IDAHO PUBLIC UTILITIES COMMISSION

IPC-E-18-15
Boise, Idaho
12/03/19

COMMENT FORM

Please use the space below to file a comment in this case. Add extra sheets as needed.
You may either hand this sheet to a commission staff member or mail it to:
IPUC, PO Box 83720, Boise, ID 83720-0074

You may also post comments on our website:
https://www.puc.idaho.gov/
Click on the "Case Comment Form" link

Thank you for the opportunity to comment.

Please See the attached 2 sheets representing My views and those of my wife Linda Helgeland Sojka. The attached comments are in addition to ones already posted on line

I request the PUC reject, and nullify the proposed ~~resolution~~ settlement ~~to this issue~~ offered by Idaho Power and require A complete study by an outside panel of experts from states that have successfully implemented permanent net metering for Domestic Solar.

I totally Agree with comments of the 1st Speaker Joshua Hill. I also agree that Idaho's Public Meeting laws were egregiously violated in Reaching this Settlement. There should be legal Repercussions to those violations

Print Name Robert E. Sojka **Sign Name** Robert E. Sojka

Address 2506 Laurie Lane **Phone Number** 208-420-1472

City and State Twin Falls, ID **Zip Code** 83301

12/3/19

Bait and Switch? Welching?

See reverse side of page 2 for additional comments 1, 2, 3 & 4

(regarding PUC case number IPC-E-18-15)

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Let's make one thing perfectly clear. Idaho Power would have never initiated its original promotion of solar and wind on-site generation and net metering several years ago if it hadn't already done enough math to determine that the terms of the original net metering compensation plan weren't a good deal for Idaho Power. In fact it's a GREAT deal for Idaho power under the original net metering terms and the changes they propose are aimed at parlaying that into a WILDLY FANTASTIC deal for themselves.

To their credit, for several years Idaho Power encouraged homeowners, farmers, and small businesses to install on site micro-generation for on-site use (mainly solar and/or wind). I'm uncertain if micro-hydro was also included. Excess power generation could be fed back to the grid and would be "*fairly*" compensated (i.e. via net metering).

In this arrangement, the homeowner pays the full tab for system design, materials and installation, bears total responsibility for its maintenance and all liability regarding impact on future work on or near the system, or problems the system may cause to the home structure in the future (e.g. roof damage during wind or whatever).

Furthermore, Idaho Power only compensates homeowner excess power production on the basis of their "*retail*" rates for power delivered via the grid to the point of use. This is a heck of a deal for Idaho Power since it has to produce far more power at centralized generation facilities to deliver a net increment of power to a down line user. This is due to transmission losses. However, excess power produced by homeowners typically travels short distances across the grid to the nearest net-user (next door neighbor?), thus suffering nearly no transmission loss. In essence, "Net Metering" is already structured to produce a profit for Idaho power. And it is highly likely the net metering profit per unit power is more than delivering that same increment of power from a central

generation point. This remains true regardless of the type of centralized generation (including solar). Even centralized solar installations suffer transmission loss because they are at great distance from the ultimate power consumers.

I would like to think that Idaho Power's motivation for initially promoting home solar installations was formulated in significant part from a sense of environmental and social responsibility. As the years have passed, however, it is clear that if there was any altruism or sense of societal obligation whatsoever in the initial campaign to promote on-site solar etc. that has given way to greed as the public has embraced and accelerated its willingness to protect our environment and meet our energy generation needs directly.

If we were here today arguing about the price of any other commodity or service that had been initially contracted and paid for in advance and in good faith, and then within months of signing the agreement the selling party demanded a better deal, it would be regarded as ***bait and switch*** or ***welching on the deal***. This is particularly true given the clout differential of a statewide entity vs an individual customer/citizen. Idaho Power has vastly more influence with the utility commission than individual citizens, and Idaho Power knows that. They know it and they've played their cards from that influence perspective.

insert Points 1, 2, 3, & 4 on back of page 2

There have been and are other countries where public entities regard what the public entity owns as ***theirs*** but also regards what individual citizens have as belonging to that public entity as well. Does Idaho Power believe that what is theirs is theirs and that what is ours is theirs as well? That system is referred to variously as communism, socialism, or even totalitarianism. Are we really going to go down that path in Idaho?

I remind the PUC that times are changing in Idaho. Our citizens have already successfully vented their frustration over public officials' insensitivity to reasonable solutions to problems that have already been shown to work in other states (i.e. Medicaid expansion). When put to a vote in other states net metering was kept and "jiggered" metering was rejected by voters. Idaho has an initiative process and I would hope that if Idaho Power has its way with the PUC that this literal POWER GRAB by Idaho Power would be challenged by voters who don't like being ignored or treated unfairly.

Linda and I sincerely thank you for the opportunity to present this comment.

1. We have never failed to pay our power bill in a timely manner, and 18 months ago we invested over $40,000 based on Idaho Power's stated terms governing Domestic Solar installations. That would have meant our power bill had been paid in full for the life of our system.

Q. Adding our system under Idaho Power's original terms was an added value to our house in the event of resale. The proposed new terms will greatly diminish or wipe out that resale value improvement.

3. Is It Idaho Power's intent to stifle completion by supressing investments in Domestic Solar Systems? I thought competition was good for capitalism? Why would it be in the people of Idaho's interest to do this when solar Domestic installers are the fastest growing job sector in the Idaho Economy that actually pays a livable wage?

4. Will Idaho Power Give complete (100%) net metering reimbursement to large scale contracted solar generation sites? If so why would ~~would Domestic~~ Solar generation be compensated at the full rate even though large scale remote Solar sites suffer the same ~~generation~~ Power transmission losses as any other static large Scale remote generation installation? If this is fair why wouldn't Domestic Solar Systems continue to receive full (100%) net metering compensation, How is this Fair? Is it even legal?

Tracking emissions in the US electricity system

Jacques A. de Chalendar, John Taggart, and Sally M. Benson

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Edited by Daniel M. Kammen, University of California, Berkeley, CA, and accepted by Editorial Board Member B. L. Turner II October 30, 2019 (received for review July 29, 2019)

Significance

The environmental quality of the electricity flowing through electric grids varies by location, season, and time of day. Data from 3 publicly available sources have been combined to produce an hourly emissions dataset for the 66 balancing authorities in the United States. The environmental quality of electricity varies greatly. Electricity transfers are especially important in the western United States and can be responsible for more than 20 to 40% of emissions. They play a much smaller role in the eastern United States. In a number of regions, a large fraction of pollutant-intensive electricity is exported, resulting in local communities bearing the pollution burden of electricity generation without the benefits of consuming the electricity.

Abstract

Understanding electricity consumption and production patterns is a necessary first step

Tracking emissions in the US electricity system

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Edited by Daniel M. Kammen, University of California, Berkeley, CA, and accepted by Editorial Board Member B. L. Turner II October 30, 2019 (received for review July 29, 2019)

Understanding electricity consumption and production patterns is a necessary first step toward reducing the health and climate impacts of associated emissions. In this work, the economic input–output model is adapted to track emissions flows through electric grids and quantify the pollution embodied in electricity production, exchanges, and, ultimately, consumption for the 66 continental US Balancing Authorities (BAs). The hourly and BA-level dataset we generate and release leverages multiple publicly available datasets for the year 2016. Our analysis demonstrates the importance of considering location and temporal effects as well as electricity exchanges in estimating emissions footprints. While increasing electricity exchanges makes the integration of renewable electricity easier, importing electricity may also run counter to climate-change goals, and citizens in regions exporting electricity from high-emission-generating sources bear a disproportionate air-pollution burden. For example, 40% of the carbon emissions related to electricity consumption in California's main BA were produced in a different region. From 30 to 50% of the sulfur dioxide and nitrogen oxides released in some of the coal-heavy Rocky Mountain regions were related to electricity produced that was then exported. Whether for policymakers designing energy efficiency and renewable programs, regulators enforcing emissions standards, or large electricity consumers greening their supply, greater resolution is needed for electric-sector emissions indices to evaluate progress against current and future goals.

carbon intensity of electricity | renewable energy policy | electricity system emissions factors | emissions embodied in electricity exchanges

Power grids transport electrical energy between many different locations, often over large distances. As a result, linking changes in production and consumption at different points of an electric grid is challenging. Accounting for and monitoring pollutants emitted during electricity production and subsequently embodied in electricity trade and consumption is even more complex, difficult, and data-intensive.

Yet, electricity represents a large fraction of emissions from fossil-fuel consumption: in the United States, 28% of 2016 greenhouse gas (GHG) emissions (1). To achieve climate goals (2), massive electrification will very likely be needed, upping the stakes for effectively decarbonizing the electricity sector (3). The climate and health impacts associated with producing, consuming, and exchanging electricity should therefore be the subject of close attention. Ensuring that emissions accounting methods for our electricity systems accurately capture when, where, and why emissions are occurring is especially critical as they become more connected and as the role of renewables grows. Accurate monitoring will help prevent the outsourcing of pollution (carbon leakage), and neglecting the consumption-based perspective may have undesired consequences for social equity and environmental justice.

The emissions impact of electricity can be measured through Emissions Factors (EFs; mass of pollutant per unit electrical energy). According to a compilation of life-cycle analysis estimates for carbon EFs (4), coal emits 2 times more carbon dioxide (CO_2) than natural gas, which emits an order of magnitude more than electricity from the sun, wind, or water. Recent direct emissions estimates (5) show that the carbon intensity of the US grid as a whole decreased by 30% from 2001 to 2017 as gas and renewables displaced coal.

Capturing heterogeneity matters when considering the climate and health impacts of the electric grid. Previous studies have compared the use of average and marginal EFs (6, 7) to estimate the impact of policy interventions in the short-term; shown how EFs can vary by location, season, or time of day (8, 9); and can use consumption or production of electricity as the accounting basis (10–13).

The impact of GHG emissions is global and only depends on time path and total volume, not on geographic location. Not so for air pollutants such as sulfur dioxide (SO_2), nitrogen oxides (NOx), and particulate matter, where damages are more localized. While distant electricity consumers get the benefits of reliable electricity, the associated pollutant burden is borne by communities near the generating units. Whether their impact is global or local, understanding how electricity consumption drives the emission of different pollutants is critical and will be needed by policymakers to develop sound and durable shared-responsibility models between producers and consumers.

The need to capture heterogeneity becomes more pressing as electric grids absorb greater amounts of renewable energy, whose availability typically varies in time and space (14). In such grids, demand will need to become more responsive (15). Understanding embodied emissions flows will be especially important in networks with high levels of trade, e.g., in the US system's western interconnect. As the fraction of renewable generation

Significance

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Author contributions: J.A.d.C., J.T., and S.M.B. designed research; J.A.d.C. performed research; J.A.d.C. analyzed data; and J.A.d.C., J.T., and S.M.B. wrote the paper.

The authors declare no competing interest.

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Data deposition: The code and data have been deposited on GitHub and are available at https://github.com/jdechalendar/tracking_emissions.

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increases, greater amounts of trade are beneficial for reducing costs and helping to balance excess and deficits of electricity supply (16).

In this paper, we trace the flow of electricity through the electric grid and calculate hourly embodied pollutant flows. As in previous work (10–13), we use a fully coupled economic multiregional input–output model (MRIO) of the electricity system. MRIO models have been used to quantify emissions embodied in trade of goods and services between countries (17, 18), but also to assess other footprints, e.g., water, land, or biodiversity (*SI Appendix*, refs. 3–5).

Often constrained by the lack of appropriate data, previous assessments of electricity grids present results that use monthly resolution at best, or do not properly account for the impact of trade (a more detailed literature review can be found in *SI Appendix*). In this work, we built and solved a linear system for each hour of 2016 corresponding to the full exchange network for the 66 continental US balancing areas, as described in Materials and Methods. The high spatial and temporal resolution of the dataset we generated and released represents a significant advance and was obtained by solving a fully coupled MRIO model. This allowed us to perform an exhaustive analysis of the US electricity system and, in particular, of the role played by electricity transfers in the flow of embodied pollution through the electric grid.

We show why emissions accounting systems should consider subdaily, local, and exchange data, in that they would more closely align with the operation of modern electricity markets. As these data on the electric system become routinely available, we can now compute more precise emissions footprints for different components of the electricity system.

Results

The most recent databases available with appropriate resolution describe the state of the US electricity system in 2016, and, accordingly, all results in this paper apply to the year 2016. We computed and reported electric-sector emissions for the 66 balancing authorities (BAs) in the continental United States by combining hourly data on BA-level electricity production, consumption, and trade with hourly data on plant-level emissions produced. Exhaustive, BA-by-BA, hourly reports from this work are provided in *SI Appendix*, while the main text focuses on key findings and insights.

We report both production- and consumption-based emissions, taking the MRIO view that pollution is embodied in generated electricity and subsequently flows through the electricity network. Produced emissions are defined by the administrative territory in which they are physically emitted. Consumption-based emissions are defined by the administrative territory in which electricity is consumed, and we will refer to them as "consumed" emissions. We will similarly refer to "traded" emissions as the emissions embodied in hourly electricity exchanges. In the remainder of the paper, BAs will be referred to as "regions" to simplify language. A full table for abbreviations for the different regions can be found in *SI Appendix*, Table S1; additionally, Figs. 1 and 2 can be used to provide an indication for location and a reference for frequently used abbreviations, respectively.

Carbon Footprint of Electricity Consumption. In 2016, 1.83 Gtons of CO_2 were emitted in the United States to meet 4 PWh (4 million MWh) of electricity consumption. Tracking emissions at the BA level is natural because they correspond to the physical organization of the electricity system, where control-room operators must continually monitor the state of the electric grid to ensure that supply can meet demand and line flows remain technically acceptable. The consumption-based carbon intensity of electricity varies by almost an order of magnitude across the different regions in the US electricity system, as shown in Fig. 1. In these maps, the size of the circles and arrows is representative of annual consumption and trade of electricity (Fig. 1, *Upper*) and carbon (Fig. 1, *Lower*), respectively, and color is representative of consumption-based carbon intensity. The footprint of the US electricity system is dominated by its two largest regions, the Pennsylvania–New Jersey–Maryland Power Pool (PJM; 20% of electricity and 19% of emissions) and the Midcontinent Independent System Operator (MISO; 17% of electricity, but 21% of emissions). The Pacific Northwest is a large exporter of low-emissions-intensity hydroelectric power, while the Rocky Mountain region is a large exporter of carbon, as are some regions in the coal-heavy Midwest.

Exchanges between regions play an especially large role in the western interconnect, where net imports account for 29% of consumption for the 17 net importer regions, and net exports account for 37% of production for the 16 net exporter regions. Exchanges represent a smaller share of consumption and production in the eastern interconnect, while the Electric Reliability Council of Texas (ERCO) has few ties to the rest of the US electricity system. In the US system as a whole, carbon trade represents 5% of total carbon production.

Moving forward, annual accounting tools will not be enough to track decarbonization efforts in the US electricity system, because they will misstate carbon footprints for regions in which renewables and exchanges play a large role (19). The heterogeneity in the carbon footprint of electricity consumption and production, both in time and in space, is highlighted in Fig. 2, where we show the 10th, 50th, and 90th percentiles for hourly data on consumption- and production-based EFs for 20 regions. The overall US electric grid carbon intensity of 450 kg CO_2/MWh would accurately match the carbon embodied in electricity consumed only in PJM, ERCO, and the southeastern Southern Co. Services. For the others, the annual median carbon intensity can be lower than 100 kg/MWh or higher than 900 kg/MWh.

Hourly carbon intensity can fluctuate equally significantly around the median. In the MISO, consumption EFs swing by 15% around the median, from 480 to 660 kg/MWh. For the Idaho Power Company (IPCO), the carbon content of imports (625 kg/MWh) is much higher than that of local generation (71 kg/MWh), and the carbon emissions per unit of electricity consumed depends sensitively on time. While in the spring, this region generates almost enough low-emissions-intensity energy to meet its demand, in other months it relies heavily on imports from the neighboring PacifiCorp East (716 kg/MWh) and NorthWestern Energy (765 kg/MWh). The Salt River Project (SRP) exports a large fraction of its generation and simultaneously imports lower-emissions-intensity electricity: Its consumption-based EF is 22% lower than its production-based EF. Such trends cannot be captured without hourly exchange data.

In California, the Air Resources Board computes the electric system's carbon footprint from technology-specific EFs and the annual generation mix, including imports. Imports are incorporated by considering private contracts and market settlements (*SI Appendix*, refs. 4 and 5). In 2016, 14% of the electricity consumed was reported as imported from an unspecified source (and given a generic EF). In contrast, our more simple and transparent approach relies on publicly available physical observations (electricity balances between regions and measured emissions) to compute the corresponding embodied carbon flows, leaving no stranded electricity or emissions. Our results confirm that the largest carbon imports into the California Independent System Operator (CISO) originate from the SRP (654 kg/MWh) and Los Angeles (Los Angeles Department of Water and Power; 384 kg/MWh) regions. Considering imports to compute the median EF changes it by 20%, from 194 kg/MWh

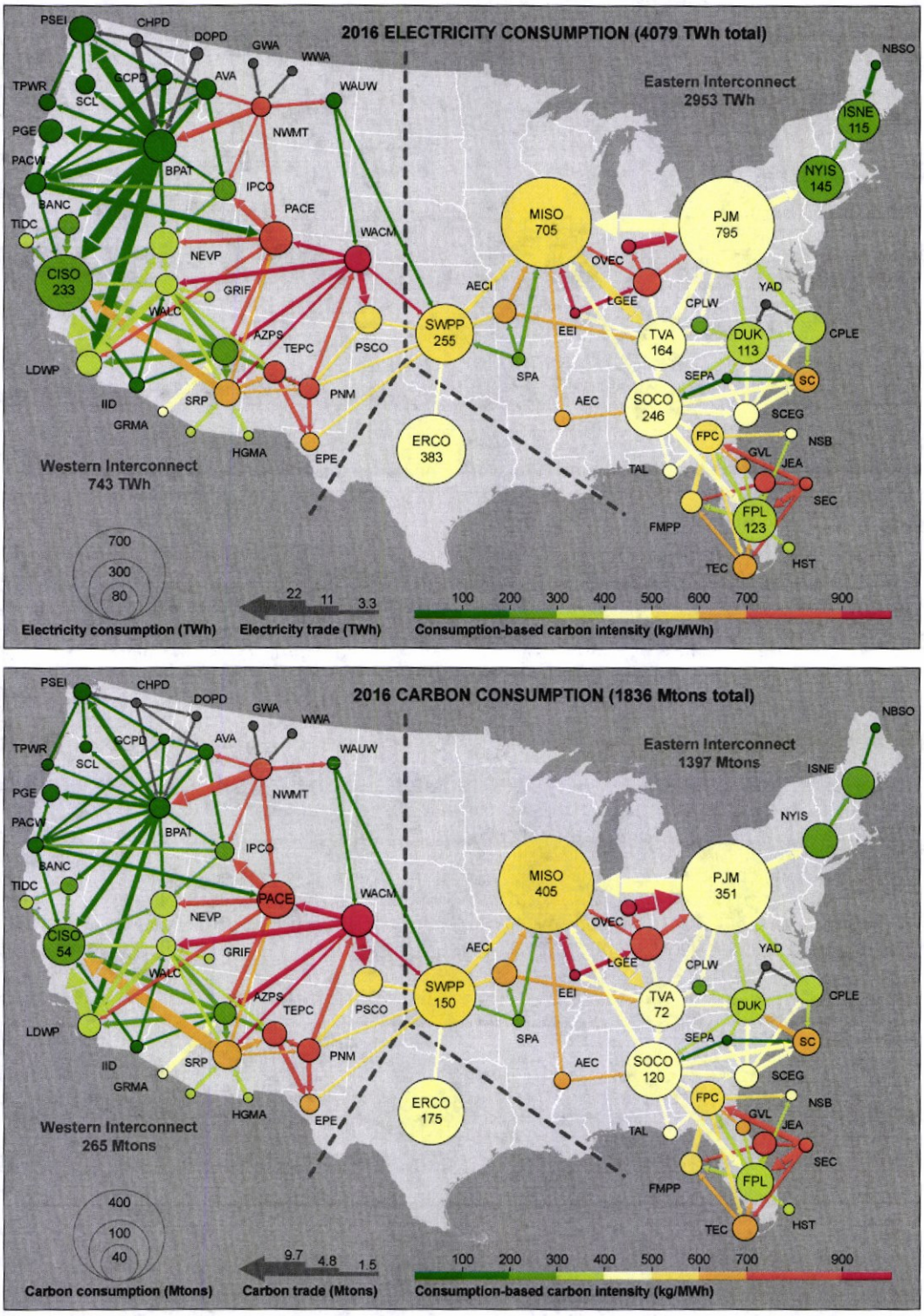

Fig. 1. Carbon footprint of the US electricity system. Electricity (*Upper*) and carbon (*Lower*) consumption and exchanges and consumption-based carbon intensity of grid electricity (*Upper* and *Lower*) for the 66 US BAs. The radius of the nodes and width of the arrows scale with consumption and trade, respectively. The color of the nodes and arrows scale with consumption-based carbon intensity. The gray nodes and arrows correspond to regions for which no emissions were reported. *SI Appendix*, Figs. S2 and S3 provide similar maps for SO_2 and NOx, respectively. *SI Appendix*, Table S1 provides a reference for abbreviations.

(production-based EF) to 233 kg/MWh (consumption-based EF). Our results also demonstrate the importance of time-of-year effects and that carbon accounting based on annual data alone is insufficient: The median hourly EF for imports into CISO was 216 kg/MWh between March and June but 394 kg/MWh between August and November. Accounting for

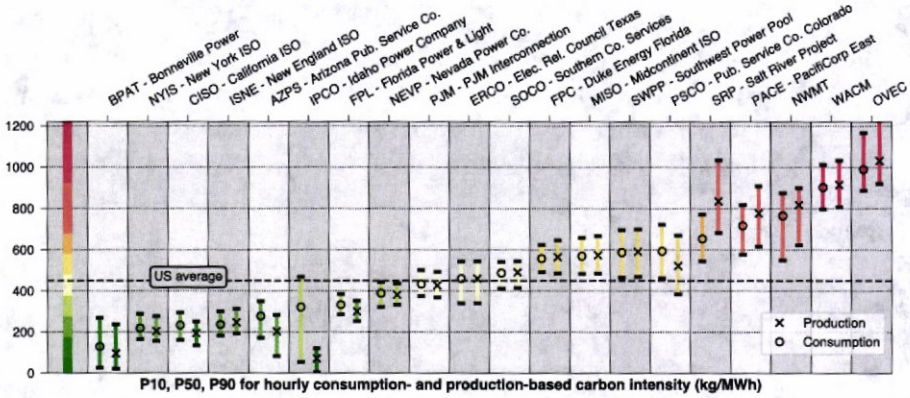

Fig. 2. The carbon footprint of electricity consumption. National- and annual-level carbon accounting does not capture the heterogeneity in space and time of EFs. The 10th, 50th, and 90th percentiles (P10, P50, and P90, respectively) of consumption- and production-based carbon intensity for selected BAs are shown.

these complex carbon flows will be critical for California to meet its ambitious decarbonization targets.

Exhaustive hourly time-series data for electricity and carbon produced, consumed, and traded as well as the corresponding hourly carbon EFs are provided in *SI Appendix*, Figs. S12–S77 for each of the regions in the United States and can be used to further interpret the trends observed in Figs. 1 and 2.

Balancing Area-Level and Hourly Level Carbon Accounting. Both the amount of electrical energy consumed and its carbon footprint vary significantly from region to region, by month and by hour. Understanding the dynamics of demand and supply for electricity will be key to help reduce emissions.

Median daily profiles for carbon consumption in the two largest eastern and western regions are shown in Fig. 3. In the western US grid, it is clear that capturing the impacts of electricity exchanges is critical to accurately portray pollutant flows and to design effective mitigation strategies. That is less true in the eastern US grid. For very large regions, such as PJM and MISO, further disaggregation of hourly electricity and emissions reporting (e.g., at the Power Control Area level) will enable more targeted policies. While base load represents a large portion of demand, electricity and, consequently, carbon consumption, is typically greatest in the late afternoon on hot summer days and in the early fall in PJM, MISO, and CISO. In the other seasons, demand profiles are much flatter throughout the day (although demand is very often lower at night). In the winter, base load is higher in PJM, MISO, and the Pacific Northwest's Bonneville Power Administration (BPAT). These daily profiles confirm that harsher temperatures drive emissions.

As can be seen in Eq. **1**, consumption-based carbon intensity is a function of the intensity of generation (largely driven by technology mix) and of imports. Generation mix varies significantly across the regions in the US electricity system, and so does the carbon intensity of electricity. Further daily and seasonal data on other regions are shown in *SI Appendix*, Figs. S4–S9, while *SI Appendix*, Fig. S1 presents monthly time series for 8 of the largest regions in the United States. Coal and gas dominate in the MISO and Southwestern Power Pool. High penetrations of hydropower and renewables are responsible for the low-emissions-intensity electricity consumed in the 2 major western regions, CISO and BPAT. Nuclear powers most of the low-emissions-intensity electricity consumed in the New York region (New York ISO). Even though they each represent a relatively small fraction of electricity consumed (3 to 4%) and emissions

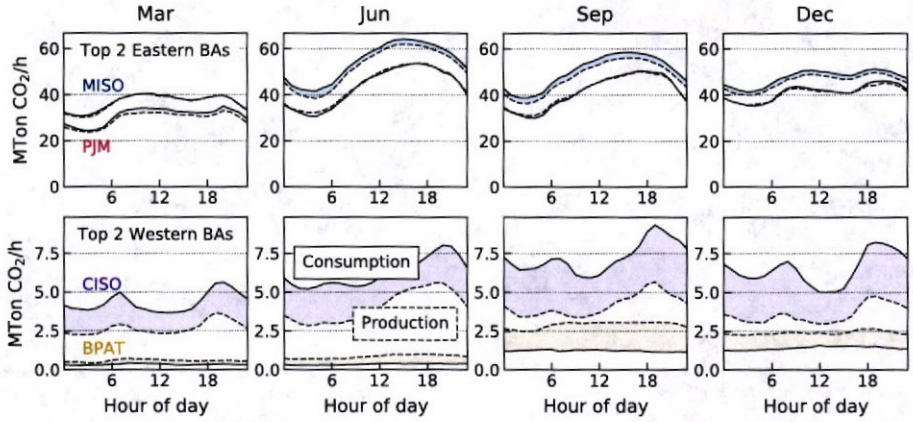

Fig. 3. Daily carbon profiles for the two largest balancing areas in both US interconnections: the midwestern MISO and northeastern PJM in the eastern interconnect, and California's CISO and Pacific Northwest's BPAT in the western interconnect. Daily profiles are computed as the median values for different months and hours of the day, using local time zones. The full lines represent consumed emissions, while the dashed lines represent produced emissions. The shaded area between the full and dashed lines corresponds to net carbon transfers. Trade is much more important in the West than in the East, as can also be seen in Fig. 4. *SI Appendix*, Figs. S4–S9 show similar daily profiles for selected regions in the US electricity system, as well as daily profiles for electricity and consumption-based carbon intensity. Dec, December; Jun, June; Mar, March; Sep, September.

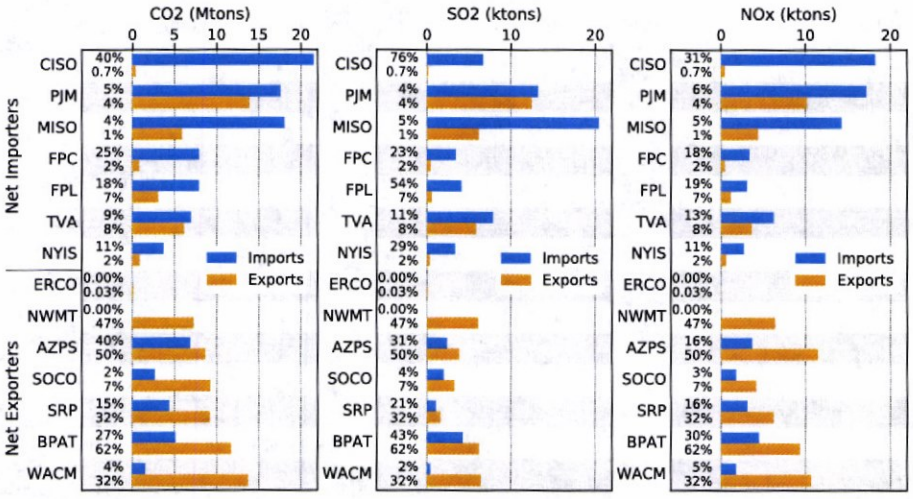

Fig. 4. Sharing responsibility for US electric-sector emissions. Top net importers and exporters of pollutants are shown. Relative imports and exports are expressed as a fraction of the total embodied pollution for a region—i.e., if we call imports, exports, production, and consumption as I, E, P, and C, the percentages in the graph represent $\frac{I}{I+P}$ for imports and $\frac{E}{I+P}$. We note that pollutant flows are balanced: For each region, $I+P=E+C$, and for the regions that almost only import $\frac{I}{I+P} \approx \frac{I}{C}$, while for regions that almost only export $\frac{E}{I+P} \approx \frac{E}{P}$. In the West, trade is particularly important. *SI Appendix*, Fig. S10 provides further insight into the pollutant trading patterns there in the form of Sankey diagrams. *SI Appendix*, Table S1 provides a reference for abbreviations.

(0.75 to 1.8%), 20% of the US population lived in these 3 regions in 2016.

Emissions Embodied in Electricity Exchanges. Pollution traded in Fig. 4 corresponds to the emissions embodied in electricity exchanges for the US electric grid's top net importers and exporters. In the same figure, relative pollution traded is expressed as a fraction of the total embodied pollution for a region (consumption plus exports or, equivalently, production plus imports). While CO_2 emissions cause global climate damages, emissions of SO_2 and NOx cause local health damages.

For regional climate policies, accurately measuring and tracking the carbon emissions embodied in electricity exchanges will be key to achieving the desired impact. Imported electricity may run counter to climate goals. Of the 265 Mt of CO_2 that were emitted to the atmosphere when generating electricity in 2016 in the western grid, the interconnection where trade is the most relevant, 17% were emitted to satisfyx electrical consumption in a different region. In the CISO, for example, 2016 imports represented 28% of consumption, but 40% of the carbon emissions related to California electricity consumption were produced in a different region. Carbon exports represent 30 to 60% of total embodied carbon for a group of large western regions in Washington state, the Rocky Mountains, and Arizona (BPAT, NorthWestern Corporation, Western Area Power Administration–Rocky Mountain Region [WACM], Arizona Public Service Company [AZPS], and SRP). Some of the same regions act as trade routes for electricity and embodied pollution, simultaneously importing and exporting large amounts of carbon (AZPS, SRP, and BPAT). The Tennessee Valley is another region which experiences such transshipments of electricity and carbon. For a few trade links, electricity (and carbon) can flow both ways during the year, or even during the day. Reverse flows represent from 5 to 40% of total trade for the 6 largest of these bidirectional trade routes (*SI Appendix*, Fig. S11). In contrast, net carbon imports represented less than 3% of consumption in the 2 largest eastern regions (PJM and MISO), and the Texas electricity grid is almost completely independent.

Citizens in regions exporting electricity from higher-intensity-generating sources bear a disproportionate local air pollution burden. For some of the extreme cases in Fig. 4, like the CISO or Idaho's IPCO on the importer side or the Rocky Mountain WACM and the Southwestern Power Administration on the exporter side, almost all of the local pollution caused by electricity generation is not colocated with the electricity consumption that caused it. This is particularly troublesome for the exporters: While the generated electricity physically leaves those regions through the electricity grid, these local pollutants don't. Our computation of consumption-based pollutant intensity of electricity can provide an indication as to how embodied pollution propagates through the electric grid. Fig. 4 also highlights that levels of pollution for SO_2 and NOx (and CO_2) are not always correlated and that each of these pollutants needs to be tracked individually. Higher levels of SO_2 are typically indicative of higher shares of coal generation, and higher shares of NOx are typically indicative of higher shares of gas generation. In the CISO, SO_2 imports represent 76% of SO_2 consumed, while this number is only 31% for NOx.

Discussion

In this work, we build and analyze a dataset for pollutant production, consumption, and trade between the 66 continental US regions, from which localized hourly emissions footprints can be built. If the damages from pollution are priced, be it through a price- or a quantity-based approach (20), electricity generators and consumers will internalize the environmental costs of electricity and adapt their behavior. For instance, large electricity consumers could respond to variations in electric-grid carbon intensity by shifting their operations schedules to better match the environmental quality of the grid through carbon-aware or pollution-aware scheduling. Similarly, developers of renewable energy projects could target renewable resources that are available where and when grid electricity is currently carbon-intensive. Such economic signals will have the most impact, however, when emissions data are reported at the appropriate scales in time and space—namely, hourly and at the BA level.

This work has strong implications for both private and public actors at the local, regional, and federal levels, even without a price on emissions. Coarse national- and annual-level carbon accounting will not capture the heterogeneity of hourly production- and consumption-based EFs and may misstate emissions and emissions reductions. Understanding emissions flows and their drivers will be key to ensuring that climate-change

policies address the bigger picture and to avoid resource shuffling. Similarly, local environmental and health policies that ignore how the responsibility for pollutants flows from producers to consumers through the electric grid and that do not result from the cooperation of all of the parties involved will have little effect in networks where trade volumes represent a large share of consumption and production. In contrast, regions with fewer connections to the rest of the US electric grid and less electricity trade, such as in Texas, have more direct control over their consumed emissions.

While US power plants reliably report hourly data for CO_2 on a quarterly basis, accurate hourly measurements of SO_2 and NOx emissions remain unreliable in some regions (*SI Appendix*). This study demonstrates that it is now possible to track electricity and pollutants in real time and that doing so will provide valuable benefits for policymakers and investors alike.

Materials and Methods

Different publicly available sources for emissions and electricity data are used in this work. The US Environmental Protection Agency (EPA) tracks emissions for 3 major pollutants through its Continuous Emissions Monitoring Systems: CO_2, SO_2, and NOx (*SI Appendix*, ref. 1). The US Energy Information Administration Electric System Operating Data website has reported hourly consumption, production, and interregional exchanges at the BA level since 2015 (*SI Appendix*, ref. 2). Finally, plant, BA, and national statistics at the annual level from the EPA's Emissions and Generation Integrated Resource database (*SI Appendix*, ref. 3) are used to adjust emissions levels when dealing with missing data and for validation. The full procedure that is used to clean data from these sources and the underlying assumptions are detailed in *SI Appendix*. This analysis does not account for life-cycle emissions associated with building power plants or extracting fuels.

Consumption-based emissions inventories are computed at hourly, monthly, and annual resolution for CO_2, and annual resolution for SO_2 and NOx. To estimate the pollution emitted on behalf of electricity consumption at a certain node, we assumed that emissions are embodied in traded electricity and that we can write the following balance equation for a given pollutant (CO_2, SO_2, or NOx):

$$x_i d_i = f_i + \sum_j x_j u_{ij} - \sum_k x_i v_{ki}, \quad [1]$$

where for node i, d_i is electricity consumed, x_i is the intensity of electricity consumed, f_i is pollutant production, u_{ij} is electricity imported from j to i, and v_{ki} is electricity exported from i to k. This represents the balance equation for a fully coupled MRIO model, accounting for transshipments of electricity and embodied pollution. All quantities (and, in particular, trade) are positive. We rearrange this to:

$$x_i \left(d_i + \sum_k v_{ki} \right) - \sum_j x_j u_{ij} = f_i. \quad [2]$$

We can also write a balance equation for electricity (assuming there are no transmission losses):

$$p + U = d + V, \quad [3]$$

where U, V are total import and export vectors and p is electricity produced. We can substitute this to obtain:

$$x_i (p_i + U_i) - \sum_j x_j u_{ij} = f_i. \quad [4]$$

This equation can be rewritten in the form $Mx = f$, with $M = diag(P + U) - u$. To access the intensity of consumption, we solve a linear system at each time step, of size the number of nodes.

To illustrate and guide intuition, we consider a simple example with 2 electric grid regions, A and B. We call x_i, y_i the consumption and production carbon intensities at node i; D_i, P_i the consumption and production of electricity at node i; and $T_{A,B}$ a 1-way transfer of electricity from node A to node B. We write the following balance equations for carbon:

$$\begin{cases} x_A D_A = y_A P_A - x_A T_{A,B}, \\ x_B D_B = y_B P_B + x_A T_{A,B}. \end{cases} \quad [5]$$

By writing that energy is conserved at node A, we obtain:

$$\begin{cases} x_A = y_A, \\ x_B = y_B \frac{P_B}{D_B} + x_A \frac{T_{A,B}}{D_B}. \end{cases} \quad [6]$$

For the exporter-only node, production and consumption intensity are the same. For the importer-only node B, on the other hand, the consumption intensity is the weighted average of its production intensity and of node A's consumption intensity. Weights correspond to the fractional sourcing of node B's electricity consumption from its own production and from node A. In a network with a more complex topology, the framework still applies, but consumption-based intensities may be less intuitive, in particular for nodes that simultaneously import and export electricity, since all nodes in the network are coupled by Eq. **1**.

We have released both the code and data from this work on GitHub (21).

ACKNOWLEDGMENTS. This work was supported at Stanford by the Global Climate and Energy Project and a State Grid Graduate Student Fellowship through the Bits & Watts initiative.

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About the Self-Generation Incentive Program

The Self Generation Incentive Program (SGIP) is one of the longest-running and most successful distributed generation incentive programs in the country. As of December, 2016, SGIP has funded 2,178 completed projects representing over 450 MW of rated capacity. An additional 312 projects representing over 178 MW of rated capacity are in process towards completion. The program continues to make strides towards a cleaner, distributed-energy future.

The SGIP was initially conceived of as a peak-load reduction program in response to the energy crisis of 2001. Assembly Bill 970 (Ducheny, 2000) designed the Program as a complement to the California Energy Commissions' Emerging Renewables Program, which focused on smaller systems than the SGIP. Since 2001, the SGIP has evolved significantly. It no longer supports solar photovoltaic technologies, which were moved under the purview of the California Solar Initiative after its launch in 2006. It has also been modified to include energy storage technologies, to support larger projects, and to provide an additional 20% bonus for California-supplied products.

Senate Bill 412 (Kehoe, 2009) modified the focus on the Program to include greenhouse gas reductions. Specifically, this bill directed the Commission, in consultation with the Air Resources Board, to identify distributed energy resources which will contribute to greenhouse gas reduction goals and to set appropriate incentive levels to encourage their adoption. The Commission took this opportunity to expand the portfolio of eligible technologies, modify the incentive approach, and to enact other operational requirements including warrantees and performance monitoring to ensure greenhouse gas reductions.

SGIP was significantly modified by D.16-06-055 to reflect changing conditions and priorities with respect to the program. The changes made by D.16-06-055 include the allocation of 75% of the incentive budget to energy storage projects, capping each technology developer to no more of 20% each of the incentives for large-scale energy storage, residential energy storage and generation, the creation of a step system for incentives and the creation of a lottery system for allocating incentives to projects when a given step is oversubscribed.

The Self-Generation Incentive Program will offer incentives to energy storage systems based on several factors, including the kilowatt-hour (kWh) capacity of the system. The incentive amount offered to new storage customers will decline over time as the market matures to ensure efficient use of these ratepayer-funded incentives. Each incentive level is known as a "step," and a certain amount of money is reserved for each step. On a statewide basis, approximately $40 million has been reserved for energy storage systems in each step. There will be five steps for energy storage systems.

The table below illustrates the planned incentive steps for residential energy storage systems 10 kilowatts (kW) in size or less. For systems above 10kW, please refer to the SGIP Handbook available at this webpage for more details on the incentive levels that apply (the 2017 version of the SGIP Handbook may not be posted until March, 2017).

Residential Energy Storage Systems less than or equal to 10kW in size	**Incentive rate per Watt-hour (see important disclaimer below)**
Step 1	50 cents/Watt-hour
Step 2	45 cents/Watt-hour
Step 3	40 cents/Watt-hour

Step 4	35 cents/Watt-hour
Step 5	30 cents/Watt-hour

Step 1 will commence when the program reopens in spring 2017. Each subsequent step will begin once the previous step's budget is extinguished.

IMPORTANT DISCLAIMER: The amount of incentive decrease between steps can accelerate if a step extinguishes the entirety of its budget in 10 days or less. In that event, the decrease between steps is 10 cents/Watt-hour rather than 5 cents/Watt-hour. For example, if Step 1 extinguishes its budget within 10 days of its opening date, then the Step 2 incentive rate will be 40 cents/Watt-hour rather than 45 cents/Watt-hour.

Contact Us

- If you have any questions about the SGIP, please contact the Program Administrator for your utility as identified under the Applying for SGIP Incentives section of the main SGIP page. For general inquiries concerning SGIP and the CPUC's role in managing the program, please contact Mary Claire Evans, Regulatory Analyst at me2@cpuc.ca.gov or (415)703-5274.

Michael G. McBride's comments to PUC case IPC-E-18-15 December 3, 2019

I would like to thank the PUC for giving me the opportunity to make comments on this proposed settlement agreement.

I think it was great that the parties involved tried to use a collaborative process to reach a consensus through this settlement agreement.

I think that it is positive that under this process the current service charges of about $5 per month were retained. Also, under this agreement if we have any excess energy credits at the end of the year it seems reasonable to pay a $10 aggregation fee to move the power credits over to our pasture irrigation pump which is on a different bill and meter.

I do, however, have a number of concerns with the agreement as written. One of my concerns is that this agreement is written so that it is very confusing for a lay person to read and understand what it is saying. This is especially troublesome on page 5 of the agreement where they talk about schedules 6 and 8. Terms like current blended base energy rate or the difference between the then current export credit rate or what 75% of the difference between these (I am thinking to myself "say what????").

Another thing that bothers me is that I found several places where the parties seem to agree on the settlement's outline but reserve the right to fight over the details in a future proceeding. For instance, on page 3 under III. Avoided Transmission...(the methodology to determine such a value is not part of this settlement agreement, but parties retain the right to advocate for a methodology to determine such a value in a future docket). It seems to me that in a lot of areas the parties failed to agree and meet consensus and are just pushing this partially completed settlement agreement forward even though it doesn't thoroughly solve the issues.

I have several additional concerns about this agreement. Firstly, Idaho Power controls the data on which future billings can be based and they don't seem to be sharing a true cost analysis for the numbers and proposed charges that have been generated for this settlement despite the fact that they were directed to do so previously by the PUC. On page 2 of the settlement agreement under A. net-

hourly billing this document proposes a new method of calculating excess power produced or power imported is introduced- " NET Hourly Billing". The reason for this change in accounting method is not explained but must be something that is done to favor Idaho Power's position. The reasons for and outcomes being unknown is this perhaps some sort of trojan horse that the power company has put in for future adjustments. One outcome might be that solar installation companies will no longer be able to give prospective customers accurate projections on how long it will take to realize pay back on their investment. I would encourage the PUC to change this back to the current monthly net-metering process not hourly net-metering

We have learned that Idaho Conservation League was part of the negotiations and they did not sign this settlement agreement at least in part because they felt it was unfair to current on-site generation customers like ourselves.

I ask now that rather than making us suffer with this agreement that the PUC exempts the 4,000 or so current on-site generation customers from the new rules. I think it is only fair. Idaho Power seems to want to stifle future on-site production so it is up to the PUC to decide if you will permit them to do so through this agreement. Please make the choice to encourage customer generated power.

In closing, this past Sunday I took a walk around our extended neighborhood and knocked on doors of houses with solar panels to see how the rest of the neighborhood was reacting to this settlement. Bob our neighbor down the street agreed to come with us and testify tonight. At two houses no one was at home and at the remaining two houses I talked with neighbors who were completely oblivious to what was going on here and kind of looked at me like I was a man from the moon. A lot of people who have solar also have kids to take care of, Thanksgiving dinners to cook and lives to live and are really dependent on the members of the PUC to look out for them.

About a year and a half ago I testified to the PUC about net-metering in Pocatello at which time Idaho Power had wanted to raise on-site generation customer's service fees from about $5 to $65 without presenting data to justify this raise. In this settlement case from what I can tell Idaho Power is trying to pull another rabbit out of the hat without presenting the data to back up their request. I am

not opposed to getting credited only for say 80 or 90% kWh for my exported kWh but cutting it to 50% kWh does not seem fair on the face of it.

Thanks

Michael McBride

2502 Laurie Lane

Twin Falls, ID 83301

Melody Asher's comments to PUC case IPC-E-18-15

but we spent $34,720 to put solar panels on our roof.

We are not rich. We as a family made a substantial investment into solar panels because we felt it was the right thing to do NOT just to reduce our monthly power bills but we still feel that we should be able to see our investment pay off monetarily as well before we are dead! We spent a good portion of the money we inherited when my parents passed away on our solar panels. We put solar panels on our roof as our way to contribute less to human-caused global warming or climate change. We put solar panels on our roof and became on-site generation or net-metering customers because we hope that we can make a difference globally by acting locally by producing and using solar power. Through the currently existing program with Idaho Power I think it will take 12 plus years to pay back our investment and it will take even longer if Idaho Power is allowed to give us less kWh credit for our excess power. Our solar power system was designed to meet a certain % of our usage & it will not do that anymore if Idaho Power is allowed to credit us for only about ½ our exported power...

We as a society and as power companies need to do this now not in 10 or 20 years. We are contributing to Idaho Power's 100% clean energy by 2045 goal now. Reviewing what information we could find in local news, mailings, and internet searches I cannot see that Idaho Power did the comprehensive study of the costs and benefits of solar power that on-site generation customers send into the grid like the PUC said would happen before Idaho Power would be allowed to change the value of credit for our excess electricity. Isn't that something that was supposed to happen before Idaho Power is allowed to change the net-metering program. If they did the comprehensive study then where is it??? I would like to see it. I would have thought that it would have been included as an attachment to the settlement agreement. The comprehensive study should have explained the rational used to develop the new schedule. To me the current kWh credit for kWh exported is a fair credit for our investment in local clean energy that benefits us all including Idaho Power. About 50% credit like Idaho Power wants to change the kWh credit to does not seem reasonable or fair!

Idaho Power must have studied hourly vs monthly metering because they want to change that also and they must be going to make even more money off our on-

site generation through hourly metering & again we have not seen a study about this & I would like to stay on monthly net metering as it is now.

Idaho Power Company acts like they support residential solar power generation and sends out little brochures to that effect with our bills and maintains a webpage encouraging customer solar power but they seem to want to make it less and less worthwhile for their customers to actually have solar panels. Instead they should support their on-site generation customers because we are making solar power for them also. I think that Idaho Power makes plenty of money off our excess power by selling it to our neighbors at full rate. I expect that there is almost no line loss with the power going to our adjacent neighbors. I do not believe that Idaho power should not be allowed to change the value of on-site generation kWh credits. The settlement agreement clearly states that the parties therein involved leaves it up the the PUC whether the current on-site generation customers should be grandfathered and remain under the same system that was in place when the customer installed their solar panels. I think that Idaho Power should grandfather all current customer on-site generation -schedule 06 customers in at the full credit for kWh and monthly net-metering program that we are on now. That way current customers would live by the rules that are in place already and new customers would know up front what energy credits they would receive and be able to determine how long it would really take to pay back their investment. This is only fair. (+ really would prefer new people get the new deal too - don't stifle Solar power!

Please reject Idaho Power's request to establish new compensation structures for the customers already generating power and just leave us under the current existing rule/schedule.

Thank you.

Melody Asher

2502 Laurie Lane

Twin Falls, ID 83301

Testimony of: Patricia B. Raino
Private Citizen
Address: 4905 W Outlook Ave
Boise, Id 83703
For: Case no. IPC-E-18-15 as regards to Net Metering

Thank you for holding this hearing.

It is important that Idaho Power not betray the trust of the customers that have invested in solar power here in Idaho. To change the program under which solar was installed is wrong and will bring hardship to many of Idaho Power customers that have made the good sense choice to limit their carbon footprint. Further, moving from net metering will discourage others like me to utilize solar to meet their energy needs.

My son has a large solar company in Honolulu that employs more than a 100 people, and because he grew up in Idaho, has property and family ties to our state he has also extended his business to Idaho. His business, RevoluSun provides residential and commercial solar as well as storage systems for solar. Those who have purchased solar systems using the current Idaho Power policy of net metering will find it difficult and costly to adjust their system to the proposal submitted by Idaho Power. The PUC should be concerned with diversifying and creating redundancy in our energy system.

I concur with many of the points made by the Idaho Conservation League and also recommend the PUC adopt the following recommendations as regards Idaho Power's new Net Billing Program:

1. Set the Net Metering Program availability enrollment dealing to 60 days following the Commission's order, with eligibility based on application and system completion within a year.
2. Keep the Net Metering Program open to existing customers indefinitely or at a minimum 20 years.
3. Existing customers should have the option to transition to the Net Billing Program.
4. Apply Net Metering Program status to the system, not the customer, allowing for sale of property.

Solar generation is an important part of our energy system and with the PUC's encouragement could supply energy to many of our citizen's. It is important to look at the big picture and Idaho Power has taken a very parochial and limiting view of solar generation in this state.

My name is Micah Hornback. ~~I swear to tell the truth.~~ I am an Idaho Power customer.

Thank you for the opportunity to speak today Commissioners. I am honored and privileged to be a part of this democratic process.

I've worked for a solar company here in Boise for four years now; however, I am speaking from my own perspective and not on behalf of the company I work for.

I'd like to start by quoting from the case that we are discussing here today.

On November 9th, 2018, the PUC released Order No. 34189 in Case No. IPC-E-18-15. Starting with the third paragraph of that document, it reads:

Notice of Petition

> YOU ARE HEREBY NOTIFIED that Idaho Power's Petition asks the Commission, according to Order No. 34046, to "*initiate a docket to comprehensively study the costs and benefits of on site-generation on Idaho Power's system, as well as the proper rates and rate design, transitional rates, and related issues of compensation for net excess energy as a resource to the Company.*" Petition at 2, citing Order No. 34046 at 31. In that Order, the Commission indicated that *the docket should include all net-metering interests* with a focus on Idaho Power's systems, costs, benefits, resources, and tariffs. Petition at 2; Order No. 34046 at 23.

I originally interpreted this notice to mean that the "intervention" period was to ensure that this study was to be fairly conducted by Idaho Power in conjunction with third parties, in the most objective manner possible.

I believed at the time that engineers, mathematicians, economists, and other specialists in the field would be drawing diagrams on whiteboards, running numbers, comparing notes, utilizing other net metering studies, and working together to determine the most fair solution for properly evaluating customer generated solar energy on the Idaho Power grid.

Well...it turned out that instead of an analysis by engineers, mathematicians, and specialists, it was just Idaho Power behind closed doors intimidating these "intervener's" lawyers with more powerful lawyers and stronger negotiation tactics.

During these closed door negotiations, not only was there no attempt to "*comprehensively study the costs and benefits of on site-generation on Idaho Power's system*," but there was no consulting with existing net metering customers, solar installers, and "*all net metering interests*" were certainly not accounted for.

The parties who decided to intervene, although well-intentioned, signed onto a settlement agreement that I venture to say would have been almost unanimously shot down by existing net metering customers and most solar installers, myself included.

I am confused at how the vast majority of net metering customers, as well as solar installers, are being blindsided with this settlement agreement when we were instead told that we'd be presented with a comprehensive, objective, cost/benefit analysis of the import/export value of customer generated power on the grid.

I disagree that the proposed settlement is "just, fair, and reasonable, in the public interest, or otherwise in accordance with law or regulatory policy," as stated on page 3, paragraph 3 of Order No. 34460 in Case No. IPC-E-18-15.

I can say with conviction that I renounce this settlement completely. In fact, I consider it null and void for having not met the original requirements set forth in Order No. 34189 in Case No. IPC-E-18-15. I believe that the study should be completed and that all parties with net metering interests should have ample time to review the published study prior to implementing net metering changes. Only after these tasks have been accomplished should we revisit this hearing.

Thank you for your time. [Grandfathering should be a given. The argument need not be made. It's a given.]

A Study of the Impact on an Idaho Family
of
No. IPC-E-18-15 "Net Hourly Metering & Compensation"

Idaho Public Utilities Commission
11331 W. Chinden Boulevard
Building 8, Suite 201-A
Boise, Idaho 83714

Re: Case No. IPC-E-18-15
Study of Costs, Benefits, and Compensation of Net Excess Energy Supplied by Customer On-Site Generation

I am a residential customer of Idaho Power Co. residing in Meridian, Idaho. In the summer of 2019 I performed a financial analysis of installing a solar photovoltaic system at my Meridian home. This analysis indicated that the costs of the $21,450 system would be recovered in 16 years. The analysis was based on the current "monthly net metering" program, the only one available at the time, and the only one offered by Idaho Power.

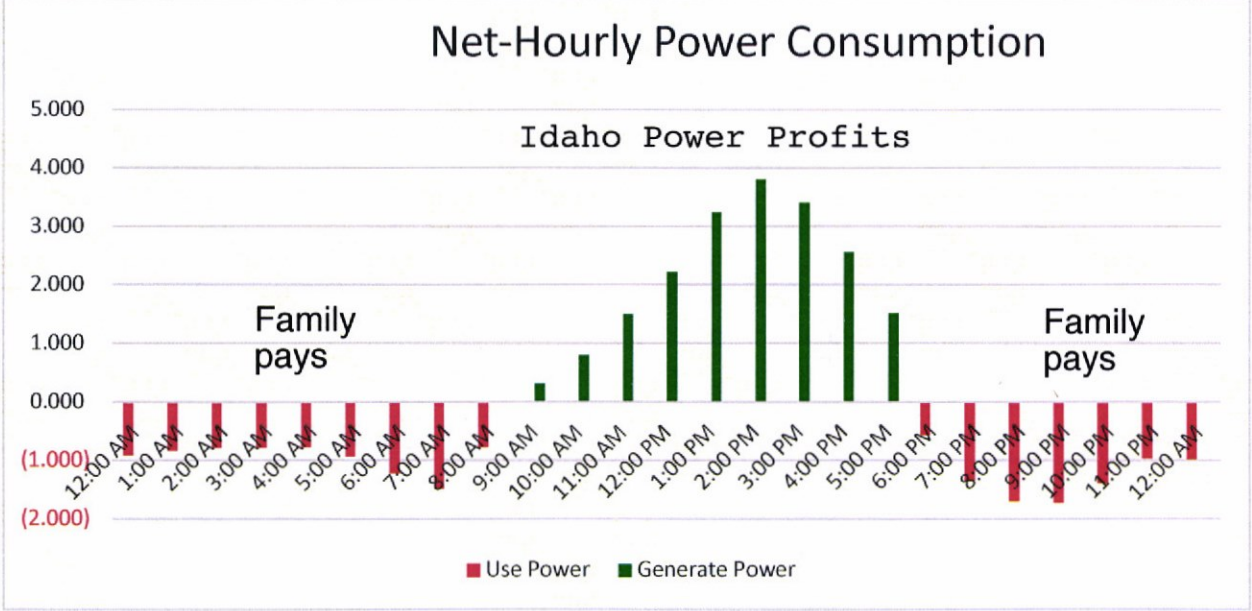
An application was made to Idaho Power in the fall of 2019 and a 23-panel system was installed. Months after my application Idaho Power informed me of the proposed program changes. The intention of my system was to meet my family's needs under the monthly-net metering program. The following is the analysis of these proposed program changes on one Idaho family.

I have a Master's degree in Economics/Econometrics and I am not an expert on Idaho Power, nor on solar systems, however I am an expert on my family's finances, solar generation, and electricity consumption. In order to perform my analysis of the impact on my family I had to model the electrical consumption of my home for every hour of every day of every month. This means I had to evaluate the consumption by refrigerators, freezers, HVAC system, hot tubs, computer systems, electrical car, and other appliances.

The story begins with my family's acquisition of a solar system in fall of 2019. The total cost was **$21,450**, after credits the cost was approximately $14,500. Under the system of net-monthly metering program at the time of the purchase, my system had a cost-recovery period of 16 years. In simple terms, that means in **16 years** my family will recover the cost of the system, with no profit and no return on our investment. This investment, under the net-monthly program in place at the time of purchase would increase the value of my home and in the event of a sale a large portion of the solar investment would be recovered. In addition, Idaho Power Company would make a profit of $3,600 on the excess power my system produces.

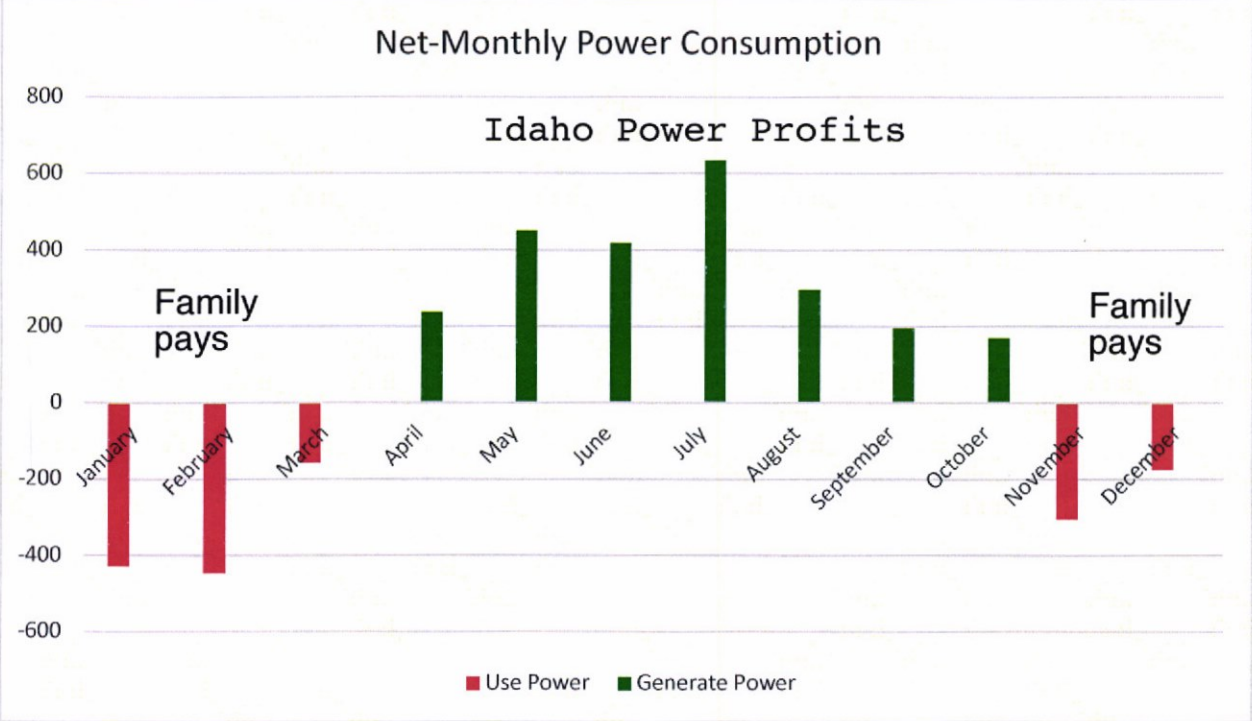
Under the proposed program changes (Case No. IPC-E-18-15 - Hourly net-metering & dollar charge/compensation to the solar producer) the results the of economics analysis of this family's solar system drastically changes. The cost-recovery period of **16 years** becomes **36 years** on equipment with a life expectancy of 25 years. Few families would make such an investment in a solar system where the family will never recover their initial costs.

The first question how is that possible? The answer is simple. My system generates the majority of the power during the mid-day and during the summer months (i.e. when the sun is shining), while the majority of the power consumption is in the early mornings and evenings (i.e. outside of the time the sun is shining). The following graph illustrates Idaho Power's proposed net-hourly consumption and generation of power (net power usage is red and net generation green).



A Study of the Impact on an Idaho Family
of
No. IPC-E-18-15 "Net Hourly Metering & Compensation"

Also, at play, is an annual cycle, as solar production is significantly higher during the summer months due to longer hours of sunshine and the position of the sun. The following graph illustrates the Net-Monthly generation and consumption of energy at my home (net power usage is red and net generation green). .



These two factors, the home's net-hourly consumption and the annual net-monthly consumption along with the proposed pricing under No. IPC-E-18-15 net-hourly metering would create a situation where one economic value is placed on the power consumed, but a separate, much lower, value is placed on the power generated. I believe the standard rate for power consumed is both practical and economically justifiable, and I have no dispute with it. However, the rate now proposed to be paid for generated (exported) power is not justified by any economic or cost-based analysis, and, if adopted, would create the situation where this family's solar system will never recover the costs. The study of my system and the proposed net-hourly pricing structure the cost pf the system will never be recovered **but** Idaho Power Company will make a **profit of $25,000 to $40,000** with no investment and no risk.

How is that possible? Idaho Power's profit is simple, I am paid a few cents for the excess/exported power, the power flows out of my home to a transformer and back down a powerline to my neighbor's home. My neighbor is charged full market price and Idaho Power just made 150% off my exported electricity with no production cost, no risk and no investment by Idaho Power.

Who wins? The shareholders of Idaho Power Company. Not one rate payer. This study shows that Idaho Power shareholders and executives win with no investment and no risk, while my family loses.

The next question for me was whether, under this "net-hourly program" is there any size solar system that makes economic sense to install. A simple cost-recovery analysis shows that the answer is **No**! If this is true for similar Idaho family solar systems, that means few Idaho home owners will invest in solar and that means lower demand and thus the solar industry will cut back and the industry might even move out of state to locations more welcoming to the industry.

This event raises two more questions: With the solar industry gone, who then will provide the warranties to the current solar customers? And the more Important question, is elimination of family owned solar generation systems in the public's interest or Idaho Power's? I suggest that Idaho Power's proposed new rate structure, which, if adopted, would destroy any rational concept of "net" in net metering, will severely impair, or even eliminate, this important element of distributed electrical generation in Idaho and would not be in the public interest. I believe that a more diverse, distributed electrical generation base, particularly one whose capital costs are being borne by Idaho citizens and not the power company, is in the public interest. This is particularly true now, when global warming is threatening our economy and our natural world. Idaho Power's proposed approach here is an attempt to stave off needed changes in the electrical utility industry, and I believe ultimately would not in the Company's own interests. The Commission should adopt policies that encourage the utility to broaden its resource base, not narrow it with deliberate and one-sided rate structure that unfairly penalizes rooftop solar.

Finally, this study shows that, if the Commission were to adopt Idaho Power's under the proposed "Net-Hourly metering program" it would simply constitute the taking of my family's property by Idaho Power for their benefit and without compensation.
This is because the Company would be receiving power from me for resale at retail rates on its own account without providing me fair and reasonable compensation. A taking also occurs, I submit, under the criteria Idaho Power proposes for maintaining eligibility within this "net-hourly program." Even if my system were grandfathered by a Commission order, my system would become ineligible for this status when I sell my home or pass it to heirs. At those events the economic value of my solar system is eliminated because my system is then converted to the new, no-reasonable-return-on-investment program.

A Study of the Impact on an Idaho Family
of
No. IPC-E-18-15 "Net Hourly Metering & Compensation"

Conclusions:
The real study of the economics of rooftop solar at a real Idaho home demonstrates a simple conclusion: IPC-E-18-15 is about profit, greed, and making solar unprofitable. It is about eliminating home solar generation from Idaho Power's grid. The PUC's duty is to supervise and regulate utilities like Idaho Power, to be fair, just, and reasonable, and to make decisions in the public interest. The PUC should reject No. IPC-E-18-15 for the following reasons

1. This proposed net-hourly program **takes** a family's investment and creates a situation where the family loses and Idaho Power profits by way of: (1) a rate differential that is unsupported and unfair; and (2) eliminating the value of the family's investment at the time of their home sale.

2. Idaho Power's manufactured credit rate for exported power is a fabrication as demonstrated by my analysis of who really consumes the power my home generates and what they pay for the power I generated. Idaho Power has not shown, and I believe cannot demonstrate, that receiving and reselling electrical energy from my solar system comes at a cost to the Company that would justify such an extraordinary price differential.

3. The proposed net-hourly metering will substantially reduce, if not eliminate altogether, the solar industry in Idaho.

4. My family was not represented in this behind the scenes proposed settlement and was not in any way represented as it is clear no homework was performed by anyone regarding a solar generator of my nature.

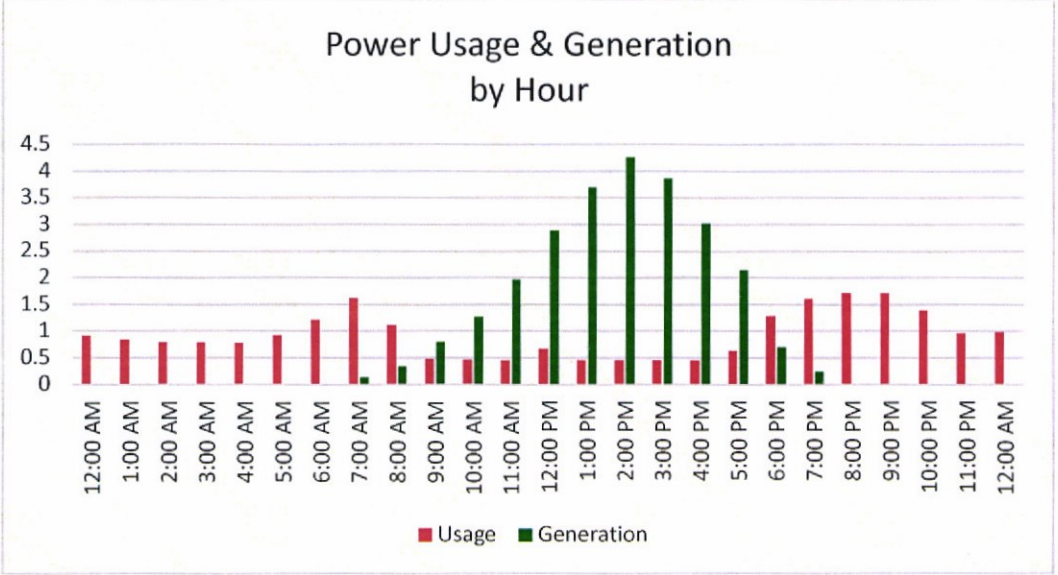
The PUC should immediately order Idaho Power Company to provide every customer with access to the customer hourly power consumption for the last year, and should require the Company to complete a thorough analysis of the economics of rooftop solar and its true costs and benefits to its customers.

Richard Kluckhohn
Meridian, Idaho
(208) 941-4186
kluckhohn@gmail.com

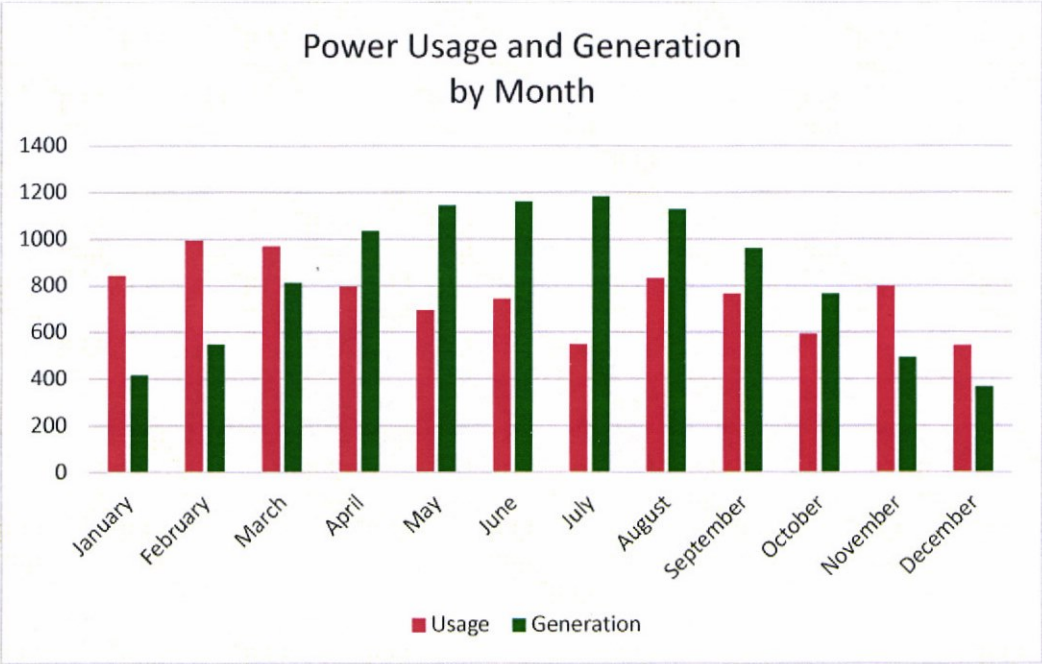
A Study of the Impact on an Idaho Family
of
No. IPC-E-18-15 "Net Hourly Metering & Compensation"

Power Generation and Usage Graphs

The following graph illustrates power used & generated by hour and demonstrates that usage in the early morning and evenings is the highest, while production of energy is the highest in the middle of the day.



The following graph illustrates power used & generated by month and demonstrates the unique pattern of usage of my home, and the highest is during the summer months.



Jeff Fereday and Kay Hummel
420 E. Crestline Drive
Boise, ID 83702
jcfereday@gmail.com
kayhum@cableone.net

December 2, 2019

Idaho Public Utilities Commission
11331 W. Chinden Boulevard
Building 8, Suite 201-A
Boise, Idaho 83714

Re: Case No. IPC-E-18-15
Study of Costs, Benefits, and Compensation of Net Excess Energy Supplied by Customer On-Site Generation

Dear Commissioners:

We are residential customers of Idaho Power Company ("IPCo" or the "Company). Beginning in 2016, with additional panels and a new inverter in 2018, we have invested over $28,000 in a solar photovoltaic system at our Boise home.[1] The Company's proposed changes to its net metering program in this proceeding would substantially undercut our expected return on this investment and, we believe, constitute an unjustified windfall to the Company and its shareholders. But beyond that, and more important as a public policy matter, is the fact that the Company's proposal would have a severe chilling effect on the development in Idaho of distributed solar and other customer-owned distributed generation ("DG") resources.

We respectfully request that the Commission not adopt or approve the October 11, 2019 Settlement Agreement entered by IPCo and others (the "Settlement"), not impose the Settlement's proposed new rate structure applicable to DG resources, and hold the matter in abeyance pending further study. Rooftop solar in Idaho is in its infancy, and this proposal by Idaho Power Company likely will throttle it. Rooftop solar today has been adopted by some 5,000 of the

[1]The total cost of the system, which was paid to AltEnergy, Inc. as supplier and installer, was $28,707.00. With the federal tax credit and a state tax deduction, the cost to us (after a five-year amortization) will be approximately $18,000. In evaluating the costs of IPCo's proposal, it would appear that the higher number would be appropriate because that is what went into Idaho's economy. In evaluating the cost to our investment posture, the lower number, adjusted for the timing of tax savings, would be appropriate.

Company's customers—about 0.01% of its customer base—and it accounts for a miniscule portion of the Company's installed capacity. The effect, financial or otherwise, of private rooftop solar on the other 99.99 percent of ratepayers cannot be significant. On the other hand, distributed solar is a step in the right direction for the environment and, we submit, for IPCo's customer base generally; it certainly carries part of the load toward the Company's "100% clean energy" aspiration. The Commission should take no steps to thwart the development of customer-sponsored rooftop solar in Idaho.

DG's effect on other ratepayers is typically based on the argument that the revenues they pay for the electricity they still purchase from the utility may not be covering an adequate share of fixed costs, such as transmission—in other words, "that net metering customers are not purchasing sufficient kWh to cover fixed costs," and that "an additional measure is needed to prevent a cost shift from occurring."[2] Presumably, this is IPCo's argument, even though the Company has not yet made a case for this, much less a convincing one. In any event, studies by the Brookings Institution and others have concluded that such impacts become meaningful only when the penetration of rooftop solar approaches an installed capacity of around ten percent. In Idaho, the current number reportedly is no more than about 3.5 percent. As stated in an exhaustive analysis of this issue by the economists at Lawrence Berkeley Lab, "for the overwhelming majority of utilities, current PV penetration levels are far too low to result in any discernible effect on retail electricity prices, even under the most pessimistic assumptions about the value of solar and generous assumptions about compensation provided to solar customers (e.g., full NEM [net metering] with volumetric rates)."[3]

Furthermore, even if DG in the Company's service area were causing increased costs to other ratepayers, any rate structure change to address this should compensate these ratepayers for these exact costs, not the Company's shareholders. There is no indication that the structure proposed here, which plainly would penalize the solar power generators to the point of being confiscatory of their investments, would be tailored to compensate for such effects and would not simply enrich shareholders.

We contend that neither the Company nor the Commission has enough information yet to make such a momentous decision. IPCo has not completed the

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[2] https://www.infrastructureusa.org/wp-content/uploads/2014/12/ftg2014finalreport-141113033126-conversion-gate01-1.pdf

[3] http://eta-publications.lbl.gov/sites/default/files/lbnl-1007060.pdf

study the Commission ordered, and has not released any analysis it may have done for public review and comment. In sum, there is no need to rush into this decision, especially absent a thorough cost-benefit study such as the one the Company is obligated to produce. We believe that any analysis the Company or the Commission ultimately engages in on this subject should be available for review and should cover all relevant issues, such as those set forth below.

To summarize our central requests, we urge the Commission to:

1) reject the proposed Settlement and hold this matter in abeyance;

2) order the Company to complete and make available to the public the study specified in the Commission's June 1, 2018 Order 34604, Case No. IPC-E-17-13, which study is to evaluate the costs and benefits, both to the Company and to other customers, of net metering relative to DG, and particularly residential on-site generation;

3) ensure that the study includes, in addition to the above, at least the following analyses:

   a. the value of DG over the next 25 years, to the Company and its ratepayers, in helping to meet Company's stated goal of achieving 100% "clean energy" by 2045;[4]

   b. the current value of the investment in generating plant represented by all the DG involved in the Company's net metering plan, and the Company's cost of replicating this amount of installed capacity with solar or other energy sources;

   c. the actual transmission and other fixed costs incurred by the Company or ratepayers arising from DG-produced electricity;

[4]The Agreement expressly avoids assigning any "environmental benefit" to rooftop solar. This is unacceptable, particularly where the Company itself claims to be putting resources into clean energy, presumably to gain their environmental benefits. Existing DG resources should not be hamstrung, and future DG resources effectively blocked, by this proposed new rate schedule while the Company supposedly figures out how to bring on line cost-effective clean energy resources. These clean energy resources are here today, delivering an environmental benefit that the Company, we contend, should be compelled to value in this process.

d. the relative firmness, and the relative interruptibility, of DG in the Company's system as compared to the energy from generation sources from which IPCo might be able to purchase on the retail or wholesale markets;

e. the higher costs, if any, borne by non-DG IPCo customers as a result of having DG systems producing power for the Company's grid under the current, one-for-one net metering arrangement;

f. the benefit to the Company arising from those DG owners who annually produce and provide to IPCo more electrical power than they consume—thus producing excess electrical energy that cannot be used by the producer and for which, under the present system, there will be no credit or compensation from IPCo—including an explanation of whether this benefit will accrue to other ratepayers or to Company shareholders, and in what amounts;

g. the revenues that will accrue to the Company from reducing the net metering credit by some fifty percent, including an explanation of whether these revenues will accrue to the benefit other ratepayers or to Company shareholders, and in what amounts;

h. an explication of the reasons for, and implications of, calculating the net metering credit on an hourly basis rather than a monthly basis;[5]

i. losses to investment-backed expectations accruing to existing DG owners who currently provide net metered electricity to IPCo should their net meter credits be reduced to approximately 50% of what they now are;

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[5]The Agreement calls for "net hourly billing" as follows: "At the end of each hour, consumption and exports within the hour will be netted and net hourly exports will be compensated at the Export Credit Rate," which is proposed to be calculated by a method involving such elements as the avoided energy, capacity and transmission and distribution costs; avoided line losses. The Export Credit Rate does not factor in environmental benefits or integration costs. The Agreement also states that "Schedule 6 and Schedule 8 customers will be compensated for net hourly exported energy at the Blended Base Energy Rate for their respective customer classes." The Blended Base Energy Rate is described as "the total revenue to be collected through the base energy charges for each respective class divided by the total forecasted annual energy for each respective class." These calculations are difficult to parse, and we urge the Commission to insist that they be made clear with specific examples and formulae. And above all, we need to know how these rates and the hourly billing schedule will affect the economics of rooftop solar. IPCo should be required to answer this question fully and fairly.

j. the economic impact, including the loss of commerce and jobs in the Company's service area, of a diminished solar equipment sales and installation industry that will result should the Company be permitted to reduce net metering credits by some fifty percent; and

k. the economic impact on home values if the net-metering credit now in place, and therefore the current value of a rooftop solar system, cannot be passed on to a purchaser of the home.

The public, including IPCo's ratepayers, will benefit from any meaningful effort to reduce carbon emissions and speed the transition to clean energy. The effort to make this transition is in the public interest, which is another reason the Commission should not adopt the Settlement and, before making a decision, insist on a full display of all costs and all benefits of net metering and DG energy production (including, without limitation, each of the above items). Uncertainties should be resolved in favor of encouraging development of solar and other carbon-free energy sources. The current proposal, particularly the idea that IPCo would begin the process of substantially devaluing credits, is going in the opposite direction.

While our home's full system has been functioning for just over a year, it appears we will be generating and sending into the grid slightly more electricity than our annual consumption. We designed it to produce enough to cover all of our electrical demand, but recent upgrades to our air conditioning system and other efficiency measures have contributed to this situation. In any event, it stands to reason that at least some residential solar systems that are designed to meet all of the home's annual electrical demand in fact will, like ours, produce more than 100% every year, thus generating credits we never actually use.

We are not asking the Commission to compensate rooftop system owners for this unusable, extra energy credit (even though the Company receives this energy for free, with little or no transmission cost[6] and sells it at retail rates); their decision to aim for a "100% system" was their choice, taking a chance that they would overshoot somewhat. But we are asking that you address this situation and devise a way to calculate the revenue IPCo is earning from this overage represented by unusable credits. Such a benefit should be factored into the overall analysis of the

[6]It is our understanding that electricity pushed to the grid from a home's photovoltaic system is used at the nearest location needing supply—that is, the neighboring homes.

impact of rooftop solar on the Company and its customers, and its financial benefit should accrue to other customers.

The Company's approach dodges other important questions, such as the actual fixed costs (if any) accruing to the Company or other customers involved in receiving otherwise free electrical supply from private solar systems, the revenues the Company receives from selling excess power from these systems, and the role these systems play in reducing both generating and fixed costs associated with meeting peak summer demand. Idaho Power's answer to whatever problem it perceives here is to ask this Commission to impose conditions that appear to be a windfall to IPCo and its shareholders while delivering a crushing blow to future development of distributed energy sources. There is no fairness or public interest in this approach. Before entering any order in this matter, the Commission should ensure there are answers to such questions.

IPCo began this proceeding by asking the Commission to establish a separate rate class for net-metered customers, ostensibly to address the question of unfair cross-subsidy. The Commission obliged, and now we see what the Company wants to do with this customer class, which is to reduce its relevance essentially to extinction—to make the installation of rooftop solar so outlandishly expensive that few, if any, IPCo customers will opt for it in the future. Such a policy is not in the public interest or the interests of other Idaho Power customers. Nor, of course, is it consistent with the Company's stated goal to become a 100% "clean energy" enterprise in the next twenty-five years.

We recognize that the Company likely sees this as a simple rate-making matter, in which a utility is seeking to protect the rate base on which it earns a return; private rooftop solar systems are not in its rate base. However, we ask the Commission to consider the impact that adopting the Company's position will have on the continued development of solar energy in our state. Here we have customers making substantial investments that will carry nowhere near the rate of return on investment the Company enjoys as a matter of law and IPUC policy. We believe most of these consumers made these investments in significant part because they see them as a small but meaningful step in what should, and we hope will, become a nationwide effort to transition from carbon emitting energy sources. We ask that the Commission initiate a process to classify DG in a way that does not discourage solar power development. It may be that this will entail a new way of structuring the relationship between the utility and its customers, or a new way of evaluating a utility's rate base, or its rate of return. But surely there is a way to allow the utility

to remain viable while still encouraging—or at least not undermining—the emerging energy sector consisting of voluntary, customer-financed rooftop solar.

We ask the Commission to deny the Settlement and direct IPCo to complete a rigorous and transparent analysis, which includes input from all stakeholders, to address the issue of what the Company should pay for excess power from rooftop solar, and how independently-financed solar can be encouraged to be a part of the Company's energy production portfolio.

Respectfully submitted,

Jeff Fereday

Kay Hummel

cc: Governor Brad Little

IDAHO POWER®
An IDACORP Company

4/2/2018

James L Haddock
1738 W Puzzle Creek Dr
Meridian, ID 83646-3631

Subject: Modification to Net Metering Service

Dear James L Haddock:

Idaho Power is pleased to offer options to our customers who wish to install on-site renewable generation at their home or business. We want to let you know, on July 27, 2017, Idaho Power filed a request with the Idaho Public Utilities Commission (IPUC or Commission) to modify its net metering service applicable to new on-site renewable generation installations. These changes are intended to facilitate the expansion of on-site generation in a way that is both scalable and sustainable into the future. A ruling in the case is expected from the Commission in spring 2018, likely around April 1, 2018.

As a customer with an active net metering application, we want to let you know about the request and what it means for you.

Idaho Power is requesting to:

- Close the current net metering schedule (Schedule 84) to new residential and small general service customers.
- Create two new schedules for residential and small general service customers who wish to install on-site renewable generation.
- Update inverter requirements on new systems to meet emerging industry standards.
- Open a separate IPUC proceeding to determine a compensation structure for customer- owned generation that reflects both the costs and benefits it brings to the electric grid.

This proposal may affect your application for interconnection. As part of the application process, Idaho Power requires a System Verification Form, certifying the system has been installed and has passed all local, state and federal requirements including a city or state electrical inspection. Under the proposal, customers who submit this form before the effective date of the new schedules will take service under the existing net metering schedule (Schedule 84); customers who submit this form on or after the effective date of the new schedules will take service under the new schedules. If the new schedules are approved, the effective date will be determined by the Commission as part of its ruling in the case.

NM 2377

The company has proposed the rates under the new schedules will mirror those of the residential and small general service customer classes, as do the rates under Schedule 84. However, as part of a future rate proceeding, the new schedules will be reviewed and new pricing structures may be adopted. At this time, no date has been set for a future rate proceeding.

We value your business and want to address any questions you have about the proposed changes to net metering service. For your reference, I have enclosed a Frequently Asked Questions document that provides more details.

I invite you to learn more about the proposal. Copies of the application are available at the Commission offices (472 W. Washington St., Boise) or the IPUC website, www.puc.idaho.gov. You can also access the application and view additional, related materials at www.idahopower.com/rates and click on the link to Idaho Rate Filings.

If you have additional questions or would like to discuss further, please contact our Customer Service Center at (800) 632-6605.

Thank you for taking the time to read this letter. We share you interest in innovation and look forward to continuing to provide service options that meet your needs.

Sincerely,

Theresa Drake

Theresa Drake
Customer Relations and Energy Efficiency Manager

Charles R. Gains

Tuesday, December 3, 2019

Idaho Public Utilities Commission
11331 W. Chinden Blvd Ste. 201-A,
Boise, ID 83714

Re: Case Number IPC-E-18-15 Idaho Power's filing to change the compensation structure for residential and small general service customers with on-site generation.

SKIP ON STAND

Dear Commissioners Kjellander, Raper, and Anderson:

I have lived in Idaho for nearly 50 years. I consider myself to be a typical Idahoan. I moved here after the Army and completing college because I wanted the independence and environment Idaho life has to offer. I love the Idaho people because we put great emphasis on our values and our ability to make the right choices. Idahoans have a strong dedication to trust and fairness. We put great meaning in the phrase, "My word is my bond."

I am here because I am concerned about everyone's right to capture and use clean and renewable energy – the energy that belongs to everyone. I am also concerned about the personal investment that I and others have already made in renewable energy.

Under the net-metering program, promises and incentives were made to those who wanted to invest in solar energy. Up to and including the present day, the Idaho Public Utilities Commission (IPUC), with its net-metering order, has created win-win rules and utility rates for both Idaho Power customers and the Idaho Power Company (IDPWR). Clearly, the purpose of the net-metering order was to promote and incentivize the use of this important energy resource.

Start →

Now, along comes IDPWR with its request to change the net-metering agreement and rates.

My comments are organized into two parts. One is regarding the settlement agreement itself. And the second is regarding the treatment of existing customers who have already signed up for the net-metering program.

Part 1. Is the settlement agreement reasonable, just, and fair?

IPUC staff and IDPWR assert this issue is about IDPWR's right to change the rates. This issue is so much greater than that. It is about where IDPWR Company, a monopoly, is taking us in the future.

Let's look into the future through a telescope. Can we see the goal of getting back to 100% clean-energy getting closer or further away?

1721 E. Canova Dr. Boise, ID 83706 (208) 344-5689

When the IPUC net-metering order was issued, IDPWR customers didn't see this as a windfall. Rather, it opened the door to energy possibilities. What the IPUC had created was a clean-energy incubator. The order became popular not because it made customers rich, but because it allowed customers options and opportunities. Solar could be installed without having to buy expensive batteries. The order motivated manufacturers to design and upgrade equipment such that it would meet the IDPWR standards. The order allowed return enough that the customer could see an eventual payback. Most important of all, it created opportunity for innovation with clean energy.

Today, IDPWR claims its clean energy generation stands at about 60% - well below its goal. A goal that is hard to keep when the electricity market demand is growing. IDPWR complains it is concerned about competition and the rate threat by clean-energy generators under the net-metering order. Yet, IDPWR doesn't have to invest one dime to add this clean-renewable energy generation to its base.

Commissioners, IDPWR is not only turning the telescope around, but in addition the telescope is now out of focus. The request by IDPWR doesn't appear to be moving us any closer to the vision of more clean energy generation, at a time when IDPWR is experiencing high demand growth. It does not make any sense at all that IDPWR should be concerned about such a tiny sector of the total generating market in its service area. It should welcome the new generation and incorporate this innovation into its own generating management plan.

It is simply a fool's errand to be wasting all this time and money worrying about minor generating rates when there is such great demand for clean, reliable energy. Commissioners, throw out the settlement agreement and move on to more important matters. Let's grow the total clean energy availability in the IDPWR area.

Part 2. Is it fair or just to change the deal with existing customers?

Commissioners, how would you like it if some power authority suddenly announced that you would now have to perform your job, but for half the pay? Isn't that what IDPWR is asking of those who have already committed to the net-metering agreement?

We had a deal.

Every Business 101 Law class teaches that a contract must contain the following "elements:" The parties agree to the deal (IDPWR and I agreed to net-metering.). An offer and acceptance must be made (The whole net-metering program was presented at the full electrical rate and we, in good faith, accepted the rate.). An element of consideration must exist (We pay IDPWR for power and they credit power to us at the same rate.). The parties have to be capable to enter into agreement (Indeed we were

1721 E. Canova Dr. Boise, ID 83706 (208) 344-5689

capable and able to qualify for a loan based on the deal.). And, the agreement has to be legal (lots of evidence here). In the words of James Whitcomb Riley:

> "When I see a bird that walks like a duck and swims like a duck and quacks like a duck, I call that bird a duck."

Commissioners, let people call the net-metering deal what they want, but this bird sure looks like a *contract* to me! The problem with IDPWR's request is clear. We had a deal and IDPWR doesn't want to honor it!

When IDPWR informed me about the details and specifications of the net-metering deal, it was all about the win-win for both parties. First, I could generate and use my own power. Second, it let IDPWR avoid using its generating capacity and store the potential energy for later use. Third, if I generated extra power, IDPWR could take it and provide it to my neighbors at the full retail price and credit my account for repatriation sometime in the future.

I relied in good faith on the IDPWR assurances. IDPWR did not notify me or make an obvious statement that it was able to change the rates. Simply by this fact alone, IDPWR should not be allowed now, after we have inked the deal, to change the rates I relied on. Note too that DL Evans Bank relied on the dependability of my net-metering contract to process my loan. Following that, the Idaho Office of Energy relied on these same assurances in order to accept my application and give me the loan. I already have much more than $18,000 invested in my PV solar system. From the beginning, the net-metering deal I signed with IDPWR is how I would pay off this loan and ultimately realize a return on my investment in my retirement. It is not fair, or just, to let IDPWR back out of the existing deal by citing some hidden excuse that this is allowed because it is a "rate change." Indeed, my mother would say:

> "Lies of omission are often lies of deception. "

IDPWR never made their intention to change the rate a visible condition to me, the potential solar customer. I never would have accepted the financial decision and obligation to make the deal had I known what IDPWR was planning. All net-metering customers should have their deals protected and grandfathered in perpetuity. But IDPWR seems to hold all the cards. Senator John McCain once said:

> "The more powerful you are, the more likely you are to get what you want."

Don't allow this to happen.

There is a great disparity in bargaining power between the small net-metering customers and Idaho Power Company. The Commission, I think, was formed to provide some counter-balance to Idaho Power given its obligations, size, and its limited competition. I am asking the Commission not to allow IDPWR to change the deal. However, if the Commission does side with IDPWR's request, at least keep those

already invested grandfathered in perpetuity. This will give customers like me the dollar return to maintain, update, and keep their systems operating in compliance.

Conclusion

The IPUC net-metering order is an infinite-sum (an open) solution. The proposed IDPWR settlement agreement is a zero-sum solution. The underlying message here is that small, innovative renewable generators have no freedom to create, control, and enjoy the benefits of developing and using renewable energy resources.

In other words, the little guy doesn't have a chance. If IDPWR's request goes forward, from now on all IDPWR has to do is identify someone else's new generation technology, innovation, and/or development idea as a "threat to its rates" and the small generator business idea is D.O.A!

With the net-metering order as it presently stands, IDPWR is incentivized to research better, bigger and cheaper clean-energy ideas. Keep the order and it opens the door to healthy competition. If the IPUC sends this message to IDPWR, future projects and innovation will be created on the basis of science, technology and economy - not on a basis that leads to hearings, rule-making and regulatory manipulation.

As for those who were motivated to sign up under net-metering, by what sense of fairness or ethical thinking is there justification to pull the deal apart? By what reasoning does it make it okay to allow IDPWR to violate that basic Idahoan tenant - "My word is my bond."

Sincerely,

/s/

Charles Gains
December 3, 2019

Thank you for your attention. Are there any questions?

12/1/2019 Boise, Idaho

Honorable PUC Commissioners,

My name is Lisa Hecht. I am an Idaho Power customer who resides at 4920 E. Sagewood Drive, Boise, ID. 83716.

Thank you for your service to the Idaho public, for being the body that ensures Idaho citizens are provided with just and fair treatment by utilities granted monopolies and regulated under the PUC.

I bring multiple viewpoints to this hearing as:

- an electrical engineer,
- an Idaho Power customer,
- an Idaho Power shareholder,
- an attendee of Idaho Power's IRP sessions since 2015,
- as a net-metering customer, and the first person to install a solar PV system on my roof through Snake River Alliance's "Solarize the Valley" program in 2016,
- as the mother of two young adults, and,
- as someone who has read the IPCC reports, the Fourth National Climate Assessment, halved her personal carbon footprint, and who holds great concern for our children, and all of us.

First, the positive. To the signers of the proposed settlement: thank you for keeping demand charges the same, since that will continue to align cost with usage, incenting efficiency, benefiting all customers.

I also support a non-export option with reduced connection costs.

not subject to ~~cem~~ proposed new compensation terms for other net-meterers.

My testimony regards the proposed settlement for case IPC-E-18-15, whose title is, "***Study of Costs, Benefits, and Compensation of Net Excess Energy Supplied by Customer On-Site Generation***". The very title implies that the value of that customer generation was the purpose in opening this case. So, what was the conclusion of the costs and especially, **the benefits** of that net excess energy supplied by us net-metering customers? Some of the values of those benefits have been assigned values of **zero.** How then, can the compensation values possibly be calculated?

My first ask, therefore, is that the PUC direct the signing parties to complete the settlement by assigning mutually agreed-to values on three missing benefits of solar net-metering. Those values may be significant and include Avoided T&D Capacity, Integration Cost, and Environmental Benefits. I prefer (and asked for) costs + benefits to be assessed by an independent party.
Avoided T&D Capacity in particular could be a significant value, since Idaho Power assesses T&D costs at 2/3rd of its total costs of providing electricity. This should be done before approving any settlement.

Failing that → These missing values of net-metering could be determined concurrently with the next IRP cycle, and those **Updates to Export Credit Rate** in Section C should be determined jointly with at least the current intervenors, since Idaho Power controls the IRP process.
Given that the foundation for identifying values of solar exists; it should be possible to include all values.

- **Idaho Power has been party to an Oregon PUC Resource Value of Solar (RVOS) study for years.** On January 22, 2019, the Commission issued orders completing Phase II of the resource value of solar (RVOS) proceeding and adopting final methodologies that utilities will use to produce their initial sets of

RVOS values. At the October 29 special public meeting in docket UM 1930, the Commission requested an informational update on the status of the RVOS proceedings. OPUC staff will provide a presentation at the December 3, 2019 public meeting summarizing the compliance filings, addressing the status of the compliance filings, and outlining next steps.

- In 2017, **28 valuation studies were proposed, pending or decided in 21 states and DC**, according to the North Carolina Clean Energy Technology Center (NCCETC) 2017 solar policy review.

Secondly, the issue of grandfathering was not addressed in the settlement. My guess is that, considering what happened in Nevada with net-metering, that was what you'd call an Idaho "hot potato!".

As a net-metering customer since 2016, I urge you in the strongest terms to grandfather existing net-metering customers under the program which drove the designs and installations of their systems. Around the U.S., in other states, 20 years from installation has been a typical grandfathering period, which coincides with the expected lifetime of solar PV panel generation. That grandfathering should follow our accounts, if not our addresses.

Existing customers MUST be grandfathered, and it is all about **fairness:**

- We who installed solar on our homes don't practically have the option of a contract with Idaho Power, because a PPA would be far too expensive for homeowners and small business owners. Therefore, only the Idaho PUC can protect the value of our investment, to ensure that it is "fair, just, and reasonable" to families and small businesses who invested their hard-earned dollars in cleaner energy, for themselves, their neighborhood,

and ultimately, all Idaho Power customers. I wanted to do my part for my daughters, community, and the world, since we have under 10 years to massively reduce our carbon output, and electric generation is America's #2 source of carbon emissions at about 28%.

- Our investment will continue to benefit other customers for the lifetime of the panels, estimated generally at 20-25 years. Those benefits include avoided generation, significant avoided T&D losses (since generation and load are co-located), and lower demand for much of peak, since peak demand largely coincides with peak solar generation, and since peak load drives Idaho Power generation investments.
- The Break-Even Time (BET) of the solar investment depends in part on home resale value; what happens to resale value if we can't grandfather? On average, across the country, it raises (solar PV) value by 4.1%, but if net-metering compensation rules change frequently, uncertainty destroys that value.
- Re. precedents, a Nevada District Judge determined in 2016 that fairness meant respecting the rights of those who invested their personal money in solar PV energy systems that benefitted the entire system.
- Nevada PUC chair Paul Thomsen resigned in May 2017 after the PUC's decision to lower net-metering rates and not grandfather existing customers, and was replaced by Gov. Sandoval, because Nevadans expressed their feeling that it was profoundly unjust.
- Net-metering is a program, and our solar PV designs are built on the premise and rules, especially the economics, of monthly net-metering.
- I support the motion to grandfather new customers until or after January of 2020.

- I have accrued nearly 2200 kWh in accumulated credits under the existing rules, worth $176 at $.08/kWh, to Idaho Power. This is another value I'd like to have the possibility of recouping through grandfathering.

Finally, I invite you to join me in my perspective as a mother of two, and concerned citizen who has read the IPCC and NCA reports with great concern and determination to get us all to safe harbor by cleaning up our electric energy ASAP. U.S. supports clean energy >80%

- Per IPCC models to achieve carbon neutrality, by 2050 we must eliminate coal-burning, and reduce natural gas by 80%. Solar must grow significantly to replace them (along with wind, battery and other storage). Do we want that solar on existing rooftops and built space, or covering Idaho's precious farmland or wild places? How will Idaho Power achieve its goal of 100% clean electricity by 2045, without the help of rooftop generation?
- Vermont's Green Mountain Power, a B-corporation, entered into a cooperative agreement with customers to use batteries to shave peak load. What value might such a program hold for Idahoans? Idaho Power wants to see electric vehicle adoption grow; EVs also have batteries which could be used cooperatively to meet load.
- When we don't put a financial value on all the benefits of solar and other forms of customer net-metering, this discourages its use at a time when we must ramp it up. We can only determine what is fair to all customers by establishing a full and fair, agreed-upon valuation among all parties to the case.
- If we thereby discourage solar now, by punishing those who tried to do right, many according to their highest values, what recourse will we have to achieve the required clean energy balance mandated by physics as laid out by the IPCC and NCA scientists?

- In summary, we all have the most to gain through a cooperative relationship between Idaho Power and net-generation customers in accelerating a clean-energy future, by fully valuing not only what Idaho Power provides, but also what net-generation customers provide, now and in the future, and incentivizing that.

With gratitude for the opportunity to provide testimony on this case,

Lisa Hecht

Sources:

- *Oregon PUC RVOS Order UM1911 re. Idaho Power and RVOS* https://edocs.puc.state.or.us/efdocs/HDA/um1716hda134527.pdf
- *50 States of Solar: Q4 2017 Annual Report and 2017 Quarterly* Report Executive Summary, NC Clean Energy Technology Center https://nccleantech.ncsu.edu/wp-content/uploads/2018/06/Q4-17_SolarExecSummary_Final.pdf
- *Here's how much adding solar panels will boost your home's value, Money Magazine* http://money.com/money/5642057/home-value-solar-panels/
- *Nevada Regulators Restore Net Metering for Existing Solar Customers,* GTM, September 16, 2016 https://www.greentechmedia.com/articles/read/nevada-regulators-restore-net-metering-for-existing-solar-customers
- *Nevada utility regulator Paul Thomsen resigns* https://www.utilitydive.com/news/nevada-utility-regulator-paul-thomsen-resigns/443336/

FYI, Zoom will be a great teleconferencing tool for future hearings

Idaho Public Utilities Commission previous Order regarding Accumulated Net Excess Energy Credit Balances and potentially grandfathering:

ln Order No. 32846, the Commission stated, "we find it fair, just, and reasonable for the kWh credit to indefinitely carry forward to offset future bills for so long as the customer remains on the net metering service at the same generation site. Allowing the credits to carry forward indefinitely ensures that customers will be able to use their credits when they need them and thus receive the benefits of their systems."

IPC-E-17-13 - IDP - New schedules for customers with on-site generation

IT IS HEREBY ORDERED that Idaho Power shall close Schedule 84 and create new Schedule 6: Residential Service On-Site Generation and new Schedule 8: Small General Service On-Site Generation.

IT IS FURTHER ORDERED that Idaho Power shall initiate a docket to comprehensively study the costs and benefits of on-site generation on Idaho Power's system, as well as proper rates and rate design, transitional rates, and related issues of compensation for net excess energy provided as a resource to the Company.

IT IS FURTHER ORDERED that Idaho Power shall file a study with the Commission exploring fixed-cost recovery in basic charges and other rate design options prior to its next general rate case.

When Customers go solar, they are paying for the generation, not Idaho Power. Savings and cost-shift from solar when compared to energy efficiency is very similar to the grid. In many ways solar is more beneficial.

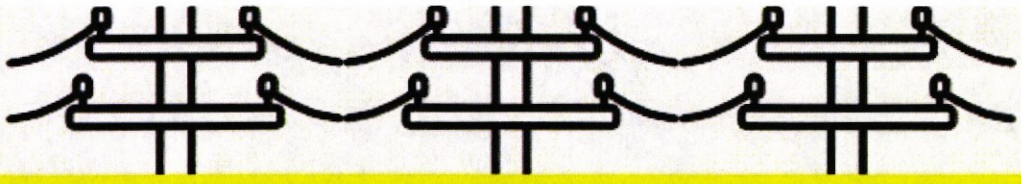
From Idaho Power's 2018 Annual report:

"In 2018, 2017, and 2016, Idaho Power expended approximately $44 million, $48 million, and $43 million, respectively, on both energy efficiency and demand response programs."

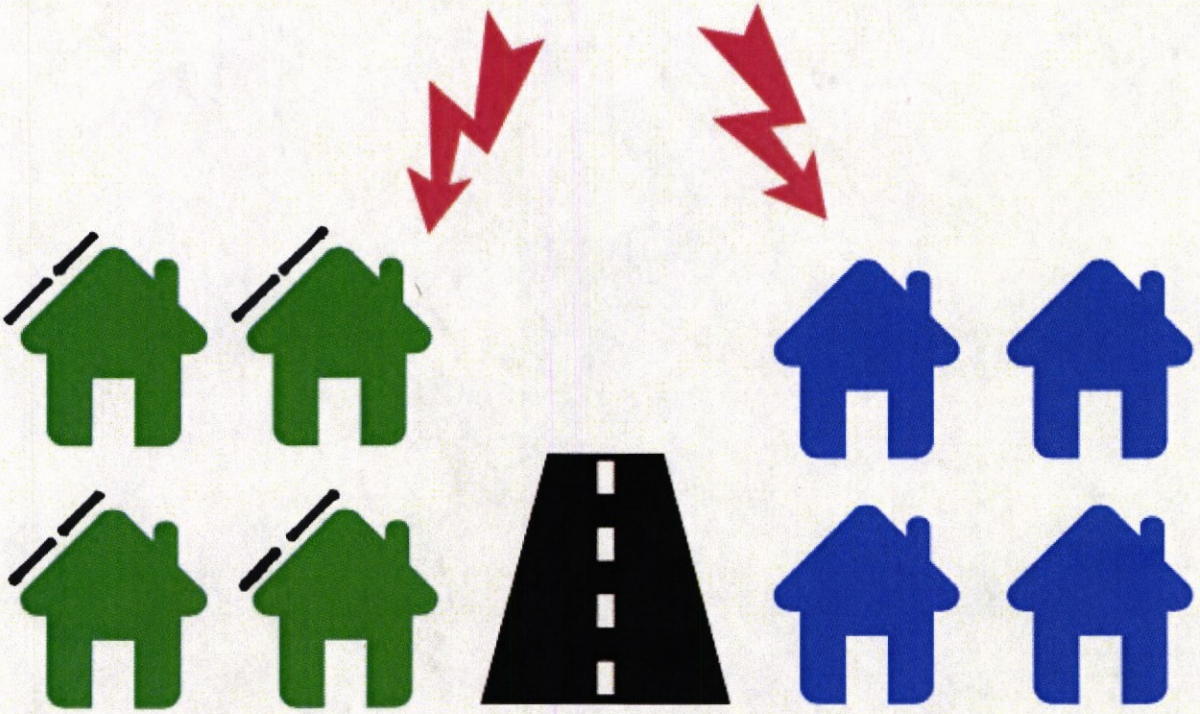
IDP STAFF: "Demand-Side Management Marketing Expenses versus Total Program Expenses Pages 19-20 of the Demand-Side Management 2018 Annual Report breaks out the marketing expenses of $1,270,112 from the portfolio total spend of $44,262,080."

That means the Company spends around 2.87% on marketing to customers encouraging energy efficiency.

"In 2018, Idaho Power's energy efficiency programs reduced energy usage by approximately 173,000 MWh."



IMAGINE 2 IDENTICAL RESIDENTIAL CIRCUITS



Circuit 2 - Saved 10% KWH/Month by changing nothing in the way they used energy, but by 10% of the homes going SOLAR

Circuit 1 - Saved 10% KWH/Month by being more energy efficient like smart thermostats and space heaters

BOTTOM LINE - SAME NET EFFECT ON BOTH SIDES

173,000 MW or $14,878,000 (at $0.086 per kWh, which is less than the actual retail value) of revenue was lost in 2018 due to customers becoming more efficient.
On-site generation customers can function exactly the same as energy efficient customers. Solar is simply one way to be energy efficient AND provide the benefits of distributed energy to the grid.

$14,878,000 + $1,270,112 = $16,148,112 in total cost of energy efficiency.

Quote from Idaho Power's 2018 Annual Net metering report:
"There are roughly 650 electrical distribution circuits in the Company's service area.
As of March 31, 2018, there were 2,068 active net metering systems totaling approximately 16 MW on 377 distribution circuits."

16+ MW of generation which costs Idaho Power $0 to install and maintain. The value of distributed generation is VERY SIGNIFICANT.

"The Company had accumulated approximately 0.5 million, 1.3 million, 2.3 million, and 2.6 million unused excess net energy credits by the end of years 2014, 2015, 2016, and 2017, respectively."

2,600,000 * $0.086 = $223,600.00+ in FREE ELECTRICITY in 2017.

PUC STAFF: "Distributed energy is every bit as valuable as energy efficiency."

The Energy Information Administration estimates that national electricity transmission and distribution losses average about 6% of the total electricity generated in the United States each year. (40- Independent Statistic & Analysis—U.S. Energy Information Administration. Accessed April 2, 2015: http://www.eia.gov/tools/faqs/faq.cfm?id=105&t=3.)

Distributed Generation lowers the transmission cost to the grid.

COMPANY STAFF: "Regarding the 70% fixed cost claim – the Company filed a cost of service study. looking at overall costs. A "class cost of service study" was uploaded as work papers in IPC-E-18-16 docket." (This study looks at Idaho Power's Overall cost of operating).

Provides an overview and explains how came to numbers.
(15:45) open case filed "fixed cost report" - case 18-16

JSH: "When is our peak pricing?"
COMPANY STAFF: "It depends, but power system peaks in late afternoon/evening in summertime."

JSH: "What solar benefits were set aside?"
COMPANY STAFF: "Three components - avoided transmission and distribution capacity, integration costs, environmental benefits."

Idaho Power's Annual Net metering report quotes:

20170428ANNUAL NET METERING REPORT

VII. SYSTEM RELIABILITY CONSIDERATIONS

The circuits that contain the greatest number of net metering systems are largely located in northeast Boise and in theWood River Valley area, while the circuits that contain the greatest amount of connected net metering capacity tend to be located in mostly agricultural and rural areas. The greatest number of active net metering systems that currently exist on a single distribution circuit is 30 totaling approximately 139 kW. On another distribution circuit, from a capacity perspective, seven generators (all solar) rated at approximately 606 kW are located on that single distribution circuit. That circuit serves mostly rural customers with a calculated summer peak load of approximately 1,900 kW. The net metering penetration on the circuit is approximately 32 percent. The net metered connected kW capacity on the Company's distribution system continues to remain small and the Company has not yet experienced significant operational impacts on these circuits.
…This review may include determining if there is adequate transformation and conductor capacity, as well as a phasing (single- versus three-phase) match. The Company has not denied any net metering applications due to system limitations, but continues to carefully monitor requests for connection to ensure ongoing safe and reliable service is available to both existing and new customers.
…As net metering system penetration increases, the Company will keep the Commission apprised of experienced or anticipated system reliability impacts and will propose mitigation as needed. This may include additional inverter requirements such as smart inverter technology, which can mitigate many high penetration issues.

20180423 ANNUAL NET METERING REPORT

II. SYSTEM RELIABILITY CONSIDERATIONS

The circuits that contain the greatest number of net metering systems continue to be located primarily in northeast and east Boise and in the Wood River Valley. However, greatest net metering connection capacity tends to be on mostly agricultural and rural serving circuits. For example, the largest number of net metering systems connected on a single distribution circuit are 47 which total approximately 244 kilowatts ('kW'). The distribution circuit that leads in connected capacity has only eight solar PV system that are rated at approximately 667 kW. This circuit serves mostly rural customers with a calculated summer peak load of approximately 2,100 kW. During minimum load conditions, the 550 kW of power flows from the circuit into the substation and on to other circuits. Although growing quickly, the net metered connected kW capacity on the Company's distribution system continues to remain small relative to the total load and the Company has been able to manage the minimal operational impacts on these circuits.

…Although some service transformer upgrades have been required, and further study has been necessary, the Company has not denied any net metering applications due to system limitations.

…The use of smart inverter technology, with reactive support capability enabled, may mitigate many high penetration issues and provide additional distributed generation hosting capacity.

RE: FW: ANY SOLAR DECISIONS?

ZH [redacted]
To Joshua Hill; Stephen [redacted]

Reply | Reply All | Forward | ...
Thu 3/21/2019 8:59 PM

Hi Josh,

After reviewing the project again (#176756 Taylor), Panasonic 325W X 58 is 18.85kw—a larger system with upgraded panels will need an amendment AND...how is this the same cost to the customer with upgraded panels and an "included" $2200 transformer upgrade? Was this approved by Steve?

Thank you,

[redacted]
Project Manager
208-[redacted]

Above graphic shows one of many projects where a customer and/or the solar provider fully funded a $2,000 - $3,000 transformer upgrade. Upgraded transformers allow the utility company's system to be more efficient as well as recover more revenue due to added capacity on the upgraded circuit (more potential customers).

Idaho power company's comments in support of settlement -
pg -7
"The Signing Parties agreed that other costs and benefits (avoided T&D [Transmission & Distribution] capacity, integration costs, and environmental benefits) may be measurable, but agreed not to include those costs or benefits as part of the Settlement Agreement."

COMPANY STAFF: "What are we trying to solve? ...whats the problem? Well the problem is, while the majority of our underlying cost structure is fixed, the way that we collect those costs is through volumetric rates. And when customers reduce their usage for any reason, that creates under-recovery for the utility and what we're left to do is collect that from other customers, and for the residential class that happens through the FCA (Fixed Cost Adjustment).
I would tell you that... the company's position is that isn't a solar problem, that's a rate design problem. And we have repeatedly stated that in these cases, and what we've tried to do in the 18-16 report is lay that out, that this needs to be addressed for all of our customers. We are not trying to single out solar."

"When customers reduce their usage for any reason, that creates under-recovery for the utility and what we're left to do is collect that from other customers. The company's position is that isnt a solar problem, that's a rate design problem. And we have repeatedly stated that in these cases."

"and what we've tried to do in the 18-16 report, is lay that out. That this needs to be addressed for ALL of our customers, we're not trying to single out solar."

ln Order No. 34046, the Commission closed Schedule 84 to R&SGS customers with on-site generation and created new tariff Schedule 6, Residential Service On-Site Generation, and new tariff Schedule 8, Small General Service On-Site Generation. The Commission also ordered ldaho Power to initiate a docket to comprehensively study the costs and benefits of on-site generation on ldaho Power's system, as well as proper rates and rate design, transitional rates,

and related issues of compensation for net excess energy provided as a resource to the Company. Order No. 34046 at 31.

So I ask you, as a solar professional, a local business owner, and a concerned citizen: how can the PUC pass any settlement without inclusion of all the benefits of solar, when they ordered a comprehensive study of costs and benefits of on-site generation customers?

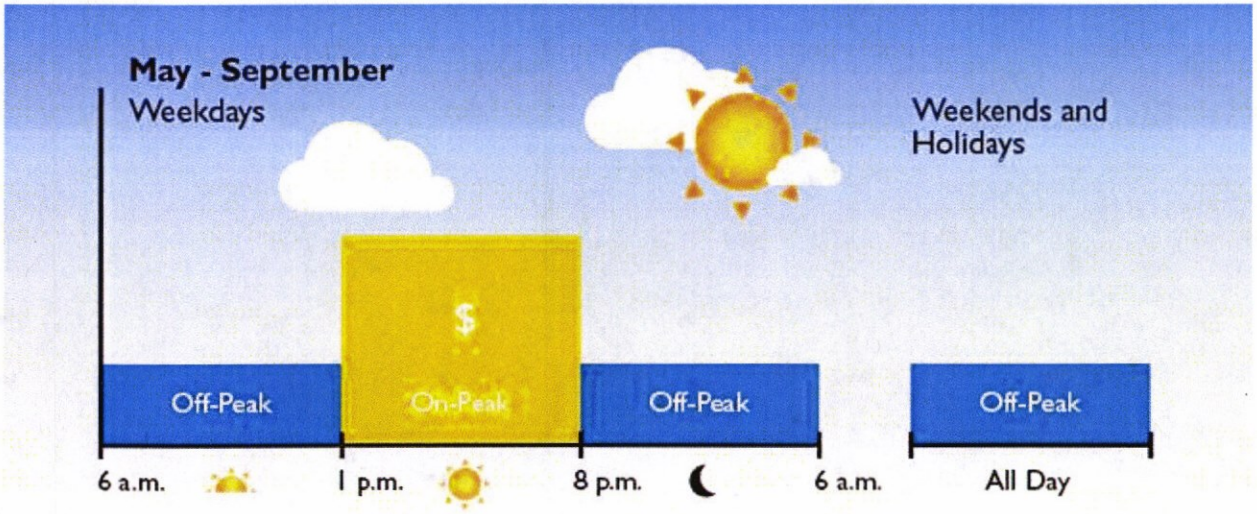
Environmental benefit of land use, grandpa hill used to say, they aren't making any more of it...use our rooftops!

Time of use across all rate schedules is a fair, just and reasonable solution.

Incentivizing West facing solar is a fair, just and reasonable solution.

Incentivizing battery storage with solar, allowing Idaho power access to a percentage of stored kWh's during peak loads is a fair, just and reasonable solution.

Please find below two programs implemented by Utah and Nevada power companies:



Utah:

Pricing

With Time of Day, your basic service rates still apply. You also pay:

- **1.6334 cents less** than your basic service rate (Schedule 1 or Schedule 3) for each kilowatt-hour (kwh) of electricity used during off-peak hours
- **4.3560 cents more** than the basic service rate for each kwh of electricity used during on-peak hours

Nevada:

Net Metering

Net metering (NEM) allows you to receive a credit for the energy generated by your renewable energy system, which you can use to offset your monthly energy bill. All customers with renewable energy systems may be eligible for NEM.

See below for more information if you are interested in applying for net metering.

Rate Types

Net Metering Rider-405 (NMR-405)

Customers who installed or had an active application for a rooftop solar system of 25 KW or less on or after June 15, 2017 are automatically placed on this rate and in the applicable tier.

LEARN MORE

Net Metering Rider-G (NMR-G)

Customers who installed or had an active application for a rooftop solar system of 1,000 KW or less as of December 31, 2015 are grandfathered into original NEM rules and rates.

LEARN MORE

Net Metering Rider-A (NMR-A)

Southern Nevada customers who installed or had an active application for a rooftop solar system of 1,000 KW or less between January 1, 2016 and June 14, 2017. This rate is not available in northern Nevada.

LEARN MORE

Energy we deliver to you	Energy you export to the grid	Energy billed at consumption rate	Excess Energy Credit calculation	Excess Energy Credit rate pe kWh
100 kWhD	30 kWhR	70 kWhN	None, because we delivered more energy than you exported	N/A
30 kWhD	100 kWhR	0 kWhN	70 kWhA multiplied by your tier rate	N. Nevada: $0.07175 S. Nevada: $0.08826

Rates are for Tier 3 regular residential service effective October 1, 2019 (northern Nevada D-1 and southern Nevada RS).