

FTC Workshop - Something New Under the Sun: Competition & Consumer Protection Issues in Solar Energy
June 21, 2016
Segment 2
Transcript

DEREK MOORE: Good morning. And welcome to the second panel today entitled "Net Metering-- Pricing Solar DG at Retail." My name is Derek Moore. And I'm an attorney in the Office of Policy Planning here at the FTC. To my immediate left is John Hilke, a former staff economist in the FTC's Bureau of Economics, who now consults for the Commission. John I will be co-moderating this panel.

Our distinguished panelists will discuss a number of issues related to a single question-- how much, if anything, should an electric utility have to pay for electricity a customer self-generates at his home or business? Our five panelists bring a wide range of knowledge and expertise to our workshop. And I'd like to introduce them in the order in which they'll be speaking.

Phil Moeller is the Senior Vice President of Energy Delivery and Chief Customer Solutions Officer at the Edison Electric Institute and is a former commissioner on the Federal Energy Regulatory Commission. To his left is Jon Wellingshoff, the Chief Policy Officer at SolarCity and a former chairman of the FERC. To his left is Karl Rabago, the Executive Director of the Pace Energy and Climate Center at the Elisabeth Haub School of Law at Pace University.

To his left is a familiar face, Severin Borenstein, who is the E. T. Grether Professor of Business Administration and Public Policy at the Haas School of Business at UC Berkeley. Finally, to his left is Tim Woolf, the Vice President of Synapse Energy Economics. Phil, the floor is yours.

PHIL MOELLER: Well, thank you, Derek. Thank you for holding this workshop. We appreciate the FTC looking into these issues in kind of a factual-- taking some of emotions out of it.

It's a very exciting time in the electricity industry right now. Customers have more options. And they want more options. It's partly because we have a smart grid now that if you contrast to say, 35 years ago, we didn't. And so in that sense, there is something new under the sun.

It's a two-way system. We've got 65 million smart meters in. People not only can have information flowing both ways, but power can actually flow both ways now, which is mainly the reason we're here today.

On the other hand, there is something that isn't new. And that is essentially what the focus of this panel is, which is how do you compensate generation that's attached or that connects to the grid? That issue has actually been around since PURPA was passed in 1978. So to the extent we have a new system, but to the other extent, we have the same issues of how to compensate generation.

When we talk about solar-- and some of this was mentioned by Dr. Ulrich today-- we want to keep in mind that the issue of private rooftop solar, which is expanding, is great. But actually the universal scale, utility scale solar amounted to 60% of the installed solar capacity last year. So

the electric companies are definitely promoting solar. Customers want it. And we want to make sure that there's more available.

And as noted, I think by Mr. Agarwal, there are now over a million rooftop private solar installations. That number is expected to go up. Those are interconnected by the electric companies, by the cooperatives and the municipalities.

And so those interconnections are going on. And those interconnection times are down to a day or two in some of the higher of areas penetration. So that is a success story in terms of getting private solar onto the grid.

The key questions, though, are really how much are these facilities going to be paid when they send electricity back to the grid? And are these facilities paying their fair share of the grid cost to maintain and accelerate the smart grid, essentially the distribution system? And the reality is the smart grid that we've talked about a little bit today-- but it's actually the enabling technology that allows all this to happen. So the proper investment signals to, again, maintain and expand smart grid are absolutely essential.

And those decisions are made by state regulators, sometimes state legislators. And we're glad that you have a couple of members of NARUC who will be speaking after this panel to give their perspective. Because that's where the decisions are made and will continue to be made for the foreseeable future. Part of this is related to an effort that NARUC is undertaking to re-look at state rate designs. And that's important, because we're in a historical changing point.

Typically the bill-- most people know this. But the bill that you pay, if you take out the taxes and fees, consists of three elements. It was referenced this morning-- the cost to generate the power, the cost to transmit the power, which is typically regulated by FERC, and then the cost of the actual distribution grid, the smart grid that delivers it to the neighborhood.

And traditionally, most of the costs in that third category, to maintain and expand what's now increasingly a smart grid, have been put onto the commodities side. That was referenced this morning by the professor as well. And that's pretty inelegant rate-making in terms of cost causation. But it's sustainable in an environment when consumption is increasing and demand is increasing.

But one of the things that we haven't mentioned this morning is that actually, energy efficiency programs work. And they've been effective. And we're now in an era where demand is either flat or declining. And in that era, that exposes kind of the historical flaws of putting the distribution smart grid costs onto the commodities side.

And what happens is if you're talking about compensation at the full retail rate for net energy metering, that means essentially that we contend there's a subsidy involved where the private rooftop solar owners are not paying their fair share of the distribution costs. And in fact, they're having other people who don't have solar pay their share of the cost. And as the grid needs to expand because it's getting more dynamic, these investments need to increase.

Typically, the average American pays \$110 per month for electricity in terms of their final bill. That's a very generic average. But generally speaking, the percentage of that \$110 that actually is a cost to maintain the smart grid and expand it is somewhere between \$45 and \$70, a huge portion of that bill that right now, if allocated to the full retail rate of net energy metering, again, has non-private solar rooftop people subsidizing those who own rooftop.

We think this is a manageable problem through rate design. Again, NARUC is putting a lot of effort into this. We look forward to that. And this will continue for the year.

The other point I'd like to point the FTC staff to is when you're talking about compensation, I would like you to consider the comments you put into the record during FERC's Order 745 process where you were very concerned as an agency about over-compensation of demand response resources. And finally, I just urge you as you look into this and you put your report together to get out there and take a look at things. There's some amazing things going on out there.

Actually seeing how a distribution system is operated, particularly say in Southern California or Hawaii where there are challenges-- manageable challenges, but real challenges-- in terms of dealing with the variable nature of this generation-- and going back to the duck curve that [INAUDIBLE] showed today, the need to keep the system in balance-- and actually seeing that in action, I think you'll find fascinating. It will be helpful in your report.

I look forward to questions, and answers, and more panel discussion.

DEREK MOORE: Before we move on to the next panelist, I just want to give everyone an idea about how this panel will proceed. We are going to each of our five panelists give an opening presentation. And then John and I will moderate a discussion following that.

And any of you in the audience who has questions, flag down one of the staff members in the aisles for a question card. And write a question down. It will be brought up to us. And we will try to incorporate those questions into our panel discussion.

With that, Jon--

JON WELLINGHOFF: Thank you, Derek. As Derek mentioned, I'm Jon Wellinghoff. I'm the Chief Policy Officer of SolarCity. That's a 14,000-plus employee company that is primarily focused on delivering distributed energy resources to consumers in the US, primarily solar PV and storage. We serve customers in over 27 states and the District of Columbia. And we are the largest provider of distributed energy resources in the US.

I'd like to certainly thank Chairwoman Ramirez and the FTC staff for having this workshop. I think it's a very important thing to have. I think it's a very important subject and one, as a former regulator with the Federal Trade Commission for seven years as a commissioner serving with Phil, I can understand the challenges relative to a changing dynamic in the utility industry and the changing consumers' choices and the consumers' desires to have choices with respect to distributed energy.

It's also good to be back at the FTC. That 40-year-ago workshop that Chairwoman Ramirez talked about on solar-- I was here then. I was actually a staff member in the Energy and Product Information Division of the Bureau of Consumer Protection under Chairman Pertschuk. Chairman Pertschuk hired me out of the Senate Commerce Committee to come over and actually focus on solar. And I focused on solar at that time. So it's good to kind of be back home here.

So the first thing I'd like to talk about is in looking at compensation for solar, we believe that consumers fundamentally have the right to self-generate. In fact, I wrote a paper on this with Steve Weissman from Boalt Hall, environmental attorney there at the University of California Berkeley, on that fundamental principle that we think is grounded in federal law, and PURPA, and state laws, and also in common law.

And the right includes the right to offset all internal consumption of electricity with self-generational on a one-to-one real-time basis. So we think that's a fundamental right from the standpoint of compensation that-- you need to understand that people do have that right to offset all the usage that they have with that generation if they do want to self-generate on their facilities.

Consumers also though have a right, we believe, to interconnect to the grid in a nondiscriminatory basis like everybody else. And simply having self-generation is not sufficient justification for putting the consumer in a separate utility rate class or imposing discriminatory rates against them. We do agree though that solar consumers, like everybody else, should pay fees to be interconnected and take service from that grid. But we think that those fees should be commensurate with that level of service. And it should be similar to the fees that are paid by all other consumers.

We do believe the distributed energy resources provide net benefits to the grid. And this is probably one of the biggest areas of controversy. But net metering has served as a sort of simplified method and a consumer-friendly proxy method for determining what these net benefits are. We think though now that there are more sophisticated models and analytical methods that are available for state regulators and others to use to determine pricing for the net excess generation that consumers generate from their own solar systems.

So solar and other distributed energy resources we believe can reduce utility costs. And costs we believe can be reduced across all segments of utility operations if solar deployment is factored into utility planning. For example, California recently canceled 13 transmission projects that were scaled to be put in place by the California ISO and saved \$192 million in doing so on the basis of determining that distributed solar and energy efficiency had now made those projects not needed anymore.

So ultimately, the California ISO determined that solar did save costs in the system-- \$192 million. And ignoring these distribution benefits in utility planning will result in redundant investments for utilities and impose unnecessary costs on all consumers.

So we have questions with and I think would raise the concerns with the utility concerns about the issue of what they call cost shifting. We believe that the claim of cost shifting is not fact-

based and has not been, in fact, determined with substantial evidence. In fact, there have been, in some jurisdictions, imposition of fees on solar consumers based upon this alleged cost shift without that substantial evidence.

Wisconsin was one example. We Energy-- there was a fee in place. And that was overturned on appeal by the courts. The courts said there that the PUC did not have enough evidence to impose a fee.

Another example is Nevada, my home state. The Commission there imposed a fee but admitted in their own decision that they did so based upon limited evidence, that they neither had the adequate evidence or time to look at all the factors regarding the benefits of solar but yet imposed the fee anyway with some really, very disastrous results ultimately.

So we believe comprehensive cost-benefit analyses should be performed to determine the net benefits of solar DG to customers and to the grid. And we think that there are defined benefits that we can look at. In fact, the Nevada Commission, in their subsequent order to the previous one that put a fee in place based upon a limited review of the benefits, enumerated 11 benefits that they believe now should be reviewed and have indicated they will be reviewing in future cases to look at the full benefits.

But going back to the Nevada case, the result of that case, of that incomplete decision of imposing excessive fees on solar customers, resulted in consumer applications for solar going from 1,500 per month in Nevada to 15. So it basically killed consumers' ability to choose over in Nevada.

We do believe that rational compromises can be achieved on these issues of determining cost for solar. And one model that we believe should be looked at for the country is New York, where the solar industry and New York utilities spent four months negotiating the settlement position on solar pricing.

There, we all agreed to a glide path with net metering being a proxy till 2020. And in the interim, a full and fair analysis will be conducted to determine the costs and benefits of solar to consumers and to the grid. So we believe that's a rational way to proceed on this issue of solar pricing.

We also believe that people should look at the tenets of grid neutrality. And grid neutrality is a concept that I have developed with a number of others in an article in the Public Utility Fortnightly. We think there are five basic tenets which will in fact increase efficiency of the grid and increase consumers' empowerment to ultimately make choices in the grid.

The first tenet is empower consumers while maintaining universal access to safe and reliable electricity at a reasonable cost. The second is to demarcate and protect the commons. And this is, in essence, establishing clear operational and jurisdictional boundaries for public and private interests, and also recognize adjacent jurisdiction between FERC and the states as was done in the case recently decided by the Supreme Court in FERC v. EPSA.

Align risks and rewards across the industry is the third principle, where we can allocate financial risks to those who are willing to assume them and safeguard public interest by containing risk at the same time. Create a transparent and open grid is the fourth principle-- to promote open standards and data access throughout the grid and prevent any single party from abusing its influence as to grid investment and financial and operational decisions. And finally, the fifth, foster open access to the grid by allowing all parties who meet open, system-wide standards the opportunity to add value and improve efficiency.

So in conclusion, we believe that consumers have the right to self-generate and use that generation to offset their usage. The consumer should not be charged discriminatory fees if they choose to have solar. The consumers with solar have a right to interconnect and use the grid like all others. And the consumers with solar should pay fees to be interconnected, similar to all others.

Consumers with solar should be compensated for their net excess generation at a rate that considers the benefits solar provides to the grid. And consumers deserve to have solar cost-benefit studies conducted in a fair and comprehensive manner in an evidentiary proceeding. They're also entitled to have distributed benefits fully considered and incorporated into utility planning.

And we also believe that consumers would benefit from a solar industry and utility industry compromise settlement on price to solar consumers, similar to the structure of the New York settlement. And finally, we do believe that consumers will benefit from a more efficient, and cost-effective, and open, transparent grid if the principles of grid neutrality are instituted. Thank you.

DEREK MOORE: Thank you, Jon. Karl, the floor is yours.

KARL RABAGO: If you guys will pass the slide clicker down-- thank you. And my thanks too to all of you for attending and for the FTC for putting on this important discussion. Yesterday, I had the opportunity to be at a conference in Tampa. And there was somebody who made a comment that was sort of expressing some skepticism about whether the Federal Trade Commission should actually be looking at solar rates.

Notwithstanding my willingness to actually raise this issue anywhere I can, it seems entirely appropriate given the potential growth of distributed energy resource markets and the role of electric utilities in vital electric service that we look at competitive options. So I'm excited to do this.

What I'm going to do is take you through just a few principles. I've got some slides for leave-behind purposes. I'll make a key point or two off of each of them.

And I guess the first one I have to start with, since I'm with the Federal Trade Commission-- having spent 15 years serving on the board of the Center for Resource Solutions-- Todd Jones over there, great resource and good comments in the record as well. I am aware of the risk of making general claims and whether or not they have to be instantiated in order to adequately

provide that those claims are not misleading in the marketplace. I am also aware that best practices-- Larry Sherwood from IREC is there, and so is Sarah-- another great source of best practices and guidance.

So when I say the value of solar, I should explain that we have lots of utility evidence about the cost of solar. You heard from the gentleman from APPA about the potential costs of solar. Solar people will tell you about the benefits of solar.

When Austin Energy first commissioned a study with clean power research, the goal was to put them both together, as Jon just described, to come up with the value of solar. And Austin Energy used that value analysis, a detailed cost-benefit analysis based on avoided costs kind of approaches, in order to find out what solar was worth.

I ultimately used it to design a tariff that we called the Value of Solar tariff. So that's what I'm talking about when I say that. That's my substantiation for the term.

I'm not going to go into detail on this. But a good place to start is where you should begin. And that is with basic principles about how rate design should work. These are the ones I used when I designed the Value of Solar tariff. They're just another version of the kind of thinking you put together in when you do rate making in the utility business in general.

Note that fairness is all around this. It's got to go up. It's got to go down. And you don't assume that subsidies are going in any particular direction until you actually back it with analysis. More on that in a minute.

I will also note that since solar is part of a suite-- last slide as well-- solar is part of a suite of emerging distributed energy resources, although perhaps the standard bearer or the tip of the spear. It's important to remember that we have lots of policy things going on electricity rates and electricity markets. So we got to lay those all out there to make sure that we don't do damage to our objectives as we're going forward.

So it's also important to remember that we're not writing on a blank slate here. While some people may have just discovered-- and we only really adopted the Value of Solar tariff in Austin in 2011. It went into effect in 2011, '12-- there's a lot of history on the idea of the relationship between non-utility generators and the utility pricing. You heard about from Severin an appreciation that price does not equal cost does not equal value except, perhaps, in the dreams of theoretical economists.

We've been doing green power and pricing premium products. Ask your utility, what would it take to deliver to my house a kilowatt hour of solar or solar-equivalent electricity? And they will tell you, it's retail plus a premium. Not surprisingly, Value of Solar analysis shows that's about what it's worth.

And then we've documented a lot of these benefits that Jon just mentioned in writing in the past. And we've even started developing some of those skills-- when we were looking at local integrated resource planning, we're now talking about that in things like the DSIPs, the

Distribution System Implementation Plans, that we're developing in New York under REV. Our utilities will be giving us the first look at those very soon.

So far this debate has been characterized by a fair amount of heat but not much light. The gold standard for claiming that there's a cost is a cost of service study in the utility business. So when a utility asserts that there's a cost associated with a customer using electricity, that general claim needs to be substantiated. It must be important to recognize that while Phil mentioned that the average customer does this or the average customer does that, the failure to use electricity does not create a cost, OK? The failure to use electricity, especially the amount of electricity the average customer uses, does not create a cost, OK?

And what it does is perhaps create a revenue shortfall, especially against sunk costs that the utility may try to recover through mechanisms like a fixed-cost recovery or an access fee on solar. But it doesn't create a cost, OK? And that's a general principle of buying service under tariffed rates. Utilities with monopoly market power are not allowed to impose rates on us for not using their product.

Anyway, so what we have to realize is that the costs that we're talking about ultimately trace back to perhaps poor forecasting, overbuilding, or immunity from competitive forces. And there are remedies for some of that. We explored some of those in the telecom industries in the early days.

As W. Edwards Deming said, "In God we trust. All others must bring data." That's what should back up the claims of these costs that establish these fair rates.

That said, there are real issues with traditional net metering. It bears a legacy. Utilities didn't like being told they had to buy power from somebody in 1978. They don't like being told it today.

There is no direct relationship between net metering as the compensation level and the value of solar. So we should back it up with some analysis. There is this accounting under-recovery. There are impacts between rate cases, as I just mentioned.

And if we have under-compensation under net metering, as it may well be, especially for excess energy or differential values for offset and excess energy, then you're really going to get sub-optimal investment levels into technologies whose price is rapidly falling. That's not good for society.

In other words, when you constrain the size of the solar system you buy on your house because the utility under-compensates you if you produce one extra KWH, then the highly fixed cost business of installing solar suffers an economic efficiency loss. If you shorten the true-up period, you will also have sub-optimal investments. And if you try to use things like tiered rates, especially rates that go on peak, you actually can create perverse behavior in the customer and the user of the electricity to actually increase their consumption so that they're offset level is higher.

So there are issues associated with it. The Value of Solar approach tried to address some of that by basically looking at what are the full range of costs that are avoided, and what integration costs are incurred in order to see and enjoy the benefit of solar operating on the grid?

The key point I want to make here is the very first bullet. And this is an important legal and regulatory framework. We do make a distinction in this country, at the IRS, at the FERC, between customers who generate for use and customers who generate for sale. So the attempt that some, for example, in the utility industry make of trying to argue that the only fair compensation rate is the locational marginal price or the PURPA avoided cost is intentionally ignoring the additional range of benefits associated with energy that is made at or near the point of consumption.

We look at lot of these things. We're looking at again also in New York, where we're examining the same ideas under the LMP plus D cost structure. With some work, we can improve on that proposal that Jon's company and the utilities came forward with. But it's a really good start, because we're trying to do it with an analytical foundation.

And let's remember that from a societal perspective, we're just talking about the rates the costs and benefits we believe belong in utility rates. There's still huge additional under-priced benefits that are out there that should inform policy and that we need to continue to analyze.

Here's one thing that RMI put together a few years ago to sort of give you an idea of where these cost categories are. It's also important to remember, we're asking costs and benefits to whom? When you do a value of solar study with the latest kind of thinking, you end up with this stacked chart. Maine found that there is \$0.33 of value in a utility system where electricity costs about \$0.13. So you've got to do the analysis to find out what it's worth.

Put it together in a tariff with one simple change. All you basically do is you charge for the full consumption based on cost of service study. And you compensate for full production based on the value of solar analysis.

It's basically like net metering. And this formula here-- I'm going to keep going just a bit, because I want to make this point. Old mechanical disk meters only allowed us to come once a month and see the net forward progress of the meter. As a result, we could only read the net bill.

But that mathematically is the same as charging the customer 100% for gross consumption and crediting them 100% for gross production both at the retail rate. That's the reason why you're seeing a formula here. All we changed with the Value of Solar tariff is the rate of compensation for production.

I can never get those dollar signs to line up.

[LAUGHTER]

I change them every time. It looks pretty simple. Normal charges, credited value of solar gives you a net bill. And that produces a whole range of benefits that I can talk about later. But I want to take more time.

The last point I want to make as I shut down here is that what we're doing in solar matters, because there's a whole host of additional distributed energy resources coming along and some that have already been around. If we're going to really accomplish utility transformation, which a lot of people think we're in the middle, we need to get these techniques and these market systems right so that we can support things like storage, smart technologies, security, and savings from customer actions on demand response and efficiency in the distributed energy resource field.

Sorry about running over. I'll stop there. Thank you. And you're using this--

SEVERIN BORENSTEIN: No.

DEREK MOORE: Severin--

SEVERIN BORENSTEIN: Thanks. And thank you for inviting me to be on this panel. I felt that the framework-- I had to be fairly opinion-free. This won't be.

[LAUGHTER]

So until the last decade, retail rate setting was mostly about fairness and redistribution. There was relatively little price responsiveness. And regulators were mostly figuring out who's ox got gored.

DG solar, storage, and now I think even more importantly, monitoring and price responsiveness have really changed that. So now there is the ability of customers to really respond. And that means that when one price looks better than another, to arbitrage between them.

In one sense, that's great. If the prices are set right, then you get efficient arbitrage. You get people choosing the most cost-effective approach. But if prices are set wrong-- and certainly, there's been no pressure up until the last decade to set them right-- then you get inefficient arbitrage.

If you over-reward some activity or under-reward some activity, you're going to get people over or under-investing in those activities. I see Karl nodding as I say this. And we're in complete agreement up to that point, I'm sure.

[LAUGHTER]

The question is, what are we over and under-rewarding? And I think we're in complete agreement that the first order of business is to figure out what those true costs and benefits are.

There have been a lot of studies done. SolarCity has done one of them. There's also been a study out of MIT on the value of solar. There's also been-- my colleague Duncan Callaway has done a very nice study using PG&E data on the impacts DG solar.

And I think most of the studies that aren't actually done by a party are finding out that on net, the DG solar is reducing the revenues to the utility by more than the value it's actually adding to the system. That is, it's being over-compensated.

You have to remember, half of the solar in the United States is in California. And half of that is in PG&E need territory. So PG&E has one quarter of all the DG solar in the country.

PG&E's rate has increasing block pricing. Their top tier rate has been as high as \$0.48 a kilowatt hour and is now around \$0.36 a kilowatt hour. And I don't think anyone thinks that that's the-- well, I take that back.

[LAUGHTER]

Most people do not think that is the right incentive for creating any sort of generation. It is true, DG solar has real value. It generates at-end use. It reduces line losses in some, it turns out very limited, cases. It reduces the need to upgrade transmission or distribution.

But it also has real costs. Unlike grid scale solar, DG solar is completely uncontrollable. So we are curtailing in California-- because of the duck curve right now, we are curtailing intermittent resources.

We are not curtailing rooftop solar, because you can't. Because of the way the inverters are being installed and I suspect some legal ramifications as well, you simply can't do it. Whereas we are curtailing grid scale, because the grid operator has to balance the system.

And so I think that we need to create a level playing field so that the arbitrage that's going on is actually fair. One of the issues that's getting brought out quite a bit in the process of having these discussions as we do the cost-benefit is that many of the advocates are saying, one of the benefits is-- and I think we heard this earlier today already-- price suppression. That is, that by putting in DG solar, we are lowering wholesale electricity prices.

Now the Federal Trade Commission lawyers and economists know that if you go into a merger and you the parties come in and say, by merging, we will be able to squeeze sellers and get a lower price out of them-- no, it's not going to actually lower their cost. And it's not going to lower the cost of actually doing business. We're just going to get them to give us a better price. That is a transfer of value. That is not a creation of value.

And this is one of the significant areas that many of the advocates now claim is value creation from DG solar. It's not value creation from DG solar. It's also not value creation from grid scale solar. I think it's simply a transfer. And we have to keep those separate from the very real benefits of solar, both grid and distributed, and the variable costs that they impose, which we're still working on.

Net metering is a holdover. I'm glad we seem to be all in agreement. There is really no connection between net metering and the value brought. You can have a customer who is shooting a lot of power into the grid, a customer who is taking a lot of power from the grid, and you could have that's running a pretty balanced system. Net metering is rewarding one of them massively, and it's giving no value to the other one.

So one customer who is installing solar that is mostly used on-site is getting very little benefit from net metering. Another is injecting a lot is getting a huge benefit. But they actually are imposing different costs on the system. So we need to set rates that actually reflect that.

I do have to point out that the CEO of SolarCity when Nevada came out with this decision was quoted by Bloomberg as saying, "No one in their right mind would choose to install solar without net metering." I agree with that. But I think that that's telling us something. We need to understand the real costs of DG solar when we have to balance the system as well as the real benefits that it brings to the system.

My view is when we get to that appropriate compensation for DG solar, it is quite possible it will kill the DG solar industry or greatly reduce it. And I'm OK with that. Because the goal is not to have DG solar. The goal is to have an efficient, reliable electricity system with an appropriate environmental impact, that's not going to be zero. We all know that-- but an appropriate and presumably much lower environmental impact.

If we can do that with DG solar-- and right now, I don't think that's the cost-effective way to do it, but I'm open to changing my mind on that-- I'm all for that. But what worries me is that now that we have gotten amazing progress in solar and wind technologies, in just the last few years, the goal seems to have shifted that it's no longer to reduce environmental impact. It's no longer to curb global warming. But it's to give people energy independence, and choice, and things that you just did not see mentioned five years ago.

So we're moving the goalpost to pursue a goal that wasn't the original goal. If DG solar is the right way to achieve the goals of reliable, efficient, and environmentally appropriate energy, I'm all for it. We may get there, there are going to be some exciting changes in building material solar and so forth in the next decade. And when we do, I want the compensation to be appropriate so that those things are appropriately incentivized.

But until we do, it worries me a great deal that we are setting up inefficient arbitrage when we set prices that don't reflect the true value that we're bringing to the grid. Thank you very much.

DEREK MOORE: Tim--

TIM WOOLF: OK, so great to see you all here today. Thanks very much. And I want to thank all my panelists for setting up perfectly for what I'm about to say.

[LAUGHTER]

We've heard from this panel, and earlier, and you've probably heard it elsewhere, the need for better data. We need better data on cost-effectiveness. We don't want to over-compensate customers. We don't want to under-compensate customers.

We need to have better impacts on utilities. We need to have better understanding of the impacts on society. We need to have better understanding of impacts on customers. And we just heard Severin say, we need to understand the real costs. I think we'd all agree.

And so what I'm going to talk about is a way to move in that direction and to hopefully get that. I think there's a whole lot more we can do to get better data, which will then allow us to balance the two goals of promoting DG but also protecting customers.

So I've been working on this in a lot of states. And two things jump out at me-- and pretty much everywhere I work. One is that many distributed generation policies are developed piecemeal. You'll have solar reqs designed over here, tax breaks over there, rate design there, net metering here. And it's not clear how they all work together.

And secondly, few policy discussions have-- they're informed by quantitative analyses on all the key issues. And in my mind, the key issues boil down to three. There's the development of DG. How much are you going to get? There's a cost effectiveness. And then there's the cost shifting. And if you have a good handle on all those three, then you're able to take a look at the implications for all our people concerned.

So I should say, we are preparing a report to address just this. The report is for the Consumers Union. It's funded by the Energy Foundation. And we're calling it "Show Me the Numbers" to place emphasis on the fact that we need better data.

So the first topic is the development of DG. And this is fairly simple and it's remarkable how infrequently, how rarely see in these debates people forecasting, well, what's this policy likely to do to DG? There are relatively straightforward ways of doing this. You can come up with the payback period for a typical homeowner. You can look at customer adoption rates and payback periods and then penetration rates.

And then these are very useful not only to see how the policies will affect DG, but it will also lead into the next two analyses, the next one being cost effectiveness. And there's a lot that could be said here. I'm going to keep it brief. We've already heard from several panelists about how important it is to keep all the costs in mind, get the true value. And I would agree.

And I would also say, you hear a lot of people saying that DG will increase costs on the system in terms of the balancing of the resources and the need to interconnect. And I say, fine, if that's true, show us the numbers. Put those costs into the analysis so we can have a fair treatment of both the costs and the benefits.

The other thing I'll say is that the lost revenues are a really critical part of all this. And I totally agree with what Karl said a few minutes ago about how when a utility loses revenues from lower sales, it's not a new cost on the system. It's a sunk cost. And all economists know that sunk costs

should not be used in evaluating cost-effectiveness for future decision. So the lost revenues which are sometimes captured in the rate impact measure test should never be considered in cost-effectiveness evaluations.

And I think it's important to look at all the different perspectives. So I would argue that we want to have cost effectiveness from the utility perspective, from the total resource cost perspective, and from society's perspective. And each state can put different weight on the different perspectives. But you want to have all the information in front of you.

So I don't mean to downplay the lost revenues and the cost shifting. Because that's one of the central issues here in this whole debate is cost shifting. And it's rare that I see this analyzed at all, let alone thoroughly.

And so one of the key points on a reiterate, in case it wasn't clear, is that the cost shifting analysis must be kept separate cost effectiveness. They're both important, but they're separate. The cost shifting, you want to look at long-term estimates of rate impacts. That's how costs are shifted its through changes to rates, whether it is a rate case, or a lost revenue adjustment mechanism, or decoupling, that's how cost shifting occurs.

So you want to do a long-term analysis that shows how rates might go up or not. And it will tell you things like what percent impact might it be on rates or what dollars per customer per month might be. So you have context to understand what the real cost shifting is going to be.

The other key thing here-- this is critical-- is that everyone recognizes that when you put PV on your roof, you have less consumption. Your revenues to the utility goes down. And that looks like, wow, that customers is being subsidized by everybody else, because they're not paying their bill so much. It may even shrink to zero

But you have to keep in mind that the other effect is avoided costs, which will put downward pressure on rates. And the rate impact analysis, the cost shifting analysis, must look at both of those impacts to see the net effect.

So I have a little bit of a preview of how this framework might shape up or should shape up. And I'll start by saying that this is an illustrative example, which means that I made the numbers up.

[LAUGHTER]

And the whole purpose of doing this study is to do some case studies and put in some real numbers. But the numbers are useful. Now they may not be big enough for you to see. So I'll just cover them at a very high level.

On the rows here, you put the various policy options. Or you could call them the rate design options or the net metering options. And I've just chosen three to keep it simple.

And for columns, there's three categories. One is how much DG gets developed. The other is how cost effective they are. And the third is the rate impacts.

And the policy options, they're ranked here by most generous to less generous, the first one being the conventional net energy metering rate, which I think, in many cases, but not always is typically fairly generous. The next one is, you reduce payment for the excess generation. And the third one is, you add increased customer charges.

And what happens is what you'd expect. But it helps to see the numbers. For the DG development, as your compensation becomes less generous, you'll see less development. But it helps to know just what that is, how much it is. You might have certain goals that you want to achieve. And this will tell you how close you are to getting those goals.

And then with cost effectiveness, again, I think you should present utility, TRC, and societal net benefits. And you can see here that as you reduce the payment for net metering for the DG and you reduce the penetration, then your benefits go down. That's a trade-off. But that's something that you might want to make.

And then the rate impacts is the third one where first of all, it's really useful to see what they are. You rarely see that done in a way that is as comprehensive as I'm suggesting here-- and also to see how they change with different policies. And maybe this policy will reduce rate impacts to some extent, but not too much. So it's a way to understand what you're working with.

So on the last slide here, I have just a quick snapshot of a slice of this where I look at several payback periods. And I call this initial draft results, which in plain English means, we've prepared these for this presentation. And they're rough. And I need to double check them before they're final. But I think they're extremely useful to give a sense of where they're going. I don't think they'll change much.

I've chosen for states that are in the news on all these issues, four states that I've been involved in in one way or the other. And I look at different policies that have been proposed in those states recently. So we have Arizona, Hawaii, Massachusetts, and Nevada.

And the one column says, what's the payback period to a typical residential customer before this policy put in place? In case of Arizona, I think they have standard net energy metering. Before the policy is put in place, the payback period is 14 years. After they institute mandatory demand charges, it goes to 26 years.

You don't have to be an economist to know what that's going to do to DG development. Now maybe that's an outcome you want. But you at least have to know that that's what the outcome is going to be.

In Hawaii-- now we all know what Hawaii is. In terms of the density, it's got PV much more densely, much more aggressively than any other state. And they've been looking at ways to do this.

And they have a different approach, which is they reduced the payment for excess generation. And they have a higher fixed charge. Now in that case, before the policy was put in place, the payback period was six years.

The other thing about this framework is you can see that every state is different. So you can't just come out and say, oh, I think that this particular policy should be applied everywhere. Because every state will have a different impact-- will see different impacts.

So for Hawaii, the reason that the payback period is so short before the policy is that the rates are really high there right now, and so it's very economic. And that's why they have so much.

But in this case, they changed the policy to make it a little bit easier on customers and to give more revenues to the utility. And the payback period is seven years. If you ask me, that's a pretty good trade-off for what they've done there.

Massachusetts-- different story altogether. And there, there's even a shorter payback period. The reason there is Massachusetts has a very generous solar REC program where customers are paid I think on the order of \$200 a megawatt hour for every megawatt hour from their PV. And it's helped push the market, which was the original intention five or six years ago.

But well, as you can see, it's very generous. And now the market's booming in Massachusetts. And then you increase fixed charges there. It doesn't change things much, because they have this huge-- what you'd call a subsidy-- on the other side still sitting there keeping the payback period short.

And then finally, Nevada-- we've heard about Nevada. Before the utilities proposal, payback period was 11 years. Now with the proposal for increased fixed charges and reduced payment for excess, it's 21 years. And Jon Wellinghoff mentioned how that affected things. The applications dropped from 1,500 to 15.

So do this analysis could have been done beforehand. And you could have predicted that that's what would happen. So I'm suggesting that this type of analysis be done during the policy discussions so that we have an informed debate and get just the right policies for every state.

Thanks. I look forward to your questions.

JOHN HILKE: Thanks very much to all our panelists. We're going to now open this for the panelists to comment on each other's presentations. And I got a verbal promise from everybody to not physically wrestle.

[LAUGHTER]

So, aww. And in order to make this not take up the entire remaining period, I'd like to ask each panelist to restrict their comments to about two minutes. And we're actually going to go in the same order that people presented to begin with. So, Phil, you get the first shot.

PHIL MOELLER: Well, thank you, John. I thought we had a nice, wide range of discussions, there. I think one of the areas that I wish had been emphasized a little bit more is ultimate impacts on customers. And, going back to the-- since we're talking about solar, generally, the universal utility-scale solar is less than half the cost of the private, rooftop solar. And so if

society wants to promote a particular fuel type, which has its pros and cons, ultimate cost to the consumer should be a big part of the discussion. Part of that is economies of scale, and part of it is operational flexibility that was noted.

But it all goes back to, again, the point about the-- the smart grid is what enables this technology to survive. And I found that the discussion about sunk costs is not actually something that's necessarily recoverable, but it's real. And if we want to continue to see this grid, the smart grid of the future, develop and have more customer interaction-- which I certainly hope we do-- and more options, there are going to be more investments needed to update it. And so, in that sense, that discussion of the need to pay your fair share of grid costs, as the grid evolves, is important.

JON WELLINGHOFF: Thanks, Phil. Yeah, I agree. I think everybody should be paying the fair share of grid costs. And on this cost-benefit study, just as Severin's point in discussion, I haven't seen the studies that, Severin, you referred to, with respect to there being net costs. But I'll tell you, the net-benefit study that Solar City did was more than just Solar City doing the study.

It was also done by the NRDC. It was also peer-reviewed by Stanford and by Rocky Mountain Institute. So, you know, it was a very comprehensive study, done by one of our people who's a former PG&E grid engineer. In fact, he was head of the PG&E Smart Grid group. So I will stand by that study.

And that study, actually, for Nevada, using the 11 benefit items that the Nevada commission has already enumerated, and using the tool that Nevada has used in the past-- which is a tool from a group called E3, a consulting firm-- came out with \$7 million to \$14 million in net benefits annually from the current installed solar PV rooftop systems in Nevada.

KARL RABAGO: So I'll just-- I'll make a couple of other, additional points. First of all, context matters. What's going on in the utility system and changing it right now is a failure of the old system. And that's the biggest game in the room. It is the exhaustion of the economies of central station-- the central station design. And if you want to find out more, just look at what our competitive utilities are saying in the Midwest about "organized market reform" and requests to be reregulated in the old style.

So solar is a harbinger, if you will, of some change that could be coming. But outside of California, Hawaii, a little bit maybe Arizona, the numbers are really, really small. And so remember-- the second thing I would say is, the law of small numbers. Yes, residential installs have doubled in the last few years. But the numbers are very, very small. This is not what's driving what's going on the utility business, except perhaps in a positive way.

And then the last thing I'll say is, we have actually looked at this kind of transformation before. What we did with unbundling of rate elements in telecommunications, in the 1990s, to ask ourselves what components of the traditional monopoly could be rendered up to competitive forces, is entirely appropriate. And that's where I take a little bit of difference from what Severin was saying, is we are making these changes because this is supposed to be the largest free-market, capitalistic society on the face of the earth. And we are supposed to always tend toward more competitive markets, where we can achieve some economic efficiencies. So I join on the

good numbers, but we should always be looking for a more competitive option. And that's what distributed resources are increasingly offering us.

SEVERIN BORENSTEIN: So, if you do an analysis of a merger, such as they do at the FTC, the first thing you learn is you don't judge competitiveness by the number of firms in there or their market shares. You judge competitiveness by the ability to deliver the product at a reasonable cost. I am all for competitiveness, and competitiveness will come through a level playing field where the real costs and benefits are represented. If that leads to a decline in DG, I'm OK with that, because I actually don't think growing the DG market should be one of our public-policy goals.

Jon mentioned an E3 tool that was used to do some evaluation in Nevada. E3 actually did a whole study of cost-shifting in California and found-- under the auspices not of a company that sells solar but of the California Public Utilities Commission-- and found a very large cost shift, as a result of DG solar in California-- which, just to remind you, is where half the solar is.

And I think this has a larger implications, as we go forward. There was this mention, in the previous session, of "community solar." And "community solar" is one of those terms like the Bible that means what everybody thinks it means. But what goes with when many people say "community solar" is what's called "virtual net metering." That is, you buy a little bit of this solar plant, and then you get to take it off at retail. And that's a great idea. Let's just virtual-net-meter all generation, and then we don't have to pay for the grid at all.

There's a real problem, obviously, when we start going down that road. And I think we need to recognize when concepts are actually cost-based and when they are as the vestige of past subsidies that the main appeal is, they're a way of hiding the subsidy. I think that was the main appeal of net metering. We should be creating a level playing field where fossil-fuel generation really has to pay for its externalities. I'm all for that, but I think we have to recognize that these structures that we have now aren't creating that sort of feel that really allows the alternatives to appropriately grow.

TIM WOOLF: Two quick points-- one just to clarify what I'm suggesting. I suggested every state develops its own policy goals for what it wants for DG development. Some states might want much more. Some might want much less. But, once they do that, then they need the information to figure out how to get there.

And secondly I can't resist challenging Severin on his points about prices being based on short-run marginal costs. Because it's quite clear that long-run marginal costs are what affects utility-system cost. That's what's used when utilities do their resource planning. That's what Professor James Bonbright said should be in an efficient price signal. He's very clear that it should be based upon long-run marginal cost. And if a resource, whether it's DG or energy efficiency or anything else, can help avoid capacity 10 years from now, then that should be factored into the price so the customer knows to curtail their load in order to save that money. And if you don't, then you're going to have overbuilding and cost unnecessarily high.

JOHN HILKE: Thank you all.

TIM WOOLF: I could respond to that.

JOHN HILKE: Go ahead.

TIM WOOLF: I had the advantage of being at the end of the row, so I could get that one in.

SEVERIN BORENSTEIN: Prices that don't reflect short-run marginal cost aren't going to reflect the dynamics of the market. There are hours in which the capacity is really stressed. And those are the hours where people should be paying appropriately high prices.

When you start smearing those long-run costs across all hours, you end up with inefficiently high prices off peak and inefficiently low prices on peak. And so the difference in terms of long run planning actually will get reflected, because you'll get high revenues on those peak periods where the system's truly stressed. And you will be able to recover long-run costs. Neither of these, by the way, is going to recover the long-run cost of the grid, which is truly a fixed cost that we need to figure out how to recover, apart from these energy costs. But maybe we should take that offline.

KARL RABAGO: That last bit was really important. Because DG operates after you've gone through all those other costs. And that's the point I tried to make, perhaps too quickly-- was that equating the value of solar with the short-run, marginal-cost-heavy, locational-marginal price that shows up in a wholesale market or kludging it a little bit with a couple little additions is not the equivalent of capturing the long-run marginal costs.

[LAUGHTER]

DEREK MOORE: Tim?

TIM WOOLF: So I think it's really important in this discussion to keep in mind historic costs versus future costs. Historic costs are all fixed, basically. Future costs are both fixed and variable. In the short run, you have fixed costs and variable costs. In the long run-- and, again, Bonbright was clear on this-- in the long run, in this industry, all costs are variable.

When we do any kind of utility planning, we look over 20, 30 years, because that's how long the resources-- the assets last. And so I disagree with the concept that all distribution costs are fixed, because it's the future avoidable cost that should be used to set the price signals, because that then allows customers to make the right decisions to help avoid those costs.

DEREK MOORE: Severin?

SEVERIN BORENSTEIN: Actually, let's go to the Q&A.

[LAUGHTER]

DEREK MOORE: So this question is open to the panel. One of the original justifications for net metering at the retail rate is that it's very easy for consumers to understand. The rate that you pay

for electricity that you're consuming is the same as the rate that you are being compensated for electricity that you generate at your home or at your business. And Karl articulated the value of solar approach which delinks those two rates. And I'm wondering if anyone on the panel has a view about potential costs associated with the delinking those two rates, or if anyone can articulate the benefits of doing so. The point is to isolate the current linkage between generation and consumption-- for retail consumers.

KARL RABAGO: Well, one thing I'll just offer. One of the benefits that we were going after, when we did it at Austin Energy-- we found our new solar customers were using more energy in the period after they installed solar systems. Maybe it's psychological. They thought their energy was free. Maybe they wanted to maximize the benefit when the sun was shining. They were shifting load to the peak.

So one of the benefits of actually using the two-part rate structure was that you decouple the compensation component for the solar production from the consumption component and reinstall an incentive for efficient behavior that also, for us as the utility, made us a little bit of a free rider. Because if the customer would receive the benefit of reducing their consumption, save on the consumption charge, and the benefit of producing kilowatt hours at that peak time-- which we knew were then going to be exported, because they were compensated the value of solar rate-- we the utility got lots of valuable electricity injected right at the most valuable part of the grid, and often at a net cost that was way below what we were facing in short-run markets.

So that was one big benefit. You reinstall an efficiency incentive that otherwise net metering can obscure.

PHIL MOELLER: Well, I think, generally speaking, we're going to see more market segmentation both at the federal level that FERC regulates and also at state utility commissions. The various ancillary services that are provided are eventually going to be broken out, to some extent unbundled and valued. And, as we talk about the general discussion of distributed generation-- its value to the smart grid, to consumers-- I'd point you to Sue Tierney's study from March, from the Analysis Group, which I think it's safe to say you can conclude that it's so locational-specific. The farther a distributed-energy resource is from the load center, the less value it has. If it's concentrated too much, it can impose significant costs on the system, because the system initially wasn't designed to be taking generated power two ways.

So the details really do matter, I guess, to Tim's point. The data will be very important. And diving into it will provide more answers as to the best way to go.

SEVERIN BORENSTEIN: Yeah, if I can-- think the "net metering is easier to understand" argument is sort of taking the concept of flat rates that we've had for years, and it's easy to understand, and spreading it to an even more distortionary usage. I think the reality is, electricity markets are really complicated. And electricity is locational, and it is-- electricity value is locational, and it is time-varying.

And I think if we're going to go down the road of saying, you become a generator who's integrated with the grid-- as Jon says, they have a right to be a generator and they have a right to

integrate with the grid-- they don't have a right to also have all the complexity of doing that stripped away. I don't think there should be extra complexity needlessly added. But saying, well, you should be protected from the reality of what you're actually bringing to the grid is just not a compelling argument.

JOHN HILKE: Yeah. So I want to follow up on a couple of the comments, here. And this is a little cheating, too, because this is sort of backroom conversation. But several of you have actually said that just talking about the value of solar as a general proposition is really not nearly as fruitful as talking about it in a sort of a local optimization fashion.

And I just wonder how much of the back-and-forth argument would be reduced if we were really sort of taking the New York PSC seriously and saying that you ought to look at each location and the time periods and basically use those locational and temporal pieces of information to value solar. And whether that would be a way around much of the argument.

KARL RABAGO: Yeah. Well, I'll say, from a policy perspective, the answer to your question is, what moves you toward that? I think everybody agrees that locational granularity, understanding of costs and price, is valuable in improving the accuracy of the service-- the level and quality of investments that are made. So what gets you in that direction?

One approach would be sort of monopoly rents-- sky-high fixed charges, uniform across massive customer classes. That doesn't move you toward understanding and quantifying locational benefits and inspiring-- sending price signals that customers can respond to. I think a good argument for value-based pricing to set the compensation level is that, in fact, it will move you towards that more granular understanding. And it will inspire utilities to really start understanding costs far below the 30 KVA minimum grid level that often shows up in a reg case so they can start assigning costs and understanding their costs better. So I think it's good policy just to get you moving in that direction.

JON WELLINGHOFF: If I could, I think that the granularity is important. It's important from the perspective that-- to the extent that we can, in fact, identify the values of these distributed systems at the granular level and, in fact, compensate and reward for those values, it's going to be important in the future. But we're looking at New York that's just starting to process. California is just starting the process, as well. It's going to be a long time before it's going to be able to rolled out across the country in any meaningful way, number 1.

Number 2, there's something to be said for simplicity, in some regard, although simplicity can be interjected for consumers in various ways. And that can be done with imposing layers of oversight by various entities, whether they be retail providers of energy who can provide more simplicity to consumers if they desire and they can choose a simpler plan, or other mechanisms that will ensure that these costs and benefits all can be appropriately valued. But the bottom line is, we need to make sure that whatever these distribute resources provide value at whatever place are appropriately valued and compensated.

JOHN HILKE: Severin?

TIM WOOLF: So I think all would agree that locational and temporal prices make more sense, for lots of reasons. And I agree, as well. We also have to recognize that consumers-- getting back to the previous question-- are limited in how much they can understand and respond to.

And the way that I see this is that customers who adopt photovoltaics or even other types of demand response, sometimes even energy efficiency, are among the more, well, engaged customers. I wouldn't say "educated" or "informed," I'd say they're more engaged. And if they're more engaged, then they're more likely to be able to respond to complex pricing structures. Whereas a lot of customers out there are just not, and they might not be for a long time.

And so that's why I generally avoid rate design for all customers that's complex and different from what we're used to. So I am very cautious about tiered customer charges or even demand charges, because customers don't get it. But if you've got a handful of customers, a growing number of customers, who are engaged and are informed and care about their bills, then you can use more complicated, locational, temporal pricing for that subset of customers. And then hopefully expand that subset over time, so that all customers, at some point, are engaged and are responding to the right prices.

JOHN HILKE: And so would you see a problem in basically allowing some customers to be on a more sophisticated metering system than others?

TIM WOOLF: No. There are issues, but in general, no.

SEVERIN BORENSTEIN: I would argue that that's exactly where we should be going, and we should have-- people who really want simplicity should continue to have a right to flat electricity rates. I don't think with net metering, but there's going to be a premium associated with that. And that's just fine. Some people don't want to have to think about this.

I think that when we start talking about locational and time-varying pricing, issues come up that, I think, can be managed on the equity side but historically have not been well managed. California has locational, marginal pricing on the supply side but has avoided it or rejected it on the demand side. And I think if we're going to start talking about this, it is going to require some pressure to start taking demand-side locational pricing seriously, which most utilities are not excited about doing.

I do want to make one other point that actually we should bring up, here, which is, when we talk about where the solar is and where these sorts of incentives have been, it is overwhelmingly-- partially because it's two utilities-- in the IOU sector. If you look at the public power sector, they have not been aggressive with this. I think it's partially because public power agencies tend to be smaller and tend to immediately see the impact it's going to have on other rate payers.

And so, in some sense, that's a market test. They are the public power agencies who are doing their cost-benefit analysis-- supposedly don't have the profit incentive that the IOUs do. And I think they do. But they also are not jumping on, DG is going to save us a boatload of money.

JOHN HILKE: So I'm not sure who got here first, but Phil, why don't you--

KARL RABAGO: Oh-- let Phil go.

JOHN HILKE: Oh, you want--

PHIL MOELLER: Well, I think when we talk about rates, generally speaking, yep, customers haven't seen a lot of dynamic pricing at the retail level, at least residential. But they are seeing it in other parts of the economy, where they're getting used to that kind of dynamism. And I think they can adapt pretty quickly. It might not be for everybody. But it would certainly send better price signals, in terms of consumption.

Again, I'll get back to making sure that the proper cost to maintain and enhance the grid has to be talked about in a way that makes sense. Again, to develop this grid so that more of this can happen-- more dynamic pricing, more options to consumers. It's a great potential.

But we'll go back to what Jon said about New York and California-- two very different markets. The density is different in, say, the ConEd service territory then it would be in SoCal Edison. Very different. Dynamics are different.

The utilities commissions are looking at this. But it's going to take them a while to digest the approach, and particularly when you get a location element to retail pricing.

KARL RABAGO: Yeah, just a couple things, real quick. First of all, the demand-side market is very different than the generation market, in some ways. We've been paying customers for demand-side reductions at the full retail rate since the start, because when you just don't use, you don't pay. And then we fully socialize the utility side of the costs associated with implementing those. Which really reduces the effective cost that customers see coming back in their rates.

Second of all, there's a lot of technology coming along at the distribution side that is probably way ahead of what we're even talking about, in terms of pricing distributed generation. You think about block chain technology, to sort of record and ultimately transfer microreductions in consumption level. You think about cloud-based technologies through thermostat and controls. You think about the opportunity to turn your solar system into a dispatchable system by adding storage, as companies are doing, like Tesla.

Where all of that takes you is that-- should not be the scary world of thinking every individual customer has to make every individual one of these decisions, one by one. My third point is, we're mostly going to do this through a building kind of management technology system that is managed by an aggregator. So we'll have to understand our relationships with those kinds of service providers but not necessarily the finely detailed technological decisions about things like, you know, dropping my household voltage down a little bit as part of a comprehensive conservation voltage program. I just need to know that the time is right on the VCR. Oh, we don't have VCRs anymore, so I'm OK, then. On the microwave.

DEREK MOORE: I'd like to ask a question from the audience that relates to the discussion, a few moments ago, between different types of customers and their ability to respond to different pricing scenarios. The question is, how can low-income customers share in the benefits-- clean

energy, local investment, health-- while also designing efficient markets? Is there a risk of benefits primarily skewing towards those with the most resources?

JON WELLINGHOFF: Sure, I'll try to take that one. I think there's multiple ways that low-income consumers can benefit from clean energy resources. There are a number of programs in a number of states, including California and others, that allow low-income consumers to take advantage of these types of programs. There's also, as I think was mentioned earlier, the issue of community solar, to the extent that people don't have the-- either don't own their home or don't have the availability of an adequate roof to actually put solar on. There are multiple states, Minnesota probably being the most prominent one, that has a very extensive community-solar program. So I think there are a number of ways for them to participate.

DEREK MOORE: Severin?

SEVERIN BORENSTEIN: I think we do low-income customers a real disservice when we focus on giving them solar power. I think that what we should focus on is moving the system to reduced emissions while maintaining cost-effectiveness. I think that there are very few low-income customers-- actually, there are very few customers-- who are hell-bent on having solar on their rooftop, as we heard this morning. The main driver is lowering your costs.

There were some early adopters who did it for the warm-glow reason, but most people want to lower their costs. And there are much more effective ways to lower the costs of low-income customers, particularly since they tend to live in much less energy-efficient homes. So improving the energy efficiency of their homes, through more efficient appliances-- refrigerators, for instance, air conditioners, and so forth-- is likely to be much more cost-effective than getting them their own solar power.

DEREK MOORE: Tim?

TIM WOOLF: Just to follow up, I was going to say, before Severin mentioned that, that distributed energy resources should be considered by utilities in a comprehensive way, like they do their supply-side resources, with some diversity. And if they find that some of them-- for example, the solar-- not enough reaches the low-income communities, then they should think of other distributed energy resources that might.

And, as Severin mentioned energy efficiency is one that every customer can benefit from, especially low-income. So literally as a part of the package of distributed energy resources, it might make sense if a customer doesn't have his or her own roof, if they can't install PV on their house, maybe they get additional efficiency measures than they would otherwise get, or at least there they're reached out to and try to be served, so that keep some balance-- not just with just any one single resource, but across all of your resources.

SEVERIN BORENSTEIN: Can I add one thing that-- I think that we need to keep in mind that when we start talking about community solar and other options, because low-income tend to have small roofs or no roofs at all the systems are going to be way below efficient size. I think

that's just the first step towards the most reasonable policy, which is, figure out the most cost-effective way to deploy this technology and go with that.

It probably isn't going to be rooftop. It now looks like it may not be the giant grid scale, either-- that the moderate grid-scale systems are coming down in cost and getting closer to the giant grid scale and may run into less transmission and siting problems. But whatever those are, moving low-income customers towards community or slightly larger-scale solar-- actually, moving all customers towards that-- is the step towards moving us towards an efficient deployment of the amazing technology that we-- technological progress we've heard about.

JOHN HILKE: Karl?

KARL RABAGO: I think Phil was up first. You want--

JOHN HILKE: OK.

PHIL MOELLER: Well, I didn't want to associate my remarks with Severin. I think we have community solar potential, universal scale solar, definitely more cost-effective at half the price, if that's what low-income people want. But a focus on energy-efficiency programs that work is probably the most cost-effective way to address it.

KARL RABAGO: Yeah. I was just going to say, whether or not you agree with Severin on the demand-response-induced price effect-- you know, the price-- moderating the wholesale prices as a result of solar-- it is true, and an increasing number of very large consumers recognize that wind and solar have flat pricing, because they don't have the variable cost associated with fuel. That is a benefit that is inducing them to buy.

When we ran our green power program at Austin Energy, that's why 85% of our customers were large business customers, because they could lock in a component of their price for 10 years under a subscription to the program. That is a benefit that we can figure out how to transfer to customers. And it is one of the reasons why we don't necessarily want to socialize all of those benefits through just utility-scale solar.

So community solar, where you pass through the fixed-price benefit to low-income customers, can do a real-- do something really helpful, in terms of stabilizing their electricity bills and therefore increasing energy affordability through predictability. So that is a reason to explore it.

JOHN HILKE: Great. So this is sort of a follow-up to that. We ran across this particular perspective and would just like to get your reactions. So some people said, well, society's decided that decarbonization of the economy is really important, to avoid some extreme detrimental climate effects at some point. Customers with DG solar are making their contribution to decarbonization by paying for carbon-free generation for part of their load. It seems entirely fitting and proper that the rest of the people should help subsidize that process, since they're not taking any steps themselves. So.

[LAUGHTER]

PHIL MOELLER: That's a pretty big assumption, that people aren't making steps themselves. So I think I disagree with the premise. But if there's going to be a price on carbon, we have to be careful, I think as Severin would say, about it being arbitrage between different markets. So the more uniformity there is it is really the key, because we want to make sure, again, that consumers are protected. And an approach like this, with externalities that society wants to impose, should be done as uniformly as possible.

JOHN HILKE: Other responses?

TIM WOOLF: So I don't quite agree with the premise that society has decided-- unfortunately, our government hasn't-- our federal government-- quite yet. But each state has-- or "many states," I should say-- have climate-change goals. And each state typically also makes decisions about the development of solar.

And so the way that I see is, each state should identify its own climate-change goals, some of which might be fairly aggressive, like reducing emissions by 80% by 2050, like some states. Others may be less so. Once you have those goals in place, then I agree with Severin-- you look at what your options are. You put them out in terms of, what's it going to take to get to those goals. And you'll find, like, what's the lowest-cost way of getting there, and what's the most expensive way?

And I've done some of this. My company's done some of this. And it's true that rooftop PV is towards the high end of the spectrum. But it's also true that if you want to get to some of those goals, you have to do it, as well.

So, yes to all of the above. We need to look at, what's the most cost-effective way of getting there? And we need to recognize that, if a state has a goal of reducing climate change, then how are we going to get there?

JOHN HILKE: Severin?

SEVERIN BORENSTEIN: Yeah. I think that we-- first of all, as we heard this morning, the primary driver of the people putting on rooftop solar is saving money. So they aren't making a contribution, they are getting subsidized. They are actually lowering their bills. The only payment-- extra payment-- is coming from the system to them, in that case. And so it's not sharing, it's purely subsidizing them.

Secondly, I'm all for subsidizing them the appropriate level-- the level that reflects the true benefits to the system. And we need to figure out what that is. My own belief, from the studies I've read, is that we can get to those goals more cost-effectively with larger-scale deployment of renewables-- and nuclear, by the way. We should be keeping all carbon-free sources in the mix-- and energy efficiency, of course.

JOHN HILKE: Jon?

JON WELLINGHOFF: I almost agreed with the last statement of Severin, there.

[LAUGHTER]

When we talked about, we need to look at the benefits and provide distributed-generation compensation for the level of benefits. I'm not suggesting that DG is getting the subsidy. I'm suggesting that, if we do, a proper cost-benefit analysis, done in an open, evidentiary proceeding that's open and transparent and has parties participating fully, that we'll come to some answer-- or at least the regulators will determine some answer from the parties that participate in that proceeding.

And I think studies have shown not only the one that I talked about in Nevada, but there's also what Karl did in Austin. And the value there showed that the value was in excess of the retail rate. The study for the value of solar in Minnesota found the same thing. The study for the value of solar in Maine found the same thing. And almost-- none of those studies were done by the solar industry. Those studies were done by independent entities. Determines that the benefit is higher than the cost. And I think when we do that there is no subsidy.

SEVERIN BORENSTEIN: And in California, where we have very high retail rates-- at least the people who are putting in solar have very high retail rates that they're avoiding-- we're getting the opposite conclusion. And that's another study that was done not by the solar industry. And I think that that is where half of all the solar is.

KARL RABAGO: Just to put a little fine point on it-- if Severin's talking about the E3 study, it's important to remember that the E3 study on the California solar initiative attempted to quantify the total costs and total benefits and included the out-of-pocket costs of individual customers as part of the cost of the California solar initiative. Which you would not do-- private investment costs are not used in rate calculations and under cost-effectiveness tests for setting utility rates. The utility rates should be indifferent to whether I choose to pay \$5 a watt, \$10 a watt, or \$1 a watt for my solar. It's a question of what the utility and other customers have to pay in order for me to get solar.

SEVERIN BORENSTEIN: And just to clarify on Karl's clarification--

[LAUGHTER]

--the conclusion of the study was that there was a multi-- a very many million dollar cost shift to nonsolar households.

JOHN HILKE: This is a question from the audience and says, most of the discussions related to residential solar. How do the cost benefits differ, if we're looking at the way solar's being treated for C&I customers?

KARL RABAGO: There's a really good little primer on solar-value methodologies published by Clean Power Research. They did one for Iowa and for Michigan, just laying it out without getting into the numbers-- just, how do you go through it? They make an important point, that what we're really measuring is the value of generation-- a KWH that appears in the distribution

system. So if the C&I customer on the small end is a shop, a strip mall, a multifamily apartment complex, your local theater, it's being injected at the distribution level of the system.

If, as it moves up the scale and gets to primary- and transmission-level voltage, it starts looking like a wholesale generator of electricity. What we're really trying to determine is an indifference price. With value of solar, we're just trying to figure out, eh, you make it, I make it. At this number, I don't really care.

Under old PURPA law, we always did that at the power-plant bus bar, because the utility had to haul and distribute all that electricity. We're at the meter, for distributed generation, because that's the point at which we should measure indifference, because that's the point at which the energy is injected. So, for C&I customers, we're somewhere along the continuum, depending on where that customer takes energy.

PHIL MOELLER: Bigger is cheaper.

[LAUGHTER]

KARL RABAGO: It worked for nuclear power really well.

DEREK MOORE: We will end on-- we will end our solar-rate-design discussion with a nuclear-power point?

KARL RABAGO: I sat on a nuclear-power rate case. That was not fun. I don't want to do that big--

DEREK MOORE: But we are officially out of time. Before we thank our panelists, one programming note. We will have our state regulator keynote panel immediately following this one. But I just want to say thanks to all of you. I thought the discussion was terrific and interesting. And no fists were drawn, which we're all very happy about. So-- give you a round of applause.

[APPLAUSE]

JOHN SEESEL: You need the clicker.

ELLEN NOWAK: I do. Is my, um--

JOHN SEESEL: Is that it?

ELLEN NOWAK: I don't see it over here. I should have a--

ANN RENDAHL: --clicker?

ELLEN NOWAK: I should have a PowerPoint in there.

JOHN SEESEL: Uh, you do. After that. It's going to go after that-- after that page [INAUDIBLE].

ELLEN NOWAK: I'm going to speak in there. All righty. Here we go. I can't see anything.

JOHN SEESEL: Good afternoon, everyone. I'm John Seesel, and I work in the general counsel's office at the FTC. And I'm going to get off message for just a second to say that my daughter, who works for Major League Baseball, up in New York, very much appreciated Tanuj Deora's mention of several teams from her favorite sport.

First of all, I want to express thanks to Severin and to our first two panels for giving us precisely the kind of interesting and thought-provoking discussions that we expected from such an array of distinguished and experienced participants. Solar-distributed generation raises a host of complex issues. And you have given us all much food for thought.

Speaking of food we're going to take an hour's break for lunch at 1:15. But before we do that, we're really looking forward to the next segment of the workshop. We have two state utility regulators who have graciously offered to make keynote presentations about their states' experiences with distributed solar energy. We are honored and very fortunate to have with us the Honorable Ellen Nowak, the chairperson of the Wisconsin Public Service Commission, and the Honorable Ann Rendahl, a commissioner on the Washington State Utilities and Transportation Commission.

I won't take up our speakers' time by going into much detail, but you can see from their biographies that Chairperson Nowak and Commissioner Rendahl have had remarkably successful and very careers in all aspects of utility regulation. They will discuss their states' on-the-ground experience with a number of the issues that our other panels are considering today.

I will turn the microphone over to Chairperson Nowak first. Her presentation relates somewhat more to the topics that we've covered this morning, with an emphasis on net metering and other pricing issues in Wisconsin. Then Commissioner Rendahl will address several aspects of Washington state's experience with regulation of distributed energy resources, including some of the competition and consumer-protection issues that this afternoon's panels will probe.

Again, let me thank these two distinguished regulators for taking part in the FTC's solar workshop. Chairperson Nowak, you have the floor.

ELLEN NOWAK: Good afternoon.

Thank you for having me. And that was a very enlightening panel. And I have some prepared remarks, and I was scribbling a bunch of new prepared remarks, trying to respond maybe to some of the panel. But I'll see if I can work it in a little bit.

I'm going to talk to date from my perspective as a state regulator and what I have seen in Wisconsin-- what we've touched on. But I'm also going to put on my NARUC cap-- the National Association of Regulatory Utility Commissioners-- and talk a little bit more broadly to what

some other states-- and we've touched on that a little bit, too-- but what NARUC as an organization is doing. I'm honored to serve on the executive committee, and I'm in a leadership role with that organization, as well. So I'm going to touch a little bit that NARUC work is very active with.

So, as we've been hearing all morning, the states are very active in this field. NARUC's members are, I believe, on the cutting edge of promoting distributed-energy resources. 43 states and the District of Columbia have net-metering policies in place. Many state regulatory commissions are currently engaged in proceedings that aim to determine the value for these resources and how to appropriately compensate consumers for such generation without shifting costs to nonparticipating customers.

This exercise, as I can personally tell you, is not simple-- and as we've just heard from our previous panelists, as well. As state regulators, we are obligated to represent all customers. So we have to think about the largest industrial customer that spends tens of millions of dollars a year on electricity to the single senior on a fixed income. We have to be cognizant of every policy that we implement or decision we make is going to impact all of them.

We've had a very good discussion, so far, about one type of customer, so far, today. But I have to remind you all that, as regulators, we have to keep every single customer in mind as we make decisions. Our goal, of course, is to represent all fairly, treat all parties fairly, ensure safe, reliable, and affordable utility services. And, again, while not also jeopardizing the health of our utilities so that they can keep delivering that reliable and safe power.

Again, it's not an easy job, and it certainly rarely comes with accolades. All too often, particularly of late, it comes with the opposite. And I'll touch on that in just a few minutes.

I do want to emphasize that net metering is a state issue. States have exclusive jurisdiction to establish retail rates. That is not debatable.

What is being debated across the country is how to reasonably compensate distributed-energy providers, and that is where the debate should remain-- again, in the states. A national or a one-size-fits-all approach to net metering would not solve anything and, I submit, is an unworkable plan and would upset the very structure of state-regulatory-commission practices that strive to keep rates affordable and electricity reliable.

As state commissioners, our decisions must be impartial and must be based on the evidentiary record. Each state's considerations for distributed generation are unique, and state commissions are the ones that are in the best position to determine the necessary components of compensation and what does compensate reasonable methodology.

Last winter, Senators Reed and King introduced an amendment regarding on-site generating or net metering to the energy bill that was floating around in the Senate. This amendment would have set, as a default, the concept that customer-sited generation should be compensated at the full retail rate for electricity service. NARUC voiced its opposition to this amendment, as it would interfere with the state's ability to set retail rates and would undermine the fundamental

purpose of PURPA, which establishes that small generators should be compensated no more and no less than the energy and capacity benefit it provides to the system. Fortunately, that amendment did not pass.

NARUC strongly believes in the need to allow consumers options to generate their own electricity in competition with monopoly providers while being compensated fairly. A case in point-- and someone mentioned this earlier-- NARUC is in the process of authoring a distributed-energy resource compensation manual to assist our members in making determinations about what is fair and reasonable compensation. We're holding a town-hall meeting to discuss that draft on July 23 at NARUC's summer meetings in Nashville to get some feedback.

So, since this is a state issue, I'm going to now turn to my home state of Wisconsin and talk about a few things that we've done there. And Wisconsin has been referenced earlier this morning, in good or bad light, depending on your perspective. Now I don't make any claim that what we've done in Wisconsin is the best solution for any other state. It may or may not work. Again, I think these are very unique issues.

Wisconsin has a very heavy industry-- manufacturing sector. And that requires a very robust base-load energy capability. And this, combined with limited and wind, solar resources, probably means that a solution that we've crafted in Wisconsin doesn't fit so well in Hawaii or Arizona. So, again, that's the problem with the one-size-fits-all solution.

So let me-- there we are. Just quickly-- again, this just will establish and underscore that states have the exclusive jurisdiction to set the retail rates. In net metering, if a customer is overcompensated for their generation, it makes the investment more economical, of course, for that particular customer, but there is a price that is paid by all of the other customers and the non-utility-generating customers. So, as a regulator, of course, we have to try to strike that balance.

Oh, I went backwards. Here's a snapshot of some things that we've done in Wisconsin, in an effort to strike a fair compensation for net-metering customers. There's a couple things we looked at.

Well, first of all, we have about 19 megawatts of distributed generation statewide. And as we've talked and heard earlier today, it is not just growing nationwide. It's growing right here in Wisconsin-- about 22% per year since 2008, we've seen that growth.

Some things that we've done in our rates, with respect to net metering, is we have looked at the retail versus the wholesale-- what that compensation should be. Many of the customers previously receiving a wholesale-- I'm sorry, a retail rate-- for their excess generation-- now they are receiving retail rates set at the average LMP. We've also limited the size that a customer can build. The purpose of that is to reduce the incentive to overbuild and produce excess energy that is not needed for that particular customer.

And we've also, for some of our utilities, modified the netting period. I think you've heard a little bit about that, earlier today. We have two of our investor-owned utilities that are on an annual netting period, meaning that there is a true-up only once a year. They get to carry over, from

month to month, their hours of excess generation. Three of our large industrial utilities that are municipal utilities now have to have monthly netting periods. And that's a recognition that energy is worth different amounts at different times of the year. And there's an argument that if you allow it to carry over throughout the whole year, you're not appropriately pricing the energy at that time.

This is just a chart that more neatly summarizes some of the changes we've made in Wisconsin that I've talked about. You could see, again, that the utilities are paying a wholesale rate to DG customers rather than a retail rate.

There was a couple comments made earlier-- a lot of talk in the last panel about cross-subsidization. And that's certainly something that we are working with and trying to address in our rates. There also was a comment, I think by Mr. Rabago, that failure to use energy is not a cost. But I would submit that there is a cost to the utility, to have its commodity available 24/7. So there is-- that customer may not at that moment be using the system, as far as receiving energy. But if that customer is expecting if his distributed generation or her distributed generation is not going to produce at that very moment, and that will be able to draw upon the utility's services at that time, then there is a cost to the utility to have it available to all customers 24/7.

We have taken a look at the fixed charges. There was a bit of a discussion about fixed charges changing across the country. They do-- we have found that they better align rates with costs-- reduce cross-subsidization. It is a very controversial subject, and it has garnered a lot of interest among many stakeholders. But we have found that it does recognize the utility's fixed costs have traditionally been put in the variable bucket charge. And if a distributed-generation customer is not using the grid as much, they aren't contributing their proportionate share to those utilities' fixed costs.

A couple other things that utilities have done that have been spoken about earlier are looking at the value of solar, perhaps implementing time-of-use rates, unbundling rates for these types of customers, or implementing demand meters. It was noted we did have a decision that was implemented in Wisconsin-- it was overturned by the circuit court-- that would have employed demand meters for certain distributed-generation customers. That is something, I think, though, has survived-- right now, at least-- some other court challenges across the country. And I think for those customers that want to use the system in a different way that demand more information, I think a demand meter might be a useful way to provide them that information that they are seeking and provide a nice, two-way communication with the utility.

Someone also on the first panel, I think, mentioned that if you want to see a lot of interesting and innovative things that utilities are doing regarding rate design and addressing that metering, to take a look at the Sacramento municipal utility district. And they are certainly working on a lot of interesting things out there.

I'm not going to talk too much about community solar. It's been discussed many times, as well, this morning. But it's another thing that we do have experience in Wisconsin. I think we've

approved three or four of them, so far, in the past year. And we are approving them on a pilot basis. Small programs, to begin with.

They're not all designed the same, which is kind of the whole concept of doing a pilot program in the first place. Some of these actually do recognize the transmission benefits and the avoided costs and also implicitly acknowledge the distribution benefits and the avoided costs. In the orders we approved, we also are requiring the utilities to report to us on the data needed to evaluate those transmission benefits and costs. I think we hear a lot about what those are, and we want to actually-- OK, if you're going to go ahead and do this, we want some actual data in return for approving this. And the utilities have been willing to do that, as well.

An added benefit of solar-- and I think former commissioner Moeller mentioned this a couple times-- it is much cheaper than the customer-owned. In Wisconsin, it's been shown to be 42% cheaper than customer-owned distributed generation. Having the utilities also own and operate these systems does ensure better maintenance and integration to the grid. They can control the siting, and so on, and so forth.

This is another area, though, where NARUC has been very active, in community solar. Last February, at our winter meeting in Washington, DC, I moderated a panel on community solar. And we didn't have enough time to talk about it, so we're going to have another panel at our summer meeting in Nashville, on community solar, as well.

There's a lot to talk about. Utilities are very interested. Customers are very interested in it, as well. And we're also very interested in how we can address it with the low-income customers, as well. There is typically a significant up-front cost for some of the customers to participate in that.

I'll wrap up here with just a few comments. Finally, I noted that the job we have doesn't come with many accolades. And that's fine. Most people don't know what a public-utility commissioner is. I think I finally taught my family, after five years, what I do for a living. But I won't test them on that.

[LAUGH]

But unfortunately, as of late, doing what we do has come-- we've seen too many arrows come at us, particularly with respect to this very topic we're talking about today. Over the past several years, as distributed-energy generation grows, so too have the strategic efforts by different organizations and individuals to publicly criticize state utility commissioners. And unfortunately these efforts are specifically aimed at intimidating and threatening commissioners who disagree with them on policy positions of those individuals or groups speaking out.

Now, I certainly don't mind having a good, healthy debate on policy. And I think it's actually very necessary for all of us, in order to make decisions as we move forward. And I know, every day, that I make decisions that make people unhappy.

But is the personal attacks against commissioners who-- as I noted earlier, we must represent every customer that comes before us-- that has really gotten a bit out of hand. Our decisions are

based on the evidentiary record. We are public servants that strive to ensure outcomes are based and serve the public interest.

From my state of Wisconsin to Nevada, to Arizona, to Utah and Florida, just to name a few, we have seen the disruptions and distractions caused by these activities. These activities must stop, and NARUC will work to support its members to convey how state commissions do an effective job of serving the public interest, not the special interests.

So, as you have heard this morning-- and I know that will be discussed this afternoon-- the topic of distributed generation is one of great interest that invokes many passionate and complex questions. And I can assure you that the states are actively engaged and look forward to working with all stakeholders to ensure that fair, reasonable compensation is provided for these resources. Thank you for your time.

[APPLAUSE]

JOHN SEESEL: Thank you very much, Chair Nowak. And now we'll hear from Commissioner Rendahl.

ANN RENDAHL: Good afternoon. It's a pleasure to be here in the other Washington. I just need to make a caveat that I'm speaking for myself and not for my fellow commissioners or for the commission itself.

I also appreciate the opportunity to speak as a state regulator. And I'm going to focus on the important role that state regulators can play in consumer protection. This is an area also that the Federal Trade Commission can play a highly constructive role, particularly in identifying guidelines for certain business practices and disclosure of terms. But states should be the ones who are responsible for adopting consumer-protection requirements and engaging in dispute resolution and enforcement, if necessary.

It is the consumer-protection staff at state commissions and those consumer divisions who are associated with state commissions that can and do provide effective, one-on-one assistance for customers. And that's most effective at the state level and not at the federal level.

So, while Washington state is not a leading state for solar installations, in part due to our very low electricity rates-- in fact, they are the lowest in the nation-- Washington state does have a policy framework that supports solar deployment, although maybe not as aggressively as other states. So this slide shows where we stand. We are ranked 26th in the nation in installed solar capacity. But the year-over-year growth is similar to other states.

Washington state is a bit unique, as former commissioner Moeller knows full well, being from Washington originally. It is a very strong public-power state. And so our commission, the Washington commission, regulates only three out of 63 utilities that operate the state. There are only three investor-owned utilities-- Puget Sound Energy, Avista, and PacifiCorp. But there are 60 public-power entities that we don't regulate, and they serve more than half of the customers in the state. So, in that respect, Washington has a very different electricity framework.

This is just a scope-- very quick overview of our net-metering provisions. It's very low. The cap is 0.5% of the utility's 1996 peak load. That's very small compared to other states.

There's also a 100-kw size limit, which is also low compared to other states. Several of the utilities in the state have reached this net-metering cap, but they've continued to provide net metering. So I'm going to move on to the production incentives.

Washington, to make up for its low rates and low size limits for net metering, has a pretty good tax incentive. It's a public-utility tax credit to participating utilities. The tax credit rate to customers varies from a base rate of \$0.15 per kilowatt hour, for a system that involves out of state manufactured materials, to a \$0.54-per-kilowatt rate if you use Washington-made panels and inverters. And if you're at a community solar, you can double that rate. So, for a community solar, they can get \$1.08 per kilowatt hour, which is pretty good.

This is capped, though. The utilities don't have to pay more than half of their taxable power sales or \$100,000 per year. So some utilities are rapidly reaching that cap. And, under the statute, they're required to proportionally pay customers. And some customers are not very happy about having their production incentive reduced, when they expected to receive it for the full term. Some utilities, some of the public entities have actually placed a moratorium on their applications for the production incentives.

Actually, the program expires in 2020. There have been several legislative efforts to try to extend this program, addressing some of the other issues in terms of the incentives. One of the issues is that third-party owners of solar do not have the advantage of taking the incentives. They're not allowed to.

Well, customers who take third-party solar can net meter. The third-party solar companies are not allowed to take the incentives, so it has reduced the amount of third-party solar in Washington state.

Another of the issues in Washington state involving third-party solar is the question of whether the commission can regulate them as an electric utility. In a rule-making we put forward in 2011, we initiated it in 2011 to update our interconnection standards to try to address some of the soft costs that one of the speakers addressed earlier for DG interconnection.

A few of the parties asked us to address the question of whether third-party donors of net-metered systems are electrical companies, within the definition of our jurisdiction as public utilities. So we deferred this to a policy statement. The commission issued it in 2014. Policy statements, under our Administrative Procedure Act, are nonbinding orders in which the commission provides guidance on a particular issue. We've issued such statements on issues like decoupling.

So we reviewed the statutory jurisdiction of the commission over electrical companies, as well as distributed-generation provisions, and we looked at the number of reported cases around the country in court cases and complaints before the Better Business Bureau involving third-party

solar, alleging various consumer complaints. Granted, this was in 2014. It's now 2016, and a lot has changed over time.

But some of the issues that were raised in these cases involved fraud and deceptive business practices, poor quality of installed systems based on what was promised, unfulfilled contract obligations, issues with the securitization of lease payments, limitation of legal remedies through arbitration, inadequate communication and disclosure of contract terms, and the impacts on the sale of a consumer's home. And so all of these issues have been raised in complaints.

So we made a few key findings in the policy statement. First, that, based on this analysis of the jurisdictional analysis that is common, not just in Washington but in other states, in looking at whether a company is a public service company, is the company for hire? Are they holding themselves out to the public? Is it a monopoly service? Or is this company providing significant market share? And finally, whether consumers are in need of protection in this line of business.

So, in looking at those factors, we decided that it was very likely that third-party owners of net-metered systems are subject to the commission's jurisdiction as electrical companies. But the policy statement also identified, this is a very fact-specific analysis. Those jurisdictional analyses are very fact-specific, and it really depends on what each third-party owner company is doing in what they're providing.

And it didn't make sense for us to make such decisions one on one. It's very time-consuming, and it also creates a fair amount of regulatory uncertainty. And we also looked at the fact that we don't really want to regulate third-party companies, like we do traditional investor-owned utilities. We don't want to set their rates. I don't think they want us to set their rates, either.

So the real issue is the consumer protection and that there's a role for the state commissions in providing some consumer-protection regulation over this issue. We do that for the utilities already. We have significant staff who answer questions on billing and services and all kinds of things and provide a very good dispute-resolution process.

So, if you access these slides, there's a few key findings-- and I'm not going to read them-- that I won't go into. But, because I'm between you and lunch, I'm just going to--

[CHUCKLING]

--close up, here. You're not there yet.

[LAUGHTER]

We did request that the legislature clarify our authority over third-party solar. Our third-party owners of distributed generation, generally, related to consumer-protection issues, similar to oversight we currently have over competitive telecommunications companies. And I was happy that one of the speakers before mentioned the analogy to the telecom competition. So, in that respect, the commission-- the statute provides that we require the companies to register with the commission and publicly disclose their contracts-- particularly if they're standard contracts. This

wouldn't apply to the more negotiated contracts with large commercial or industrial customers. But really we're talking the residential, standard contracts. And that the commission should be required to receive and investigate consumer complaints, resolve disputes so that they don't escalate, and then initiate any administrative action if necessary.

It also provided that this would be shared jurisdiction with our attorney general's division, who does consumer protection. They do not have the staff that the commission has to do the one-on-one dispute resolution, but they do take on the larger lemon-lot-type cases. So shared jurisdiction would allow us to most effectively assist the consumers.

We did say that's if the legislature didn't act we would pursue a rule-making. Well, we've been through two legislative session since we initiated this, and we haven't taken action yet, the legislature hasn't taken action yet, but it's still a pending issue.

So there have been some recent developments, I think, in this area. South Carolina has adopted a statutory framework for solar companies to register with the state PUC as a part of a broader bill promoting solar in the state. Commissions in other jurisdictions have approved utility-owned residential solar that directly compete. The Consumer Financial Protection Bureau, here in Washington, is looking more broadly at the use of predispute arbitration clauses in consumer contracts in an array of financial products and services. And the industry itself has taken steps to address the business practices that we identified in the policy statement and has adopted a voluntary code of conduct for its member companies and is developing standard disclosure requirements for the contracts.

And these are very promising developments, but we need to do more. And consumers generally-- you have some very savvy customers who know exactly where to look and research the heck out of what they're about to engage in. And then there are others who are-- you know, somebody goes door to door, and somebody signs up, and they may sign up for something that's really not in their best interest.

So I concur with Chair Nowak that the issues related to cross-subsidization, retail rate design, and impacts to the reliability of the grid are highly complex issues where everything affects everything else and where states have the expertise and the authority. So this isn't the place for the FTC. But the FTC, as I said, does have a role in consumer protection and some of the competitive issues that we're going to talk about after lunch.

So we would like to partner with the FTC, as well as the industry, in trying to come up with a framework for consumer protection. There are a number of state and federal laws that are intended to protect consumers against deceptive business practices. But consumers don't always know their rights. So the industry will say, there's all these laws that protect consumers, but consumers don't know about them. And they don't have a place to go if it's just an industry-driven consumer-protection plan.

So we would request that the FTC not take action to preempt state authority but to work with states and the industry to identify and share best practices, develop some templates for consumer communications, and maybe exert concurrent jurisdiction, if possible. We really do believe that

the state commissions and their associated consumer agencies do help consumers navigate these issues. And, because they work directly with the utilities and the consumers and they can work directly with the industry, as well, that they can provide the best service to consumers.

So, despite the contentious relationship that some state commissions and the industry currently have on net-metering issues, I don't think it has to be that way. And I think we need to work closely and work together. Because, really, this is about the customer experience. I think that's what the industry would say, and I think that's what the commissions would say. It's about the customer experience. And so this should be a shared goal, and we should work together on that. So, thank you.

[APPLAUSE]

JOHN SEESEL: I just want to thank Chair Nowak and Commissioner Rendahl again for excellent presentations. We've really enjoyed them. And it is time now for lunch.

For people in the audience, if you go out-- and many of you may already know this-- but if you go out those doors and then take a left, there's a cafeteria, a very good cafeteria, on the first floor of the building. And you'll find if you just go out here and then take a left. For panelists and speakers, we're going to be assembling in the greenroom. And then we'll be back here at 2:15 for two afternoon panels on competition and consumer-protection issues in solar DG. Thank you.