

FTC Workshop - Something New Under the Sun: Competition & Consumer Protection Issues in Solar Energy  
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Segment 3  
Transcript

JIM MONGOVEN: Well, we'll get started despite the fact that we're missing one panelist. But I'm sure he's on the way. OK. Good afternoon, and welcome to the afternoon, Competition Issues in a Changing Industry. First, a few administrative issues. This panel will run until 3:45. Then we'll have a 15-minute break. And we'll be followed by the fourth panel on consumer protection issues. My name is Jim Mongoven. I am the Assistant Director of the Office of Policy and Coordination at the Federal Trade Commission. My co-moderator is Jade Eaton, who's a staff attorney with the transportation, energy, and agriculture section in the Antitrust Division at the Department of Justice. I'll briefly introduce each of our speakers. And they will have approximately 10 minutes to give their opening remarks. And then-- here comes our fifth panelist. And then Jade will give each of them an opportunity to react to the other speakers. And then we'll have a question and answer session, and time permitting, we'll take questions from the audience.

I'll just give a brief introduction. There's a fuller biography in the handout on the table outside. Our first speaker will be Ari Peskoe. He is the Senior Fellow in Electricity Law at the Harvard Environmental Policy Initiative, which is a nonpartisan organization that provides legal analysis on a range of energy and environmental issues. Next is Diana Moss, President of the American Antitrust Institute and an adjunct faculty member at the Department of Economics at the University of Colorado at Boulder. Following her will be Richard Schmalensee, who is the Howard W. Johnson Professor of Management and Economics, Emeritus at MIT, and has served as the John C. Head III Dean of the MIT Sloan School of Management. As a side note, we heard several references this morning to a 1977 conference on solar issues at the FTC. And Derek Moore went to the FTC library and found the report from that conference. Low and behold, on page 119, we find out that Associate Professor Richard Schmalensee was a speaker at that conference.

RICHARD SCHMALENSEE: Time flies.

JIM MONGOVEN: So if we don't get it right this time, we'll invite you back in 2055 to finish it.

RICHARD SCHMALENSEE: I can't imagine what I said.

JIM MONGOVEN: Our fourth speaker will be Michael Wara. He's an associate professor of law and the Justin M. Roche Junior Faculty Scholar at Stanford Law School. Also, a research fellow at The Program in Energy and Sustainable Development at Stanford's Freeman Spogli Institute for International Studies, a faculty fellow at the Steyer-Taylor Center for Energy Policy and Finance, and a center fellow at the Woods Institute for the Environment. Finally, we have Nancy Pfund who is founder and managing partner of DBL Partners, which provides financing in the solar space. She's also chair of the advisory council of the Bill Lane Center for the American West at Stanford University, a member of the advisory board of the Lawrence Berkeley National

Laboratory and the UC Davis Center for Energy Efficiency, and is a trustee of the National Geographic Society. So we'll start with Ari Peskoe.

ARI PESKOE: Good afternoon, and thank you to the FTC staff for inviting me to participate today. My remarks will focus on the role of state regulation in setting the terms and conditions for adoption by utility rate payers of distributed solar. My thesis is that investor-owned utilities' century-old technology and business model for electricity distribution is being fundamentally challenged. Decentralized technologies and services owned and provided by rate payers and third parties allow consumers to buy less power from their local monopoly utility and may effectively compete with the utility for capital investments. State regulation plays a vital role in how investor-owned utilities have responded to this threat. Utilities can and indeed are using the regulatory system to maintain the status quo of a top-down utility system. However, to varying degrees, regulators and some states are taking steps to enable an innovative environment where decentralized third party providers of technologies and services can compete and flourish.

One note before I dig into this. While the focus today is on solar, as has been mentioned previously, it's really a combination of complimentary technologies and services that really has the potential to disrupt the electricity system. Some of them face similar challenges in terms of a state regulation perspective that I'll talk about now.

State regulation is about protection. Utilities receive protection when states initially passed laws in the early 20th century that tasked public utility commissions with regulating electric companies. State regulation effectively insulated utilities from competitive market pressures and provided them with de facto monopolies over electricity distribution in a given geographic region. Rate payers receive ongoing protection from state regulation. By law, utility rates must be approved by regulators and must be just and reasonable and not unduly discriminatory. 70 years ago, the Supreme Court concluded that just and reasonable rates must balance consumer and utility investor interests. In practice, rates reimburse utilities for operating expenses and provide them with an opportunity to earn a return on prudent capital investments, while also preventing monopoly profits. The just and reasonable price approved by regulators is intended to mimic the price that a competitive commodity market would produce. The prohibition on undo discrimination prevents the utility from playing favorites among its rate payers by charging different rates for the same service. Another formulation of this prohibition is that rates should adhere to the cost causation principle. Like just and reasonable, undo discrimination connects utility rates to utility costs.

There are essentially two steps to rate making. First, setting the revenue requirement. That is, the amount of money that utility can expect to earn from rates. And then two, establishing the rate design, which allocates that amount among different classes of rate payers. And then sets volumetric fixed rates and other charges. This is a highly technical, contested process involving engineers, economists, and lawyers. Although parties often speak in neutral terms, emphasizing cost causation, economic efficiency, and sound engineering, choosing a rate structure involves a subjective balancing of interests.

State courts reviewing utility commission rate design decisions are differential to the commission on both aspects of the rate. Many state courts have said on great design that cost causation is a

factor, but it is just a factor. As long as the commission bases its decision on the record, state courts are very unlikely to overturn a utilities rate decision. Effectively, regulators have the final say on rate design.

This regulatory model was created 100 years ago when it was clearly in the public interest to expand electricity and enable more per capita consumption. The basic rate-making formula incentivized utilities to invest capital and to sell more kilowatt hours. Growth was the key ingredient that aligned the public interest with private profit. Today, volumetric sales have been flat in the US for nearly a decade, and this is unprecedented. Rooftop solar probably played a very small role in that, but the prospect for dramatic expansion, along with other complimentary technologies, raises the possibility that utility sales may actually decline in the future.

To delay this decline and blunt the effects of flat sales on their revenues, utilities across the country have sought permission to change rate designs. Two widespread utility proposals, which we've already touched on today, are to increase fixed fees on all rate payers and to reduce the net metering rate. Utilities typically rationalize these changes by appealing to the cost causation principle. They argue because they recover most costs through volumetric rates, and the costs of distribution are largely fixed, they must increase fixed fees to account for no volumetric growth. On net metering, there's a similar argument. Net metered consumers reduce their volume and are therefore, underpaying for the fixed costs of distribution. And the result according to utilities is that net metered rate payers are being subsidized by other rate payers. And we've heard about this cost shift.

These rationales and the underlying facts are hotly debated. And I won't get into that debate now, but what I'd like to do is just highlight that cross subsidies, or cost shifts, between individual rate payers are a feature and not a flawed utility rates. There are numerous such cross subsidies, and utilities and regulators typically ignore them. Rather, ignore the differences between individuals in the same class. Historically, when utilities offered incentives either to increase consumption, which they often did in the earlier days of regulation, or today to decrease consumption, regulators evaluated those incentives by looking at the overall benefit or cost to the utility system. So long as regulators could find that the utilities benefited, they typically allowed incentives that may have directly benefit only a handful of consumers as long as there were system-wide benefits.

And I just wanted to briefly mention there was a lot of back and forth on the last panel about a California study that found that there was a cost shift that benefited net metered customers. It's worth pointing out that that same study also showed that prior to adopting solar, those customers we're actually paying 50% more than the cost to serve them. And that's because these cross subsidies, or cost shifts, are just an inherent feature of how we've always done utility rates. To the extent regulators today think they must chase economically efficient pricing to the exclusion of other goals, there are places to start other than targeting rate payers who buy less energy from their utility.

Apart from rate design and any specific policy such as interconnection procedures that could be used to stall the growth of solar, there are deeper features of the state regulatory system that the utilities at odds with distributed solar. Although rapid per capita growth in electricity

consumption may no longer be in the public interest, one could still certainly make the case that we need a lot of capital investment in the electricity system. Today, rate payers, independent power producers, and other parties, rather than the utility, could potentially provide those investments. But under the traditional rate-making formula, utilities have an incentive to make those capital investments. And utilities also have an incentive to rely on capital intensive solutions rather than operational solutions to maintain the grid.

The architecture and ownership of the grid are additional factors. Nearly all power today is still generated at thousands of large, central power stations and transmitted over hundreds of thousands of miles of high voltage power lines. Utilities, investor-owned utilities, own 2/3 of those power lines in the continental US. And in 35 states, utilities that distribute power still own most of the generating capacity. If the electricity system becomes more decentralized, capital deployed by non-utility parties may effectively compete with these utility investments. Then there are also utility holding companies.

Take the case of Exelon, one of the largest generating companies in the country, which also distributes power in five states, as well as the District of Columbia. Last year, two utility commissioners in Maryland dissented from a state commission order that provided the company with permission to purchase two distribution utilities. And this is what the dissent wrote. "Exelon's economic interests to shield it's generating fleet from emerging distributed energy technologies and other competitive threats are inherently misaligned with the interests of the customer of the distribution utilities it's purchasing."

A decentralized architecture is not just a major change to the physical electric grid. It raises the possibility that rather than paying a uniform rate, each rate payer could have their own unique economic profile. And rather than transacting with just a handful of large-scale entities, it raises the possibility utilities could be transacting with tens of thousands of entities on an hourly basis. This vision is a dramatic departure from the industry's 100-year-old model. This sort of transformation is very difficult, and incentives created by the regulatory system appear weighted towards maintaining the status quo, even if decentralized technologies can benefit rate payers. Using regulation to insulate a monopoly from the effects of industry trends and technological development, such as by increasing fixed fees, seem unlikely to facilitate innovation. In fact, high fixed fees seem designed to maintain this status quo. The nature of regulation of this industry means that innovation must be a shared endeavor among regulators, utilities, rate payers, and third party providers.

I'll close by saying that regulators in some states are moving forward. Many states have been rejecting utility requests for high fixed fees. For example, a few states, New York has come up as the leading example, are taking a broader approach, and are looking at how they can change utility incentives generally in a way that doesn't put them at odds with distributed technologies and services. And as regulators examine whether and how to open the distribution system, one tool at their disposal is the prohibition on undo discrimination. This prohibition is rooted in concerns about anti-competitive behavior.

The connection between discrimination and the economic self-interests of monopolists was a key factor, a key part of FERC's argument to advance competition in a wholesale generation in the

1990s. FERC concluded then that the incentive for utilities to engage in discriminatory practices is increasing significantly as competitive pressures grow in the industry. This was FERC in 1996. FERC was talking about the very same companies that today are facing competitive pressures on the distribution grid. Depending on the state law, regulators at the very least may be able to use this authority to ensure fair procedures that allow new market entrants to participate and are not biased in favor of incumbents.

JIM MONGOVEN: Thank you, Ari. Diana?

DIANA MOSS: Well first, thanks to the FTC staff for organizing this very productive day. And thanks to Jim and to Jade for moderating. It's an honor and privilege to be here. I was asked to speak to the intersection between antitrust and regulation in promoting competition in this very emerging area of downstream, or retail-level distributed generation. And I'm happy to do that.

So I want to talk about three things. The as yet, undiscovered role of antitrust in this domain. I'd like to speak about that for a couple of minutes. And then I want to try and frame some analytics around how we would define or look at markets in the event there were some antitrust enforcement developments in this space. And then finally, would like to talk a little bit about what antitrust remedies might be available and contrast those to what regulatory remedies are available for anti-competitive conduct were it to be found in some of these markets.

So first of all, the role of antitrust enforcement. We know the role of regulation. Regulators are very busy out there at the state level developing rate structures to deal with these very unusual little distributed generation customers with rooftop solar panels. And it really is a state-by-state play at this point. But we don't know that much about how can antitrust is developing. So the ultimate role for antitrust is really undetermined at this point. We're watching cases very carefully like the SolarCity Salt River project case. We will be reading carefully what the courts say about the role of antitrust in this domain. I would wager that the antitrust agencies, the DOJ and the FTC, will use a lot of prosecutorial discretion in deciding if and when to engage public enforcement resources in this debate. I think we can expect to see the full range of antitrust immunities claimed as a defense for the type of conduct that we're seeing at the utility level. And I'm not opining on whether that conduct is good or bad or legal or illegal. But I do think, I we've already seen this and certainly in SolarCity, that the full range of immunities will be rolled out. State action, filed rate doctrine, all sorts of things.

I think it is instructive and useful to look to history for some lessons on how this will develop. My first jobs out of graduate school as a new PhD were to work on the QF cases from the PURPA days. And I'm dating myself, unfortunately. But that's what I worked on. My first case was a case involving Thermo Electron and Rolls Royce filing a case against Florida Power and Light. They built a 17 megawatt co-generator down there in Dade County. And were summarily slapped with very, very discriminatory, allegedly discriminatory, standby and backup rates to sell power back to the grid. Those are very instructive cases to look at. It's perhaps old wine in a new bottle when we're talking about distributed generation. There, I think state action got a lot of traction because there was a state-level regulatory regime that deliberately displaced competition. That media very, very different play now.

We've certainly seen antitrust step in when we had what were called deferral packs. This is the Rochester Gas and Electric, University of Rochester agreement that the university would not build a co-generator. So we have a little bit of history on that front from the PURPA days and from more recent antitrust activity. But this is really a fundamentally different play that we're in now. Very fundamentally different. We have states that have competition regimes, legislated regimes, that promote competition at the retail level. They don't displace competition. They promote competition.

We also have all this happening within the broader rubric of a national policy designed to promote energy efficiency. A really bad outcome would be for us to proceed state by state, where state action defenses got traction in some states and not in others. We'd have a very Balkanized system where antitrust applied here, but it didn't apply there. That would have very bad effects on innovation. It would have perverse results for driving innovators in distributed generation to some states where it was a friendlier environment and away from other states. Consumers would be overall deprived of new technology, of competition, and of benefits from that.

So how antitrust sort of fits into the bigger picture has yet to be determined. But my guess is there are complementary roles for antitrust and regulation in this space.

So let me go on quickly and talk a little bit about how we might look at markets for distributed generation PV in an antitrust framework. I think we have to consider some very unique factors and attributes of what goes on down there. Obviously, we've got networks, distribution networks, now being used instead of one way, power injected, power taken off, it being used in two ways. Power injected and taken off and power re-injected into the grid. We have equipment and services being bundled together. That raises potential for some mischief on the competition front, which we have not yet seen. We're also talking about an essential facility. I know that's a bad word, but I'm going to say essential facility. There is an essential facility doctrine that I think may be revitalized in the context of some of these competitive concerns.

If you look to the demand side, we see some very unique demand attributes on the part of consumers, residential consumers, who are installing these rooftop solar arrays. I live in Boulder, Colorado. It is mania in Boulder to have rooftop solar on your home. I cannot because I have too many trees in my backyard. But I have friends who really value having rooftop solar for both intrinsic and extrinsic reasons. There's the feeling that you're green. You're supporting energy efficiency. You feel good because you have rooftop on your home, but you get to sell back and make some money that way. It also implies that perhaps this particular set of customers that install these technologies may value utility provided services less. They may not value one stop shopping. Go to utility, they do all the procurement, they package it all together for you, you have a simple billing system. And they may not value that as much as they would generating themselves.

So this all leads us to questions about market definition. How would we, as antitrust advocates and enforcers, define a market in which distributed generation of photovoltaics live in this market? who's the competition? What's competing with rooftop solar? And for the purposes of determining whether there has been anti-competitive conduct, for example, of the sort we see in SolarCity, that would really be the first step. So I would say, and I'm just raising questions here,

we probably want to think about relevant markets for green electricity since there are these very unique consumer attributes, demand attributes, and use of the grid. We might want to think about green electricity delivered at the retail level. We may want to think about these consumers as what we call targeted consumers. If you go to the merger guidelines, there is big section on market definition. Targeted consumers who can be price discriminated against because of these unique demand attributes.

These are differentiated product markets. If you want to generate electricity on your rooftop, you may well, if price were to go up high enough, switch over to the utility to buy rooftop solar with bundled service or utility. Or you might even be happy buying a green utility product that was generated higher up in the supply chain from a Solar Garden, for example. Or a Central Station Solar, or even a wind farm, or something like that. So the question is if the price were to go up to the consumer because of anti-competitive conduct, who would they switch to? Who's in the market? Who's available to avoid the price increase?

So this is where the question of price comes in. And I think it will be hotly debated as we've seen in earlier panels in terms of the net metering issues. But as far as antitrust is concerned, unpacking that hugely complex calculation of what's in the price, what are the components of price, what does the rate structure look like is something that antitrust probably should and needs to avoid.

So finally, just a word on remedies in the context of remediating the type of anti-competitive, alleged anti-competitive conduct that is an issue in the SolarCity cases. There are things antitrust can do that regulation cannot, as we all know. As Ari just pointed out, regulators are loath to sort of undercut or indict their own regulatory regimes. FERC has as a regime in place for open access and RTOs to promote access at the wholesale level. State regulators are going to have exactly the same reaction at the retail level where they will not want to indict their existing access regimes. Antitrust has a lot of deterrence value when it comes to levying penalties, particularly in private cases where they're are damages involved. So that's something to consider. The type of exclusionary conduct that we're talking about in SolarCity is probably a pretty standard case for antitrust. The question is what can antitrust do that will complement as opposed to interfering with or creating tensions with regulation? And that's where the big questions lie.

Antitrust should not get involved in price regulation. That really is the domain of the regulators. Injunctive relief. Stop doing what you're doing in terms of excluding the SolarCity's of the world with discriminatory rate structures. That might open up some options for reviewing what's going on at the state level. And there might even be possibilities for structural relief. And I would just pose the question to this group that we might want to start thinking about whether utility should be in the business of competing with competitive downstream rooftop photovoltaic suppliers. Or whether their job is better done higher up in the supply chain with more efficient, larger scale generation. And certainly, the antitrust agency should continue their competition advocacy work, workshops, technical conferences, and like. Thank you.

JIM MONGOVEN: Dick?

RICHARD SCHMALENSEE: Thanks for having me back and giving me a chance to correct whatever it was I said in 1977. I'm sure was all correct, and I'll go on to something else. I find it useful in settings like this that are complex to start with simple examples and add layers of complexity.

So let me start with my own situation. I get billed by Eversource, which is a wire-only utility in the New England area. And my bill has three components. It's a tiny, fixed charge, which I gather is being increased, but a pretty small, fixed charge. An energy charge, which reflects the cost of purchases in the wholesale market. And a distribution charge. The distribution charge is a pretty big deal. In 2014, the average wholesale price in Massachusetts was \$0.076 a kilowatt hour, and the residential retail price was \$0.174 a kilowatt hour. That's not uncharacteristic of gaps elsewhere in the country. Now, as we all know by now, that gap, it doesn't reflect a calculation of costs related to rooftop solar. It's basically the cost of Eversource's operation, most of which involves fixed cost, divided by kilowatt hours and added to my monthly bill.

I want to mention the MIT study that [INAUDIBLE] referred to before lunch. It's a pretty straightforward study done by a bunch of engineers. They asked the question, compared to generation at the high voltage grid level, suppose you put PV distributed in the low voltage distribution system, what's the difference? In the low voltage-- it varies a lot by the configuration of the grid and the detailed incidence of where the solar hits. But the general pattern was really simple. You save online losses because you're putting power nearer to load. But the grid's not designed for reverse power flows. The grid's not designed to have power injected at the ends of feeders. You can handle those, but the cost of handling those overwhelms the reduction in line losses. And that's engineering. That's not hard stuff.

So is there competition in the Eversource case? Eversource has decoupling, so its revenues aren't threatened by rooftop solar. Is there competition? Well, sure. Rooftop solar competes with other generation. And rooftop solar is more highly compensated than other generation. But there's no particular scope or incentive for Eversource to take anti-competitive action. In fact, rooftop solar doesn't compete with what Eversource provides, which is a connection to the high voltage, bulk power system. That's what it provides under decoupling. That's what it's paid for.

So there's a rough sense in which decoupling makes sense. But now let me go another step. Suppose Eversource has no generation, but doesn't have decoupling. OK. Then rooftop solar-- I should've said one other thing. Decoupling automatically shifts costs. You can say whether it's good, whether it's bad, but that's what it does. This is not theory. This is not highbrow economics. Fewer kilowatt hours sold, fixed cost, higher distribution charge per kilowatt hour. That's just-- that's arithmetic folks, that's arithmetic. And if you don't have rooftop solar, you pay a higher distribution charge. Whether it's good or it's bad, it's arithmetic. Now suppose Eversource doesn't have decoupling. Well, it has every incentive to resist rooftop solar and to scream to the regulators and to complain. Not because it's being competed with, because remember I said it doesn't have generation. But because, under the regulatory regime I hypothesized, its revenues are being eroded, its ability to maintain the grid, its ability to make the grid smart are being affected. That's not a competition problem. That's a rate design problem.

Volumetric rates are, in a situation where you could have distributed generation, a terrible way to recover fixed costs. And an easy way to see that is suppose I have a solar roof that permits me to sell power during the sunniest hours. And then I buy power the rest of the time. And suppose my net usage is zero. Well, in that case, under the rate design that's almost universal in this country, in fact almost universal worldwide, I don't pay for the grid. I'm not paying net any distribution charge. But I'm using the grid intensively. Pure volumetric can't be the way to go. Applying the same fixed charge to everybody can't be the way to go, because people differ in how much they use and when they use it. We are going to need to do distribution cost recovery that reflects basically, the load profile. How much do you use, and when do you use it? And we need a system that is perceived as fair, reflects cause causality, and can be explained to people. My engineering colleagues say, oh, I've got it. And they run off into reference network models. And I say, no, no, we don't play that game in this country. There has to be another way to do it. We don't know what that way is. And I think that's a regulatory problem. I'm afraid it's not an antitrust problem.

I would say one other thing. There was a discussion this morning about grid neutrality. And I would suggest an important principle, which I like the term, an important principle of grid neutrality that I would propose is that what goes on behind the meter shouldn't matter. All that should matter is what the customer does when. What the customer does when. Whether I use electricity because I have a solar roof, or because I've installed efficient appliances, or because I leave the lights off all night, shouldn't affect what I pay for electricity. Whether I have storage or don't have storage, what should matter is what demands I put on the system. And it can't be current demands, because then you get back into the volumetric problem. But some appropriate demand. Figuring this out is that not something antitrust is likely to be good at. Not something antitrust is likely to be good at.

Now let me add one more level of complexity. Let me suppose Eversource sourced doesn't have decoupling, but has generation. Well, now you get into the potential for real competitive problems. Because Eversource has every incentive to resist competition with its generation fleet. The natural cure, of course, the cleanest cure is structural. They shouldn't have generation. They should be in the wires business. We should go where a number of other countries have gone, and do a structural separation. At the very least, pricing should be separate. But then you have the problem is there's a good economic course for protecting the wires part of the business in most parts of the country where competition in generation is the norm. There is no good case for protecting the generation part of the business. How you do that, and how you do rate design to do that, and what kind of proposals the company can make that are and aren't anti-competitive, is not simple. I believe that is a hard regulatory problem, not an easy antitrust problem when you've got generation and distribution together.

Let me come to the final problem. Suppose all of this happens. Eversource doesn't have decoupling. Eversource has generation. And it is in a part of the country that doesn't have organized wholesale markets, doesn't have generation competition. And now comes distributed generation. Well, the regulatory problem is hard because there's no easy way to separate distribution from generation. Because they haven't been separated either in an accounting sense, and certainly not generally in a structural sense. It's not clear to me antitrust is a good tool for

that, to deal with that anti-competitive problem. It is clear there is potentially enormous incentive, and probably ability to exclude.

It strikes me that antitrust is a relatively blunt instrument. Except, and I love to hear Diana talk about structural remedies because structural remedies are the cleanest in these situations, antitrust shouldn't-- I agree with her-- shouldn't be in the business of price regulation. But without structural remedies, is it anti-competitive to impose a fixed charge? Well, doesn't it depend on what the fixed charge is, and how that relates to other principles of rate making? And how is an antitrust court going to make that decision? So I would, being a believer in competitive markets, I would love to see structural change. Whether brought about by antitrust or other means. But I'm not convinced that antitrust has a huge role to play. Thank you.

JIM MONGOVEN: Thank you, Dick. Michael?

MICHAEL WARA: Thanks for having me today. Unfortunately, my Stanford IT and the FTC's IT don't talk to each other in a way that allows me to print things. So I'm going to read from my, or work from my laptop today.

So, I want to start by saying that I think that competitive markets, as I think everyone on the panel so far has agreed, are in the national interest. This is especially true when technological innovation create the prospect of competition where natural monopoly has previously existed. Rate regulation of industries that do not require it will always tend to produce sub-optimal outcomes, because of the information challenges of the undertaking. Competition in the power sector, as in other sectors, most notably telecoms, will tend to create productivity gains, greater consumer choice, greater consumer value. Not necessarily lower consumer costs.

This workshop, this harps back something to that Ari said, is ostensibly about solar. But at the outset, I want to state clearly that the real issue for the electricity industry is not limited to a particular technology. The competition issue is not just about solar net metering, although it might seem like it right now. The real issue is customer side energy services, generally. Storage next big thing. Smart homes and businesses will follow. And all that focus on solar and net metering risks missing the bigger and much more important question of what to do to avoid erecting barriers to and perhaps even to enable the dynamic innovation that's unfolding on the customer side of the meter. And to be clear, the evolution is occurring at a much more rapid pace than the utility industry can likely responsive to.

I think the most important aspect of this unfolding dynamic is probably the very different product cycles that occur in utility scale power generation, relative to distribute energy resources. DER product cycles are annual. They're like your iPhone. Utility scale product cycles, the product cycle for a GE gas turbine, are more like decadal. This has important implications for rates of innovation. It means that the competition situation today is unlikely to be representative of where things will be in a decade.

I also want to be clear that I believe very strongly that utilities deserve a fair shake. They've made, and continue to be required to make, investments predicated on a business model that assumes no competition, and focuses on cost minimization rather than value creation for their

customer. Cost minimization is a very limiting box to be in when exposed to firms that are willing to take risk, because they can enjoy high returns if those risks turn out well. Regulated utilities provide a very valuable service to American consumers at relatively low cost, and are obligated to serve all comers, unlike they would be disruptors. These firms need to be given a fair deal and allowed to enjoy, in Warren Buffett's words, the good, but not great return on investment capital that they've enjoyed for the past century or so.

So how should competition agencies respond to this nascent competition we see in the power sector? I think in a number of different ways. The basic principle should be to strive to create a level playing field for energy services' provision to consumers. To resist attempts to create or raise barriers to entry. The goals will be effectuated by differentiating between rate structures and discourage competition from those that allow for and reward it. The end goal should be creation of a national market for DERs that allows for full exploitation of the potential productivity gains created by these technological innovations.

Involvement of competition agencies implies, at least in the background, the potential for antitrust enforcement. Utilities object strenuously to the idea of any of their regulated businesses might be subject to the Sherman Act. And for much of their regulated businesses, they are absolutely correct. State action immunity doctrine, filed rate doctrine, protects state chartered and supervised monopolies from the application of the antitrust laws. And has done so since the 1930s. The court articulated doctrine states that even when anti-competitive conduct has been authorized, and this is by the state, and is actively supervised by the state, it's exempt from antitrust enforcement. Should the doctrine shield utilities when they take actions that erect barriers of entry to distributed energy resource providers? I think the answer is, at least in some cases, no, it shouldn't shield them.

The first issue is authorization. Many of the actions being taken by utilities across the country to change rate structures are focused solely on PV, on the subject of today. Should the utility be free from immunity when it modifies its rate structures to reduce competition from outside of its regulated service territory, from behind the meter? Absent specific statutory authorization, the answer may be no. But in many cases, the authorization will be more clear than this. Certainly in California it is. Where state legislation requiring revision [INAUDIBLE] rules has been passed. Conduct is authorized.

A separate question that matters for both separate PV net energy metering rates, and for retail electricity rates more generally, is whether utilities anti-competitive conduct is sufficiently supervised by the Public Service Commission that oversee and approve rates. On the one hand, it might seem odd to suggest that PUC does not actively supervise retail rates. Most utilities would beg to differ. But the important question here is what is the content of supervision that occurs? Is it of utility cost recovery? Is it of bill impacts to rate payers? Or is it of competitive impacts to other would be customer energy service providers? I at least would argue that, to some degree, the last piece is the most important criterion in assessing whether in fact supervision is active in the context of a structurally competitive, but indirectly rate regulated, market such as distributed energy resources. Truth is we don't really know how courts will respond to this question. They've been quite vague to date on the content of active supervision. What the history and evolution of

antitrust does teach is that enforcement is highly fact and context specific. And these are a new set of facts and a very different context.

Private enforcement of antitrust law in the energy resource context, as has been mentioned, is already being actively pursued by SolarCity in Arizona. There, the DER provider has survived a motion to dismiss based on state action immunity. And the issue of state action is currently before the Ninth Circuit. DOJ antitrust has submitted an amicus brief in support of SolarCity's position. The decision is both in the trial court and the Ninth Circuit. Given this jurisdiction covers the largest solar markets in the country will be crucial to determining whether anti-competitive business practices are permitted in the evolution of the US [INAUDIBLE] energy resources market. I think this is true even though Salt River Project is a bit of an odd duck when it comes to the question of state action [INAUDIBLE] doctrine. The court will send an important signal about how they are going to think about this question moving forward.

I believe the best way forward in the broader context of the numerous rate cases across countries is for utility commissions to take a much more active role in oversight of the competitive impacts and proposed changes to retail rates. By evaluating not just how retail rates will impact current rate payers, but how rate structure changes, including but not limited to net energy metering, fixed charges, time and use rates, demand charges, will affect competition more generally. PUCs and their regulated utilities can do much to avoid a highly disruptive private, or potentially public, antitrust challenge by taking such actions. DOJ antitrust involvement in the SolarCity SRP case is an important signal, I think, to utility commissions that this should be the rule moving forward. That competitive impacts need to be an additional and important factor in thinking about changes to rate structures. But antitrust regulators needn't stop there. Federal competition regulators can and should be taking a more active stance in their horizontal merger review of major utilities. Competition regulators should be asking for disclosure during merger review of current retail rate structures and the competitive impacts on distributed energy resources of spread of one set of practices to the [INAUDIBLE] territory. They should also be soliciting input from the merging utilities DER competitors.

And finally, they should also be actively seeking input on developing a set of per se anti-competitive practices for utilities to commit to avoid. In particular, I'd point to high fixed bills as has been mentioned as highly anti-competitive. I agree with the remarks earlier on the panel that context matters. And what is high in one place may be low in another. But there are complexities here. However, high fixed charges eliminate consumer choice. They remove the ability of DER providers to create value by offering a partial alternative to grid services. Managing competition in context where rate regulation and structurally competitive markets intersect is hard work.

The issues are enormously complex. Particularly challenging is the issue of allocation of joint costs, as has been mentioned. But antitrust agencies should not shy away from this challenge. And they should, instead, take heart in fact that the law governing what counts as acceptable rate recovery for utilities already recognizes this complexity. For 72 years, the law of the land has been that rate cases will not be overturned by courts so long as their impact is reasonable. Not because there are technical defects in their accounting methods.

Perfection is not required. For 48 years, the Supreme Court doctrine has held the so long as the commission's decision is within the zone of reasonableness, whatever exactly that means, it will not be disturbed. In other words, rough justice is acceptable in the rate setting context, so long as the utility is maintained. As an ongoing concern, earning a reasonable rate of return for its shareholders. Regulators should reassure themselves, therefore, that there's no question that utilities shouldn't be free of charge a rate that allows them a fair recovery on their invested capital. That it's not what is issue in these cases. The issue is how that rate is distributed across customers and the competitive impact of that structure on consumer energy services. In that context, there is no reason why antitrust agencies, in collaboration with both PUCs and regulated firms, should not play a more active role in ensuring that the competitive landscape is level for all participants. Insuring this will further not just the interest of DER providers, but of energy consumers, the regulated utilities themselves, which have an interest in not facing these kinds of disruptive changes that will come because of consumer demand, state governments that face political pressure from would be consumers of DER, and the nation as a whole, which has an interest in seeing technological innovation produce the kinds of productivity gains that we so desperately need in this country. Thank you.

JIM MONGOVEN: Thank you, Michael. Nancy?

NANCY PFUND: Thanks to the FTC for bringing us here today. We've talked a lot about solar and the role of regulation. And I agree. We need to broaden the discussion. It's not just solar. It's a whole new way of interacting with your electricity life. And let's make sure we're not dinosaurs here. Some people have been talking about storage as though it's five, ten years away. It's around the corner. It's coming to a garage in your neighborhood very, very soon. And that changes everything. So it's important that we celebrate rather than obfuscate the role of innovation. And that's what I'm going to talk about here. But for innovation to work, we need regulations that really do level the playing field as so many people have said.

So just setting the stage. We've really lived with our grandfather's electricity system for the past 100 years. Not much has changed. Not lots of innovation. Well, the good news is that now we're in an innovation cycle. And we all know what innovation cycles are because we've lived through them in industries like phones, and music, and computers. We all know how our lives have improved because of innovations there. The issue here is that since it's been so long since there's been an innovation cycle in electricity, and it's so early, a lot of people don't even realize that we're in one. And so that's why we really need to elevate what's happening. Because we certainly don't want to miss the boat and lose ground in terms of a better future.

So over the past few years, and our firm has been involved in funding companies like Power Light, which was sold to Sun Power and Tesla and SolarCity and Next Tracker, which was just sold to Flextronics, a tracker company. And several more. So we've seen iconic firms emerge creating customer choice, increasing the quality of life, reducing costs along the way. We've got electric vehicles, we've got residential storage, smart home services, appliances, thermostats, wind, and of course, more and more cost effective solar panels that are becoming very, very common in many regions of the country.

So these new innovations would never have happened if we had relied on the incumbents. And as Michael said, they're not designed to do that. If my investors see me investing, they want me to be compensated for the high risk I'm taking with a high return. That's not what utilities are set up to do. So we have to understand we're never going to innovate, we're never going to move to the future, if we hang onto a monopolistic, centralized utility model. Power Light and Next Tracker, both home runs created over half a billion in market value and hundreds of jobs, that was started by the same guy, Dan Shugar, who was a PG&E engineer and just thought about tractors years and years ago and solar. And then just said, you know what, I can never do this in PG&E, so I'm getting out and I'm going to start a company. That's the American dream. And we wouldn't have these companies that are employing tens of thousands of people each if we didn't recognize the role of innovation.

And it's important to understand that while companies like Tesla and SolarCity and Nest and such are great success stories, that getting the policy right is super important going forward. Because we have a whole new generation of companies that are coming down the pike, and we need to help them thrive just as we've seen the first generation thrive. And just on a cultural level, it's important to realize that in terms of who's working at these companies, all your students-- I'm a venture capitalist, but sometimes I feel I'm a recruiter, because while this panel is going on, I've probably gotten 15 resumes of people in your classes that want to work in this industry. It's aspirational. It pays well. It is changing the world.

We all have our millennial relatives, children or otherwise, and this is what they love. They don't want to do the same old, same old. We've got to work this out so that we have places for these folks to live. We talked about the importance of locational placement and granularity a few panels ago. We've already invested in a company that's doing just that. And guess who the engineers are in that company? They all worked at SoCal Ed or PG&E. This is where people want to go to work. And this is really what the future holds. And this is America's strength. So what we can't afford to do is to let our electricity sector fall behind do to an environment that doesn't reward innovation and competition. We need a level playing field.

So, a lot of folks have mentioned how we are not at a level playing field. We mentioned demand charges, a tax for and against net metering, the bait and switch, changing regulatory regimes midway. Lack of visibility is anathema to successful investing. So we hate yanking policies midstream. This prohibition against third party ownership. My favorite example of the dysfunctionality of that is that the Sunshine State, Florida, with arguably some of the best solar characteristics in the country has a prohibition about third party ownership. I mean these are the kinds of real world obstacles that this young industry faces. And there is a cost.

We've talked about the SRP suit that SolarCity is involved in, which is going to-- it's already changing the way we think about antitrust and other policies. But you know what? It's expensive. This suit for young company in a very young industry is not done without a cost. Same with all of the state by state regulation, which even the AT&T break-up, at least that was more on a national level and you didn't have to do it state by state. SolarCity, for example, has some 60 government affairs professionals, very talented, very committed crew. Some of them probably in this room. But that's a huge expense. I've been a venture capitalist for over 25 years. I used to be in life sciences, which is where everyone thinks the heavy regulatory burden is and imposes risk

on your investments because of that call regulatory cost. Nothing compared to the rooftop solar industry. So we've got to understand that you can't have to have it both ways. You can't want innovation and progress and put such a cost structure on the business that they're compromised from the get go.

We also need to have much more visibility as to what are the incumbents spending their money on? Where-- there's a lot of opposition going on. We read all of these articles about spending for this campaign or that campaign. This is something that really is hard to come together when you don't have all the cards on the table.

And we've also heard about the various positions on net metering. There are many studies. I mean Brookings just came out with a compilation of studies that show that net metering is a benefit. You have one MIT study. Well Brookings has 11 studies. And NRDC has this. This is empirical data. This is something we can measure. Let's get rid of the polemics, and let's get people around the table figuring out what the way forward is. And I do believe that the time for net metering-- we didn't invent net metering, we being the solar industry. That was kind of a regulatory process. And maybe it won't last forever. And I don't think anyone wants to hang onto it forever. But don't blame the solar industry for taking a regulation that was on the books and building successful businesses that reduce carbon footprint, create 200,000 quality jobs. This is something that has worked, and now needs to evolve as we go forward.

So what I'd like to present is sort of two visions of the future. You've got-- and then I'll close with looking at really, what is a level playing field? What does that look like? So we have two paths we can take. The first is that solar and clean tech and storage and EB companies continue to make a huge amount of progress and advance their business models as they have been doing. And that the existing utilities realize there's need for collaboration. And because it's a very difficult road aho if you're a utility trying to do this yourself. And we've mentioned-- people said, oh, well utility should sell solar. I think Georgia Power I just read has been at this for about a year and has sold like five systems. So no, it's not easy to do. It's not something you can just snap your fingers and have this happen. So we need to have that collaboration where we all figure out the path forward. And of course, there's a way for utilities to play a significant role here.

The alternative is that utilities continue to resist this and then we as a nation fall behind. And you're going to think I'm joking, but we have an investment in an East African solar and storage company that brings little solar, little storage to rooftops in Tanzania. Well, guess what? At the rate we're going, if we don't fix this, there's going to be more solar and storage in Tanzania than there is in Tallahassee. Is that really the world you want to live in? Do you want progress-- do you want to seed progress to other parts of the world? Of course you don't. And there's no reason why we have to do.

So what does a level playing field look like? First of all, it's all about consumer choice. I'm not going to go into detail. But unless you've been living in a cave somewhere from the late 20th century until now, you need to realize that consumer choice is one of the most compelling, overarching investment themes of our age. And it doesn't-- it's every sector. It's every geography. It's happening everywhere. And it doesn't listen to regulatory pundits.

We also need pro-competitive incentives. We've talked a lot about this. And whether that starts as net metering and evolves into something else, it really is something that we have to recognize that there are ways to create barriers and there are ways that incentivize the innovation that we all want. We also need to make sure that we don't shift the costs and risks of your business onto innocent third parties. So don't externalize that. Don't allow utilities to charge DG customers more to counter they're drop in revenue caused by customer's decision to conserve energy or go solar or whatever. That just doesn't make any sense.

And finally, we need uniformity and transparency. We need transparency even in things as basic as contributing to the campaigns of your regulatory commissioners and things like that. Yes, it gets personal sometimes. I found that you have to have kind of a thick skin. No one asked me to do this. No one asked anyone to be a commissioner. We've got to kind of do this and understand that there will be different points of view. But we do need transparency in who's backing whom. And put some limits on that, of course. And then we also need to make data much more freely accessible. I mean, imagine if Uber didn't have locational data on where you were and they had to look it up on the internet and record your address. Imagine all of the mistakes that would be turn a very positive app experience into a very inefficient one. Well that's kind of where we are in the utility, solar, storage industry. We need that access to data in order to innovate and bring the next generation of services and appliances to our world.

So just in closing, we're at a major junction here. The MGM Grand Casino in Las Vegas a month or so ago decided to exit their system and pay a big exit fee to leave the grid. Apple is setting up a company to sell renewable energy. Lot of brand power in Apple. We all love our utilities, but seriously, people are going to look at branding as part of their choice, their decision making in energy. It's not far away. The battles that are going on are going to get resolved. In most states, they're getting resolved favorably. And storage is going to take care of a lot of these issues about intermittency and be able to help us shape the load curve. So these are inevitable. This is an inevitable tide. It's something that's going to continue to happen with or without the support of the various stakeholders. And so we really do have a choice now. And we can allow new entrants to thrive and be competitive and work with the incumbents so that they continue to have sources of revenue and growth. But in the end, innovation always wins. Any other answer is not just anti-competitive, it's distinctly un-American. Thank you.

JIM MONGOVEN: Thank you, Nancy. Jade?

JADE EATON: Well, I want to start out by just saying, because the amicus brief that was filed by the Department of Justice has been mentioned a number of times today that my participation on this panel, any grimaces I've had, any questions I choose to ask are my own and not the comments of the Department of Justice. And so with that, I'm going to ask each of the panelists in turn to take a little bit of time to respond to anything that they felt really needed a response by the other speakers. And that'll give everybody in the audience also a little bit of time to think about your questions and get them back up here. And with that, I will start with Ari.

ARI PESKOE: Thank you. I guess the only thing I wanted to respond to was something that Dick said about that if there's a wires-only utility and it has decoupling, then it's revenues are not threatened by DG solar, and everything should be OK. I think what I was trying to hit on was

that there's 100-year-old technological and business model that's kind of at stake here. And that we used to think of sort of a one-way flow model verses now it's a two-way flow model. Actually, it's always been two ways. The power would flow down from the utility to the consumer and then the money would flow back up from the consumer to the utility. And if we look at how DG solar can be sustainable, those flows are going to get more complicated. And I think that's a nontrivial business change for these 100-year-old companies.

And then if you look at a decoupling mechanism, there's a lot of different ways to do it. But basically, if consumption is going to go down because some people have adopted DG, well then what the utility can do is either raise variable rates for everyone else, and you start to perhaps run into some political problems with that depending on exactly how much you have to raise the rates to make up for that difference, or you start imposing fixed fees, which is what we've seen in a lot of places. And that has the effect of being essentially not blocking, but certainly reducing the incentive to adopt DG. So I think all utilities in this industry that have been operating certain ways are in some sense threatened by DG. And I think the answer of just maintaining the current system and just sort of twisting around the sort of variable and fixed fees is a short term solution, but doesn't really move the ball forward.

DIANA MOSS: I don't want to take issue with what anybody has said particularly. But I would like to just draw out a, I think, an emerging theme. And I've heard this earlier in the day and certainly [INAUDIBLE] was onto this. And that is that the role of competition enforcement and policy is really not to pick winners and losers here. It's about promoting competition and innovation and consumer choice. It's about fair markets, fair competition. It's about market entry. With what is turning into a very complex overlay of public policy surrounding energy, energy efficiency, which is now being patterned into the states through renewable portfolio standards and whatnot. So to hold all this together through competition enforcement, which includes antitrust and regulation, is not to pick winners and losers. It's to accomplish the objective with the best technologies that emerge in the process of doing that. So I just wanted to note that.

RICHARD SCHMALENSEE: Let me react briefly to Ari's point. I didn't mean to say everything was Nirvana with wires-only and decoupling. It's just as you've sort of removed some competition problems. The utility has no incentive if its revenues aren't effected to resist solar. There may be serious questions about how you do the decoupling. And I would say on top of that, there are serious questions how, in that environment, you provided an incentive for innovation. US utilities are smartening grid, as was discussed this morning. But you talk to people who sell equipment internationally and ours are not innovative, American utilities. And maybe it's in the water, but maybe it's also in the regulatory environment. So I don't think wires-only decoupling is Nirvana. I think you still have hard problems. But it's certainly removed some competitive concerns.

Let me say a little bit about Nancy's response. I must say, I don't think anybody blames the solar industry for taking advantage of a net metering, but you shouldn't blame utilities for seeking to change it when it's to their disadvantage. Net metering does two things that are really hard to contestable. First, it gives rooftop solar an advantage over utility level solar. Seven point whatever cents I had versus \$0.17 as payment for power. That net metering. The second thing it does is if you want to pay the cost of the grid, you want to cover the fixed cost of the grid, then

under net metering, more solar puts a hole in the recovery of those costs. Those costs either get shifted to shareholders or get shifted somehow to other rate payers. That's arithmetic. That's not theory about net metering. The MIT study I talk to is an engineering study that had nothing to do with pricing. It had to do with the technical effects of putting distributed generation into a low voltage grid, as currently designed. They had to do with grid reinforcement costs versus line losses. And if there are studies that reach the other conclusion, I would be stunned.

MICHAEL WARREN: I actually want to agree and reinforce something that Dick said, and then disagree with him on another point. The thing I agree with is that I think that attention to cost causation and greater willingness to experiment and innovate in rate structures is going to be a really important part of the solution to all of these competition questions. And while he and I may read our power bills, I think most people do not. Most people if they tried to read their power bills, even when they have volumetric rates, would not understand them because they are incredibly complex, other than that one number that you pay. And what most people care about is what that one number is. If we want to create more complex rate structures that then create incentives-- problems-- for Nancy's companies to come in and solve. I think there's nothing wrong with that as long as we understand how that one number is going to change.

The piece I want to disagree with is about the knowledge of and the current situation in the distribution grid. Most regulated utilities that I talked to, absent a few exceptions, I would single out-- well, it's not a reg, it's a municipal, but SMUD is a good example of someone who knows a lot about their distribution system. Because they've invested heavily in smartening it up. Most utilities are not like that. Most utilities have a paper map on the wall with pins in it. And part of the issue is that the current system is old, outdated, has not been invested in, and so it has a hard time managing these new energy resources that are in the distribution system. And so, yeah, there are costs. Should those costs be allocated to the distributed energy resources? Or should it be the responsibility of the utilities and rate payers to have an up to date grid that reflects even late 20th century technology rather than mid 20th century technology. I think those are important questions to be thinking about as we move forward in this conversation.

NANCY PFUND: I would just come back to the net metering. I'm not going to go into the details. But obviously it's empirically-- you can validate it empirically. You can figure out what the costs are, what the benefits are. And I've also invested heavily in utility solar. I'm not just a rooftop solar person. I've done storage. I've done micro grids. And I'm pretty good at math. So I will tell you that it's apples and oranges completely comparing utility solar to rooftop solar. Because if you put a plant out in the desert somewhere and you've got years and years of battling the various interests that don't want you there, then you've got transmission development, you've got line losses. There is such a-- and you add all of that up, and depending on the location and the circumstances, there a lot of costs added on that you completely avoid when you have localized rooftop solar in a distribution system.

Plus, what you're not factoring in, which is the whole point really in terms of reducing our energy usage, is that through net metering, through incentives that allow you to sell back your power, you're able to rely less, especially as we develop storage. You're really going to be able to avoid certain distribution costs and transmission development cost. Because you're managing your load in a much more modern, proactive way. And so you're actually-- there's a net benefit.

And I think it was John Wellinohoff that cited the PG&E \$192 million recently saved. Not a cost, saved. And that's quite a lot of money. Because of avoided costs of having to build a distribution and transmission due to the more prevalent use of solar and renewables. So we've got empirical evidence there that suggests that there's a lot of great savings to be had. And my view, I mean obviously I'm an optimist or I wouldn't be in the job I'm in, but we have so much more technology to modernize and make this all better. Why would we ever want to put a barrier in place so that we have to have another 100 years of the same old electricity grid?

JADE EATON: Well, I want to ask a question out to the whole panel. It's really been raised both by some audience questions and just by each other's comments. And that is, if regulation is a better place for these pricing issues to be determined but the pricing is really affecting entry and innovation, how can-- is state regulation flexible enough to create regulations that can actually take into account competitive effects on non-jurisdictional entities? They have enough trouble thinking about competitive effects on the people they see every day. How do you think they can take on this task of looking at the impact on technologies that are in their infancy? And anybody who wants the answer just put your name tag up like this to start. Let's start at the other end and everybody gets a chance.

NANCY PFUND: Just briefly, I mean, we're seeing amazing regulatory interventions that are bringing us to the clean energy future. I means the 1.3 gigawatt mandate from Carla Petermann of the California Public Utilities Commission a few years ago. I invested in a company based on that rule that's doing extremely well and is creating jobs and bringing utilities and storage and renewables together to solve customer problems. The net metering is something that has allowed us to create, helped to create over 200,000 jobs. And has allowed us to derive all the benefits I just spoke about a few minutes ago in terms of strengthening the grid and load shifting. So there are plenty-- New York, the recent agreement between the solar industry and the utilities that has been talked about many times today. There's plenty of examples and they're in big states, by the way. California, New York, these are where a lot of people live. And so there's plenty of regulation that's working. It's as usual, it's the kind of histrionics and the negative examples that occupy all the headlines.

MICHAEL WARA: I guess I would respond to that by saying that I don't think the regulators have any choice. They are subject to political constraints one way or another. And anywhere where we observe distributed energy resources starting to gain any kind of traction, the consumer political response means that the regulators need to be paying attention. You see this in California in spades obviously. But even in states where-- one state that was mentioned, Georgia, is a useful example. Right? Georgia Power is responding to political pressure, trying to direct that to its five rate-based installations. Poor Georgia Power on this panel. They do many good things. But there is political pressure to allow consumer choice that's coming from all parts of the political spectrum. And that pressure is only going to grow as facts on the ground are demonstrated about how these technologies give consumers more choice. And so I don't think that the regulators have any choice but to address these questions.

RICHARD SCHMALENSEE: I think the regulators have to address these questions. I think the regulators are better positioned to address these questions really than anyone else. I can't imagine legislating on them. I can't imagine an antitrust court ruling except in very clear extreme cases. I

mean huge fixed cost untied to customer specific expenses could well, it seems to me, be actionable. But they are well positioned institutionally. But they're also subject to political pressures of various kinds in various directions. Yeah, the consumer pressures are rising, but the utility is there every day. So it really varies from state to state sort of what that balance looks like. Capabilities vary enormously from state to state. But there isn't an obvious alternative institution. And I think in this case, as I said, I think the rate design question is really critical and really hard. And it's going to require some states doing some things, and our seeing how they work out. I think we're going to need some experiments. All of which will be challenged in court by one side or another. But we're going to need see some experiments worked out. And to see how they go. I can't see saying the FERC should just do this nationally. Because I don't think they know enough to do it nationally.

DIANA MOSS: Yeah, I would just add that I think regulators should do what they're good at doing, which is to regulate. To develop rate structures, to consider all of the sort of public interest factors that go into regulation. But if you're a devote like I am of a two-pronged competition enforcement and policy approach, which consists of regulation and antitrust, I think antitrust plays a really critically important role in highlighting to regulators, pressuring regulators, raising issues to regulators, that perhaps the rate structures are not producing efficient and fair outcomes. That perhaps the rate structures are designed to foreclose competition downstream. And designed to be exclusionary. So if we talk about the tools of regulation and antitrust, obviously regulators have the institutional knowledge. They have the technical knowledge. But antitrust enforcers have the knowledge of competition, and how to promote competition, and how to fix potential competitive problems. So there are things that antitrust can do that would pressure and shape how regulators are thinking about how they develop rate structures. And encouraging them to develop rate structures with an eye to promoting competition as opposed to promoting potentially exclusionary conduct. And you can do that through injunctive relief. Stop doing what you're doing. Stop charging discriminatory rates. That will pressure regulators to think again. It can be done potentially through private cases and damages, which will inherently force a calculation of what would have been the rate but for the exclusionary or the anti-competitive conduct? That will force a reshaping and a rethinking about how rate structures are developed. And certainly, as I said earlier, all the advocacy activities that the agencies engage in are very, very helpful in this regard, as well.

ARI PESKOE: I think if this is just a matter of rate design in terms of reallocating utility costs between fixed, variable, and demand charges, then certainly regulators have the legal authority and the confidence to do that. But if we think that we need to have 50 state processes, or there might be 49. I think Nebraska might be all public power. But if we think this as a state by state and we need 50 reds like New York is doing right now, I think then you might have to look to state legislation. And that's going to play a role in some states. The New York commission is a particularly powerful commission. They've done some big things like a renewable portfolio standard and industry restructuring in the '90s without any what legislation, which is very unusual. So other state utility regulators are more constrained by existing state law, and to the extent they want to really look at changing the utility incentives, they may need help from legislators.

JADE EATON: I'm going to just ask one last question that came from the audience in general which is that there's been some discussion this morning and then a little bit even this afternoon harkening back to the regulatory compact. You mentioned, Ari, that the original idea behind fundamentally under regulation is that it's one of protection. To protect the consumers from high prices, you protect the utilities from different risk. And so I want to put out to all of you how much you think that protection from regulatory risk should continue to play a role in regulation? How much and how long do we protect utilities from the consequences of regulation? And I just want to throw out the fact that when wholesale competition was inaugurated and when retail competition was inaugurated, in each of those cases, there were often state regulatory proceedings that collected stranded costs so that the change in the competitive landscape was already built into rates. How long do we protect the monopolist from the loss of revenues in here? Or let me say the shareholders in monopolies from the consequences of competition?

ARI PESKOE: So I'd like to just hit back on the concept that there's a regulatory compact. I did talk about protection, but there is no compact. And this phrase is-- so I would urge the government not to use that term-- but this phrase usually takes on one of two meanings. Either the one person using the term is imagining that there's some legally binding contract between regulators and utilities. And certainly there is no legally binding contract. Public utility commission is based on state laws. State laws can change within the confines of the US Constitution. The other way that sometimes that term is meant is just sort of as a shorthand metaphor kind of describing the nature of the current regulatory system. But I think the compact metaphor is misleading historically because it actually-- that sort of term comes from the 1980s, not the early 20th century when this regulatory system came into being.

But it also suggests that state regulators are somehow constrained. That somehow state regulation has to keep us in some sort of system that held in an earlier era when natural monopolies sort of pervaded this industry. But now we've approached a new era, as you brought up, the deregulation, a restructuring of wholesale generation that happened the 1990s. Certainly there was no compact that prohibited that. And actually when utilities went to public utility commissions and state courts, there's only a couple of cases where this was explicit in the decisions, but they tried to argue that there's some sort of compact that requires them to get every dollar that they demanded. And courts rejected that argument. So I don't think the metaphor has any legal force. It can be sort of a quick shorthand description, but I think we should be careful about how we toss that term around.

RICHARD SCHMALENSEE: I think that game is over in 2/3 of the country. Right? We have competition in generation in ISOs and RTOs. And there is no presumption of any sort that anybody who generates ought to be immune from competition. The wires are different. I'm a big believer in consumer choice. We can have consumer choice, but I don't have a choice of wires to connect to the high voltage grid. That is a natural monopoly. Generation isn't. And it's not a matter of a compact. I want to make sure the people who have the wires have incentive to maintain them and modernize the system. In one third of the country, the game's not over, right? In one third of the country, we have vertically integrated utilities on the same business model they were running in 1900. How that gets changed, if it gets changed, it should get changed in my view, is a whole other question. But in 2/3 of the country, that issue, at that most conceptual

level, most fundamental level, is settled. There's competition in generation. No generator should be protected.

JADE EATON: Michael, you were first.

MICHAEL WARA: I'll just make a quick point. Well, on the way to the airport, there's not an add on the radio. You can get a free Android smartphone in California if you're low-income person. And that is the new version of lifeline service for telephones in California. You get 500 megabits a month, you get your data plan, you get your voice plan, you get your smartphone. I think that in order to undo the kinds of protections, quasi protections, whatever you want to call them, reduction in risk that utilities currently benefit from, we are also going to need to reimagine as a country how we provide essential energy services to our customers? And that will probably have to be via federal legislation as it was for telecoms.

DIANA MOSS: Yeah, I think the regulatory compact is undergone a gradual erosion and tightening and restriction of the compact and redefinition the compact. I mean wholesale competition and all the stranded cost recovery stuff on the electricity side, and on the gas side for that matter, was sort of the first salvo. Technological change is really stressing the regulatory compact. Smaller, modular technologies, more efficient technologies, those are all relieving a lot of the burdens of having to engage in cost recovery for very long lived generating equipment. So I think it's a gradual process. A shortening of the time horizon. We see in strategic planning, horizons go down for utilities because of risk and technological change and regulatory changes.

But it is a gradual process. I would have to agree with Professor Schmalensee here that it really is-- you can strip off all the generation technologies. And given the advent of technological change, at this point, we must have to do that. But it's the wires that really present sort of the essential facility problem. Everyone has to use the wires. And so we may end up eventually at a place where we really should have started when we restructured the industry starting in the mid-1990s, which is to structurally unbundle and allow a wires companies to really focus on the wires, and to regulate that. And then to promote more competition and better ways in other parts of the industry.

JADE EATON: I know we're running out of time, but I just want to

NANCY PFUND: I wanted to address this, too.

JADE EATON: OK. If I can throw this out, and you can address both of them. Because it's an add-on. What I was really thinking about here was the ways in which new technologies are competing for the distribution function. Things like storage, which unload the distribution system, reduce the guaranteed revenue that underlies a monopoly that you just divide volumetrically and then charge. So with that little twist on it, I hand it over to you.

NANCY PFUND: Thank you. Well, certainly storage has distribution and generation advantages, and is an example of what we need to move to based on your first question. It's pretty simple. If you don't get paid to do something, you're not going to do it. And there are many utility regimes where you don't get paid for using the distributed assets, renewables,

storage. You have to invest in transmission lines. You have to develop substations. You have to-- your capital goes to very, very traditional kinds of allocations. And so we just by simply allowing utilities to get paid for using the rooftop and distributed asset infrastructure to do their job better, to manage loads, to go bi-directional, to strengthen weak areas of the grid, et cetera, et cetera. That would make a huge difference. Allow them to be paid for, say, infrastructure as a service. And then all of these great, innovative, entrepreneurial companies that are developing next gen services will have a partner.

But it's important to understand that that's not the only partner. We have to move from this idea that that we've had for a century that we have the utility plus a passive consumer. We have to move from we have utility plus an active consumer plus other industry stakeholders. And that's why I keep harping on the data. Because I would guess that many of you think that while utilities know data, there are other groups that know it as well or better. I mean I think Google, Microsoft, Amazon, Apple are pretty good at data. They want into this. They want to help us develop better products and services, reduce costs, along with the new entrants and the utilities. And in order for all that to work, there has to be less protection of that asset called utility data.

**RICHARD SCHMALENSEE:** Very quickly. I think storage is a terrific emerging technology. For it to really benefit the system well, we need to do the thing that we've talked about for years and years that smart meters enable, is to move to real time pricing. I would also say that as long as you need the wires, you've got to pay for the wires. In particular, if you need to modernize the wires to allow for two-way flow and all those other things. And finally, I think the answer to storage, I'll come back to a point I made earlier, what goes on behind the meter should be irrelevant to what you're charged. It's what you use and when you use it ought to matter. So if you've got storage, fabulous. If you don't, fabulous. But that shouldn't matter to what rates, what rate structure, you're in.

**JIM MONGOVEN:** That'll have to be the last word. And thank you to our panelists for an excellent discussion. We'll take a 15-minute break and then we'll have the last panel on consumer protectioning.