy at that particular time and location, and therefore do not adjust their usage patterns accordingly. For example, electricity is then over-consumed during the more costly peak periods and under-consumed during the "off-peak" periods. The cost of peak energy generation is averaged into the retail rate that is paid by all the customers, creating a cross-subsidy between off-peak users and peak users. Similarly, if distribution network costs are socialized among all customers so that the prices do not vary by location, there is a cross-subsidy between customers near where the grid is congested and others.

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[17] TOM STANTON, NAT. REG. RES. INST., DISTRIBUTED ENERGY RESOURCES: STATUS REPORT ON EVALUATING PROPOSALS AND PRACTICES FOR ELECTRIC UTILITY RATE DESIGN 10, (2015), available at http://nrri.org/wp-content/uploads/2015/09/20150924-Stanton-Presentation.pdf.

[18] Borenstein & Bushnell, *supra* note 13, at 458–59.

[19] STEVE MITNICK, BUILD ENERGY AM., CHANGING USES OF THE ELECTRIC GRID: RELIABILITY CHALLENGES AND CONCERNS xvi (2015) available at http://www.emrf.net/uploads/3/1/7/1/3171840/emrf_business_models_final_web_version.pdf .

[20] John V. Barraco, *Distributed Energy and Net Metering: Adopting Rules to Promote a Bright Future*, 29 J. LAND USE & ENVTL. L. 365, 400 (2014).

Does it make sense for PUCs to target net metering for reform, or should they focus on reforming retail rates more generally to better reflect the varying costs of supplying electric power?

Any approach other than implementing fully unbundled and granular retail rate designs should be only a stop-gap measure. Cost recovery and cost shifting problems are unintended consequences of inefficient retail rate designs, and should not be blamed on net metering polices. The first-best solution to the problems caused by net metering in the face of increased solar distributed generation penetration is to simply correct the inefficiencies of the retail rates. These reforms are necessary to achieve efficiency gains both in the retail electricity markets and in the DER markets.

Is there a way to prioritize among various reforms? Potential reforms may include a "value of solar" tariff; dual metering/net metering at something other than the retail rate; fixed charge reforms; smart meters/time-variant pricing.

In order to ensure economic efficiency, the market price of electricity that is used at a particular time and location should align with the true marginal social cost of production—the private cost of providing one more unit of electricity, plus the value of any associated externalities. Such efficient price signals are especially important for the owners of all types of distributed generation systems who are making both consumption and production decisions, not just owners of solar distributed generation. So the challenge is not only to ensure efficiency in consumption, but also efficiency in production.

However, an "Avoided Cost plus Social Benefit" approach that compensates distributed generation for all the net avoided costs that the bulk system no longer has to incur as a result of lower demand, and for the net social benefits that distributed generation provides by replacing dirtier generation, can be used as a stop-gap measure until fully unbundled and granular retail rate designs can be implemented. This approach would catalogue all the benefits and costs of distributed generation, and reward distributed generation according to these categories. Thus distributed generation would be compensated only for the particular system benefits it actually provides. This approach considers the additional costs imposed by distributed generation and rewards distributed generation only for costs it truly avoids, so it eliminates utilities' concerns about recovering costs of existing infrastructure. Even if this approach may not be as easy to implement as common net metering policies, especially at the level of granularity that is ideal, it is necessary to avoid further inefficiencies caused by retail rates as distributed generation continues to grow.

Below are some examples of designs that are currently implemented or are being discussed that are consistent with the "Avoided Cost plus Social Benefit" concept.

a. Value of Solar Tariffs

The value of solar tariff is an example of a design that is consistent with the "Avoided Cost plus Social Benefit" concept. As it incorporates external value components such as avoided greenhouse gas emissions, it already is better than current net metering policies in valuing DER systems. However, it is important to note that value of solar tariffs provide compensation based on system averages, and hence fail to provide price signals that are granular enough to drive efficient DER investment. Further, it is a value of *solar* tariff, and hence cannot be used for compensating other types of DER. This highlights the importance of providing a framework than can be used for all types of DER instead of having to formulate a new tariff every time a new DER becomes widely available.

b. LMP + D + E

Another rate design that is consistent with the "Avoided Cost plus Social Benefit" framework is currently being discussed in New York State. During the Reforming the Energy Vision proceedings, the New York State Public Service Commission introduced the concept of "LMP + D" to value DER, where "LMP" is the locational marginal price and "D" is the distribution-level value of DER systems. The Commission further stated that the value of D can include other values "not directly related to the distribution system," such as capacity and avoided emissions. During the stakeholder process, parties suggested that this concept should be further refined as "LMP+D+E" where "E" refers to environmental values provided by the distribution level resource.[21] Different DER have different external benefits, which are independent of the value of their benefits to the distribution system, and these benefits therefore need to be separately considered and valued in an "E" value that varies depending on the characteristics of the DER technology. As this approach can value DER more granularly and can be used consistently for more than one type of DER, it is preferable to value of solar tariffs, or common net metering policies.

Should environmental externalities affect retail pricing?

Internalizing externalities in retail rates is crucial to the success of clean energy policies, especially when dynamic tariffs are used. If power plants do not fully internalize the external costs of greenhouse gas emissions (or costs of other externalities), then these costs are not reflected in the whole markets, and therefore are not reflected in retail electricity rates as currently structured. Thus, net metering cannot provide the right incentives for clean energy goals. Therefore, the remuneration for distributed generation should reflect the benefits associated with the net avoided emissions it provides, to the extent that the value of the marginal external damage is not fully internalized by existing policies.

Using time- and demand-variant pricing does not automatically resolve environmental or health concerns related to emissions. It is important to note that while dynamic tariffs provide more incentives for distributed generation deployment and thus result in a decrease in the energy demanded from the bulk system, dynamic rates may also cause consumers without distributed generation systems to shift their loads to periods where dirtier plants are on the margin unless the externalities are internalized in retail rates.

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[21] Proceeding In the Matter of the Value of Distributed Energy Resources and Options Related to Establishing an Interim Methodology, Case 15-E-0751, Filing No. 12, Comments of Environmental Defense Fund and the Institute for Policy Integrity at New York University School of Law at 25-27 (April 18, 2016); Case 15-E-0751, Filing No. 7, Solar Progress Partnership Comments at 6-8 (April 18, 2016).

Understanding these two effects is crucial in preventing an inadvertent raise in overall emissions.

As peaker plants are often less efficient and dirtier,[22] overall emissions decrease when distributed generation reduces the need for the electricity generated from such plants. However, if time-varying rates shift consumption to other periods, calculating the net effects requires a more careful analysis. If the load is shifted from a period when an inefficient oil-fired plant is on the margin to a period when a more efficient gas-fired unit is on the margin, the overall greenhouse gas emissions would decrease. If, however, the load is shifted to a period when the cheaper coal-fired base load plants are on the margin, overall carbon emissions may increase even if this shift lowers overall energy generation costs. Thus, any tariff underlying net metering should include externalities at a granular enough level to be able to account for such temporal variation. If the temporal dimensions are not taken into account while calculating environmental and health benefits, and all DER are rewarded based on the same average quantity of avoided emissions, then the market incentives will lead to more investment in cheaper DER, regardless of whether they are the most beneficial for the society when externalities are taken into account.

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[22] Robin Bravender & Collin Sullivan, *Utility to Build First Power Plant with Greenhouse Gas Emissions Limits in California* (Feb. 5, 2010), http://www.scientificamerican.com/article/power-plant-greenhouse-gas; *see also Flexible Peaking Resource*, ENERGY STORAGE ASS'N, http://energystorage.org/energy-storage/technology-applications/flexible-peaking-resource (last visited Feb. 16, 2015); Janice Lin, *Energy Storage Cost Effectiveness*, CAL. ENERGY STORAGE ALLIANCE (Sept. 23, 2013), http://www.storagealliance.org/sites/default/files/Presentations/Energy%20Storage%20Cost%20Effectiveness%202013-09-23%20FINAL.pdf.