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Rapporteur's Summary*

Session One.
Customer Side of the Meter: What Works? Who Benefits? Who Belongs There?

Long anticipated, distributed energy resources, including both distributed generation and demand side resources, are increasingly the focus of policy debate on a number of fronts. Questions include what works, what is cost effective, who benefits, and what role, if any, the utility should play. Are the effects of some programs detrimental to other programs, in the sense that they provide incentives to make less efficient investments in DER than might otherwise occur? Do DER programs, or some of them, provide individualized benefits to the detriment of system benefits? Can such anomalies be remedied and how? What are the distributional effects of DER programs among customers (e.g. are they socially regressive, do they shifts costs from one class of customers to another)? To what extent do tariffs signal efficient use of DER, or, alternatively, incent inefficient deployment? What tariff elements have these adverse effects? How do we get the prices right?

* HEPG sessions are off the record. The Rapporteur's Summary captures the ideas of the session without identifying the discussants. Participant comments have been edited for clarity and readability.

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Moderator.
Welcome, everybody. I want to thank Ashley for inviting me to moderate on this panel. He did so because our company is one of the companies that is moving very quickly, and has moved very quickly, into focusing on the energy transition. And a big part of the energy transition is moving away from what I call the traditional central station generation model into a model that is more customer-focused, including on the other side of the meter.

What we have today is a very fine panel to talk about some of those issues on distributed generation and demand side issues. We'll be talking about what works, and what is the role of the utility in this, if any? And how do you get the prices right, as it comes to tariffs and other issues?

Speaker 1.
It's a pleasure to be with you all here in the future home of the South Florida Reef. [LAUGHTER] Actually, we're on a bluff here, so maybe this will be a small island in the Arc of Telugu.

I'm going to talk a little bit about a regulatory fundamentals question. So, the principal-agent problem is one way to think about justification for regulation. I'm going to talk a little bit about cost effectiveness and how that relates to public policy, and then talk about low income energy efficiency programs as implemented by utilities and implications for public policy, and I'll have a few concluding remarks.

So, for the principal-agent problem, as you may be aware, you have the principals, who are the customers out there, who are the folks who are trying to buy something. They're trying to buy energy service. And they have their agents, utilities and their regulators, who are helping them make that purchase, rather than, as individuals, trying to procure an entire energy service for themselves. They work through agents who have economies of skill, or who have other advantages, but who have a challenge, which is that their customers want all sorts of things, and they can only do one set of things. There's only one of them at any given time. The customers may want one thing, or, as a matter of fact, many things, but the utility makes more money by doing some of those things, rather than others. So, I have a representation challenge. Public policy steps in, and government structure steps in to address that. The customers elect their representatives to the legislature and governors' offices and the White House, and those folks appoint regulators. In some cases, they elect the regulators directly. And those folks step in to act as their agents in search of trying to deliver them the things that might like.

So, the net result of this is that utility rates, policies, and programs are reflecting the public interest as interpreted by their representatives through some sort of political process. So, an example of that is thinking about energy efficiency. Customers generally would want to pay the least for energy. So, that's a reasonable place to start. But utility shareholders don't make money, generally by having customers buy the least amount of energy. Traditionally, utilities make money by increasing sales between rate cases, and by increasing their investments in capital infrastructure. Now, when the policy objective is electrification, and the policy objective is to reach every American with a wire and to improve their quality of life in a way that happened from the turn of the century through the 70's, 80's, as we managed to massively increase the U.S. economy, then that set of regulatory objectives and how utilities make money makes a lot of sense. But when there are other objectives, like increasing energy efficiency, you need to step in in some other way and define some sort of other objective function for what the utilities are after. So, the regulators or legislators step in and require energy efficiency. Some states adopted a language that they require all "cost effective" energy efficiency, or perhaps have established savings targets of some percent of savings per year, or some total amount of savings by some

date in the future. One way, of course, to reconcile the question of who's in charge and whether people's objectives are aligned is just to simply give the job of procuring energy efficiency to somebody else. So, four states and the District of Columbia have taken that function away from the utilities, for a variety of reasons, but Maine, Vermont, D.C., Oregon, and Hawaii, going east to west, have adopted structures where energy efficiency is actually procured by some entity other than utility.

So, when they say procure all "cost effective" efficiency, what does that mean? First of all, I'll just sort of put a flag out there for how cost effective energy efficiency is. Even if you take a really simple definition of what "cost effective" would mean, the American Council for an Energy Efficient Economy has looked at the cost of saved energy from utility energy efficiency programs across the country. The average cost of saving energy is about three cents. There is some range there. You can see the width of that green bar. The rest of the bars here are Lazard on the subsidized cost of produced energy from a variety of sources. And you can see that energy efficiency is very much at the low end of that cost spectrum. At the same time, procuring energy efficiency gets you other things that procuring supply resources don't necessarily get you, like not having to upsize your transmission distribution infrastructure, as well as non-energy benefits, things like health and comfort. In practice, the way those efficiency programs work is as a long term PPA that you buy upfront. You pay the entire cost of the PPA in year one, for the cost of a more efficient lightbulb, or a heating system, or building weatherization. And then you get the benefits of that purchase throughout the lifetime of that asset.

So, just looking at the history of a program that has been pretty aggressive for a long period of time, looking at pure avoided rate payer wholesale costs from efficiency for a month, from its founding in 2000 through when we did this analysis in 2016, that orange area is the annual expenditure by rate payers, and the bars are the value delivered in that year from avoided energy capacity and transmission cost. You see that for the first few years you're buying upfront, and you haven't gotten all the benefits yet, and so the costs exceed the benefits. But it only took five years before the benefit started to exceed the cost on an annual ongoing basis. So, the savings are directly paying for the energy efficiency program, year by year. And that has been true every year since, with the gap continuing to grow, past that crossover point. So, on a pure sort of utility system cost basis, there's some evidence that energy efficiency is cost effective.

But there is a much broader conversation about, "What would you mean by cost effectiveness?" that comes up in the context of all sorts of other DERs, whether it's distributed generation, demand response, or other things. You try to figure out, is this "worth it" to do? Is it a cost effective thing to do? So, from whose perspective are we trying to say something is cost effective? Who's paying? Who's benefitting? Who is bearing the cost? The energy efficiency regulatory world has developed a complex vocabulary to talk about this. But it does apply to utility decision-making more broadly. I have the decision about whether to upgrade a transmission line. There's a cost-benefit analysis in that, and you can try to figure out from whose perspective you are trying to optimize the outcome. So, in the energy efficiency world, the standard tests that get applied are the utility cost tests, the total resource cost test, or the societal cost test. In each of these cases, the utility impacts (those are the ones that I was talking about in a previous slide) are included, and the question is, which of the other costs and benefits do you include? The other wedges out there…water impacts, participant costs, environmental impacts, public health impacts, a particular impact on double income communities, et cetera…

But these tests are really just an expression of the public interest, as interpreted by their utilities and policy makers. You wrestled for years with, what

do we mean by the societal cost in Vermont? Are Federal tax credits countable? The vast majority of those tax credits will be paid by Federal tax payers who are not in Vermont and are many years in the future, paying off debt. Do we need to include the cost that they're going to bear in our cost effectiveness analysis? It's a political question.

So, the *National Standard Practice Manual*, which came out last year, encourages states to adopt what they call the Resource Value Framework, which starts with, very explicitly, identifying and articulating our policies. Why are you doing the programs that you're doing? And then designing the cost effectiveness test to reflect what goes into advancing those goals. You should always include the utility's system costs and benefits, but deciding which additional costs and benefits to include to align with your policy goals is a critical step, as well as first making sure that you're not asymmetrically including a cost of something, but not the benefits that come with that cost. So, you might end up with any number of combinations, like those shown in the figures below, of how you're including those other different kinds of costs and benefits.

So, how does this actually play out in practice in low income energy efficiency programs? There will be policy reasons to support low income rate payers. So, how is that working out? Are low income rate payers getting value back for the money they're putting in, if we care, from a public interest standpoint, about fairness in equity for these folks? So, the American Council for an Energy Efficient Economy, ACEEE, looked across the energy efficiency programs in the 50 largest metro areas in the US, and looked at their low income programs and what the spending on those programs are and what savings are achieved. Two of the 51, Nashville and Birmingham, simply don't have any programs that are targeted at low income, so they're not on any of the rest of the data, but that doesn't mean that we should ignore them. So, we look at the spending on low income energy efficiency programs. On average, programs targeting low income customers spend about as much on those programs as customers pay into programs. On average about 10 or 12 percent of the total energy efficiency spending is for low-income programs. It varies a lot, over some range, but not an incredible range, between cities, depending on the size of their low income populations and how the energy efficiency revenues are collected. You can see that the average is a sort of misleading number, or at least doesn't tell you a lot about the distribution, when you look at this chart. On the far left, with the greatest share of spending on low-income programs, we have San Antonio and Memphis, both municipal utilities. The politics there are somewhat different, and they spend that much more on low-income programs. Florida Power and Light, which I believe is probably serving this building now, is bringing up the right hand side, with the lowest proportion of energy efficiency spending for low-income programs. There's some spread even within states. The fourth one there, First Energy, serving Cleveland and Columbus, is about in the middle of the pack, and Cincinnati is way over there, fourth from the right. So, there's some spread here, even within states with the same regulators, in terms of what the different objectives are that the different utilities are bringing and running through their regulatory process.

What are we getting for that spending? We're getting a good amount of energy efficiency procured. It tends to be significantly more expensive than energy efficiency procured from other sectors. It's about four times the cost of non-low-income energy efficiency. And so, there's a question. Is that worth it? Should you be doing that? Is it too little? Is it too much? My argument is that that's a political question. That's a policy question. That's a question of morals and ethics, run through the political process. There's a question of what our obligation is to that set of principals, as their agents, when we're regulators, policy makers, and others. For low income folks, the energy burden is particularly acute, and they're much more likely to see various non-

energy benefits. But if you're not including that in the set of things you're including in your calculus of cost effectiveness, maybe you don't see those benefits.

So, some states explicitly take cost effectiveness testing off the table for low income programs. They simply say, "You're going to spend this much on low income programs, and we're not going to try to test whether they're cost effective because we think that they're important for various other reasons." There's a question there about how you make sure that the programs are still performing and actually delivering benefits to that part of the population. That's an interesting one. Some states, and I think they're probably ones represented further on the right hand side of this chart, still ask those low-income programs to screen on the same kind of total resource cost-benefit analysis. And so, if that comes in at under four cents, they're cost effective. Then low-income programs have to be providing energy savings at less than four cents a kilowatt hour, and so you get a quite different looking programs in the cities over on the far right.

A few thoughts which shouldn't be a surprise from this conversation. The way that utility programs are run and designed is reflecting policy priorities as filtered through public, political, and regulatory processes. It's filtered through the leadership of those utilities and what they're proposing to do, and through their regulators. All regulation is incentive regulation. Utilities are running the programs that they feel like they need to run, both to deliver for their shareholders and to maintain their social license to operate, to be seen as benefactors in their communities, and other things. Those are important outcomes. Even when we talk about performance incentive mechanisms for utilities, we talk about whether they need a financial incentive, and whether naming and shaming and publishing data is enough, as it is in some cases, to get utilities to respond to different kinds of incentives.

So, I introduced my firm as a quantitative shop, and we do crunch numbers, but I think we need to be humble about what those numbers are. They are illustrative and help us understand and illuminate what the implications of different policy and political choices that we make may be. But, particularly in this utility regulatory context, where the whole structure is human made and operates under human rules, fundamentally, the choices are human choices. They're political choices. The idea that there is a single right number…Once you make a bunch of assumptions and understand exactly what your objectives are, you can evaluate whether what you're trying to do is meeting those objectives. But in many cases, when we're fighting about the numbers, what we're really doing is fighting about what our objectives are. Thank you very much.

Moderator: I think we're now going into the mode of clarifying questions? I see two clarifying questions out there.

Clarifying question 1: The two places where you found the most expenditures on low income were munis: San Antonio, and Memphis. You also talked about Cleveland. Cleveland is unique, because it's not First Energy. First Energy competes with Cleveland Muni.

Speaker 1: Correct.

Questioner: And they've got, maybe, one of the few places in the world where you got dual sets of wires going down the streets. So, what I was looking for, is there a pattern that munis tend to do more things for the low-income programs than do IOUs, or is that just a casual observation on my part?

Speaker 1: I haven't seen an analysis that's comprehensive on that. There are a lot of different munis out there. There are munis with 10,000 customers, and there are munis with millions. I haven't seen the next analysis to ask the folks at ACEEE to do with all the numbers they've collected just to try to figure out. One challenge

is that these are the big munis. I mean this ACEEE analysis is the 51 largest cities in the country, but most munis are not on this list. Many, generally speaking almost all, of the nation's largest IOUs are represented on this list because they generally serve at least one large major metro area. So, the question of what's going on with energy efficiency in cities of 100,000 and under is a whole separate question that I haven't seen good data on.

Clarifying question 2: A colleague of mine in Massachusetts just recently told me that Massachusetts planned to increase efficiency spending to a billion dollars a year in a three year program. I think it more than doubles what they have been spending. My colleague told me that they are facing a problem with diminishing returns to those investments, in the sense that it was easy to go after LEDs, but much harder now to go after temporal reductions in load (at specific times of year) rather than year round. Could you comment on that? I thought you were getting to that point of saying something about diminishing returns, but you didn't quite get there.

Speaker 1: Vermont's had a program, and wherever we did studies to look at what was next and how much cost-effective energy efficiency there was to acquire, it never seemed to get smaller. Because of technological advancement costs coming down, new things are becoming cost effective. There's a question of how fast the programs are ramping up. For instance, how fast those other changes are happening. That's some race there. I could see programs growing bigger, faster, than the technology keeps up. And the upper end of this green bar does tend to be the more aggressive programs that are going deeper down the supply stack. Programs that are just doing lighting and strategic energy management in industrial facilities can be at the low end of this cost bar, but they're also acquiring that much less energy efficiency. And if you have an objective of doing "all cost-effective," that means that anything that's less than the avoided cost is something that you should go out and get, even if that means that marginal project is really only a tenth of a cent cheaper. And so, there's some question about how far, how hard you can push.

Speaker 2.

So, for my organization, from the big picture kind of perspective, in terms of what are we trying to achieve with energy policy, generally, of course, climate is front and center, and Speaker 1 stole my climate jokes. But I will say that, as a real matter, Miami is flooding. I don't know if you guys passed through there on your way. I had to come in through Miami last night, and I live in Brooklyn and we only flood occasionally. I mean, they're flooding all the time. I'm sure everyone who doesn't live around here reads about sunny day flooding in Florida and the cost associated with addressing that, not to mention the cost of just dealing with the impacts of storms, fires, and floods, that real long-term cost, and this is a state where you can't even really talk about climate, because, "We're not scientists." But there are scientist here, and there are lots of states, and now there are even more states getting into the game on climate policy, and a whole slew of cities as well, just scaling up energy efficiency and clean energy solutions, but also, increasingly, with the climate.

So, we don't have federal policy driving this right now, but this is where the economy and the energy economy is going, and states and cities will be carrying that load for the next chunk of time. So, what is the role of energy efficiency and distributive resources in that landscape? This chart is based on an analysis that we did a couple of years ago. How do we get to 80 percent reduction in CO2 emissions by 2050, economy wide, nationwide, and in the smartest, cheapest, quickest way? And energy efficiency is the biggest-ticket item. There's also renewables, electrification (not just electrification of transportation, but also buildings), and a few other things.

So, from a climate perspective, this issue is critical, but even if you don't care about climate, or that's not a driver in your jurisdiction, there are

all the other kinds of pollution that are also part of the same energy system that we're talking about that we care about reducing at lowest cost. And there are just the pure economic benefits, Speaker 1 just went over some of them. We want the least-cost resources. We want the cleanest, affordable, reliable resources, and we want the reliable and clean resources to become cost effective more quickly.

So, what's the policy driver that's going to make that happen? There are other things that states especially care about in terms of not just having a lower total energy cost, but keeping energy dollars in the state. In terms of driving jobs, energy efficiency and really all distributed resources are much more labor-intensive than central station power plants, and that's all money that stays in your jurisdiction, versus sending money out of state, whether it's to import power or to import fuel. And even though the US has increased its production of fuels, most states are not fuel producers, so if you want to keep those dollars in your state, driving your economy, these are all great investments to make.

The last thing, I think, about the policy framework is that we want a smooth transition into the future that you mentioned that we're headed towards. We're going to have electric vehicles. We're going to have storage. We're going to have more distributed resources. How do we get there in the smoothest, least-cost, least stranded-cost way? The role of the utility in doing that is critical. And there are lots of places where the utility or another player could do something. As Speaker 1 mentioned, the energy efficiency programs can be run by a third party.

But the utility is a foundational unit that has tremendous resources, so, no matter what decisions you might be making on a specific piece of the puzzle, how do we create a regulatory framework that drives the utility, so that their financial incentives, their shareholder interests, are aligned with the societal interest and the customer interests? So, that's sort of big picture, setting the frame.

So, energy efficiency. Lots of states are already starting to adopt the kind of policies that I'm talking about. Energy efficiency investment is steadily increasing. And we keep not running out of low-cost opportunities to invest more. It's a gift that keeps on giving. More importantly, energy efficiency savings are steadily increasing, and I do think that's an important distinction, because the rules that we set up shouldn't be rewarding the spending. They should be rewarding the delivery of the benefit. And the benefit, in this case, is the savings. So, that's important to keep in mind.

The states are not in the same place. This is the ACEEE annual scorecard, which I hope everyone's familiar with and reads annually with religion. And there's just tons of good data in there about why, and what's behind these numbers. The darkest states are doing the most efficiency. And the "why" is policy.

So, this is just one piece, and the map shows states that have energy efficiency resource standards and how robust they are. Speaker 1 had mentioned having a numerical target and that's what this keys off of, but if you just think about "all cost-effective energy efficiency," it begs the question of how you define cost-effective, and we should talk more about that. But why would you not have a policy that says, "Drive all investment in your least-cost resource that has all these other collateral benefits?" We think it is helpful to have numerical targets so that people have a ballpark sense of what we're talking about with "all cost-effective," especially if cost effectiveness tests are not well established. But just having the idea that utilities should be investing in "all cost-effective" energy efficiency as a resource makes a lot of sense.

Another critical policy is decoupling. All regulation is incentive regulation. And what is the business that we want utilities to be in? Do we want them to be electrifying the country? The

regulatory framework that we have right now is designed to get utilities to go out and electrify the country. That's from 100 years ago, we sort of did that part. So, what do we want utilities to be doing now? We want them to help us transition into the new electricity system that we're going to be in, which policy is driving, which is also happening anyway, just because of technological advancements and what people want. And we want utilities to be delivering least-cost, affordable, reliable, clean energy services. They're really not selling kilowatt hours. We don't want them to think of themselves as selling kilowatt hours or therms, we want them to be in the business of delivering energy services to their customers. So, what is the regulatory framework that will enable them to do that?

So, this is just a little, very simple, graphic, because decoupling is a thorny, thorny issue, and sometimes we consider not even using this word anymore, because it has a lot of baggage. About half the states have some decoupling for some portion of the utility jurisdictions. It's much more heavy on the gas side than on the electric side.

Under traditional regulation, you set rates by figuring out how much it's going to cost and dividing it by the projected load. So, you've got your approved cost and your load, and now you've got a number. 10 cents a kilowatt hour, if you're lucky and live in a low-cost state (not like New York). So, once you set that rate, the utilities are now driven to sell as much as they can, because if they over-collect, they get to keep that money. If they under-collect, they're going to be coming back and trying to get that money. We're not going to project things perfectly. That's going to be a challenge, and what do we want to do about that disparity? Decoupling says, let's figure out what the approved costs are. We still have the same discourse and proceedings over what costs should be approved. But once you have them, you want the utilities to collect them. They're approved. You don't want them to have to sell a certain amount in order to collect them. That's not how they should be earning financial health and profitability. You want to tie their financial health and profitability to performance, and take this as the equation. So, that is what decoupling does.

There is an important conversation to have around, is that shifting risks onto someone? That's something that we hear from consumer advocates in many states, although there are many consumer advocates, a growing number, who are supportive of changing the regulatory framework in this way, because now you're just guaranteeing that the utilities will be able to collect their approved costs, which is true. But what about weather risk, and the economy, and all the other things, in addition to energy efficiency? And, yes, that's true, and the costs are approved, and we want the utilities to collect them. We do want to drive utilities to perform, and use regulation to do that, but let's use performance metrics and rewards and penalties tied to reliability, affordability, and delivering on things like all cost-effective energy efficiency or whatever your renewables, storage, and other policies would be. So, that's the idea of decoupling. It seems so common-sensical to me, and yet it's a fraught issue that is far from accepted standard practice across the country.

So, after you have the regulatory framework, what are the other, what's the role of utilities in other elements of energy efficiency? I'm primarily talking about energy efficiency, although all these things apply to other distributed resources. So, as Speaker 1 mentioned, you can have third parties…Efficiency Vermont is among the best in the country, always has been. The other third parties are not quite as high performing, or all of them aren't, and there are reasons for that, because there are public policy choices behind who is the program administrator and how're we're going to invest in energy efficiency. But the program administrators that are out there in the country that you see the most are utilities, and they bring a lot to the table, for example, knowing their customers. They're not just thinking about programs as a resource competing with supply,

but there are lots of other reasons why they want to invest in energy efficiency--to avoid T&D costs, and the like. And they're huge investors.

So, how do we take advantage of all of those things? We can take advantage of them, even if the utilities are not the program administrators. But we should look at them as program administrators, because the ones who have the right incentive structure are very high performers, and you can have all that in one place.

States can be program administrators. In New York, you have NYSERDA. In New Jersey, you have the Office of Clean Energy. All of these entities can deliver energy efficiency programs. There are specific challenges with state entities, because they often have state contracting rules. For a good reason. But that can hamstring their ability to be a good program administrator. And, as an advocate who wants to have accountable parties that can be rewarded and penalized based on performance, it's very challenging when the state is not a good performer. There's nobody to go to, other than just the political process. Whereas, if the utility or the third party is not a good performer, the regulator is there to oversee their performance and make sure that it's high.

Another issue for the agenda this morning is the distribution of benefits and burdens. Is there some disparity, with respect to energy efficiency or distributed resources across different customer bases? For energy efficiency, I just want to highlight the benefits that accrue to everyone. Often people talk about nonparticipants, and whether they are getting the short end of the stick when energy efficiency is primarily coming in the form of energy efficiency programs. There are, of course, codes and standards, and efficiency investments that are more tied to T&D, and that kind of thing. But if it's the low-cost resource, it's going to lower the total energy bill for the state, or whatever the jurisdiction is. So, that's a good thing. We should be doing that. That should be something that we want. If there are other impacts, we could correct them in other ways. When you're reducing demand, because of supply and demand, you're putting downward pressure on electricity prices, on the underlying fuel prices.

Something that I think really is only come to the fore maybe in the last 10 years, especially since the launch of RGGI (the Regional Greenhouse Gas Initiative), is how critical efficiency is in reducing the cost of compliance with pollution standards. So, you ask a person who lives in a RGGI state, "What is RGGI?" They don't know. Why? It's not a line item on their bill. You can't even discern it in the fluctuations of energy prices, because the cost is so low. Why is the cost so low? Because all of those states are using the structure of RGGI, which sells pollution permits and uses the money to invest in efficiency, and they've all scaled up efficiency as part of their participation in that program. It's true for other pollution programs as well, but it's not tied into the structure of the compliance with those programs, so it's less visible to people. But that's a value to everyone. And then, of course, there are all the environmental public health benefits associated with efficiency.

If the people are concerned about distributional impacts to low-income customers who are non-participants and are paying for efficiency, but not getting the benefit, well, get to the left hand side of ACEEE's scale (with a greater share of energy efficiency spending going to programs for low-income customers). It is hard. It's not as cost-effective, so if you have stringent tests, and you're not considering the full suite of benefits to low-income customers, maybe you need to adjust those. But scaling efficiency so that there is no low-income customer who is not benefiting from efficiency is really the answer. That takes time. In the interim, we can beef up the low-income protections that we have to make sure that there is not a single low-income person who has a higher energy bill because we're scaling up efficiency and delivering all these benefits that accrue to everybody. And if you look at those

benefits broadly, that's often happening anyway, but we should still do that.

The last thing I'll say is, you didn't even mention the rate impact test, because nobody uses it anymore, except that it was used in Florida one time when I was here recently. This is the idea that you do not invest in energy efficiency if there's a single customer whose rate is going to go up because of that. That is not a test that we use for any other resource that we invest in. So, let's think about that test in the context of all the resources that we invest in. Because why are we treating efficiency differently? If we want the least-cost resources, we should be using the same thought process and objective criteria to make decisions about which ones we're going to invest in.

Clarifying question 1: The idea that the revenue requirement for the utility isn't tied to the amount of electricity they sell…what's the idea behind how they recover that?

Speaker 1: It's just separating sales and recovery of approved costs. What is approved is the cost. So, if you don't recover the exact amount, because there's a little over or under, you adjust rates periodically, automatically. You still have rate cases, and you can have them as frequently as you want, but you get that little adjustment automatically, so that you never have the over and under recovery. And in states that have done this…(and there's a great study by Pamela Morgan which I highly recommend. It's a little bit dated, but it's still good.)…it goes both ways, in terms of giving back to customers when you over-recover, as well as collecting when you under-recover. And it's very modest. It's not discernable. You can put bands on it, so that you know it will be modest and you'll never have wild swings, and you can spread that out over time. But the idea is to have that smoothing, and it's just an automatic adjustment, instead of having to go in and fight in a rate case to get the under-recovery, and never talk about it when there's an over-recovery. Does that make sense?

Clarifying question 2: In terms of biomass, it really has not taken off, because we have a number of landfills and a lot of issues with respect to recycling which is declined. Are there any innovations from waste to energy? That's a factor in your presentation.

Speaker 2: Biomass is such a fraught issue. There is a lot of landfill methane, and that is sort of done, but there's a limit. Because, like you said, organic waste out of landfills is just going to be a declining resource and it's not really the resource you want. Other areas of biomass are fraught, just in terms of the carbon accounting associated with them, and you don't want clear cutting of forests for your carbon-neutral power plant. "Sustainable biomass" is so difficult to define and get agreement around. So, there hasn't been a lot of support for advancing that because it's just not clear that you're getting benefits.

Speaker 3.
Good morning. I think it's important that every panel like this have a variety of opinions. I think I'm here to provide that. [LAUGHTER]

I'm going to use a different definition of cost effectiveness (both are valid, but just different). Instead of comparing energy efficiency to other ways of providing energy services to customers, I think of the overall goal as reducing carbon. And so, let's compare energy efficiency to other policies that would reduce carbon, like solar power, renewable portfolio standards, cap and trade, a carbon tax, electrification of vehicles… Those should all be in the policy mix. And the question of the cost effectiveness is, which one of those achieves the most carbon reduction at the least cost?

I want to make three points. My first point is about how central energy efficiency is to American carbon policy, to the extent we have a carbon policy. Second, I want to ask the question, how well is energy efficiency working? And, third, I want to compare it to the carbon tax.

So, first of all, energy efficiency is the central thing the United States is doing on carbon policy. When President Obama came to Georgetown in 2013 and presented his Climate Action Plan, the plurality of the policies that were outlined, and maybe even the majority of them, were energy efficiency policies for cars and trucks, and lightbulbs, and air conditioners, and building codes. The Clean Power Plan, as finalized, would have achieved half of its future carbon emissions reductions from downstream demand reductions from things like energy efficiency and conservation. And if you look at the list of policies outlined and enumerated in the US filing under the Paris Climate Agreement, the Intended Nationally Determined Contribution (this is the document that promises to deliver 25 to 30 percent carbon reduction by 2025), almost all of those policies are energy efficiency. Cars and trucks, lightbulbs, air conditioners, appliances, building codes…both from the federal side and the standards for personal… So, it's what we're doing on the regulatory side.

On the legislative side, the same story. For the Waxman-Markey Bill that passed the House of Representatives in 2009, the cap and trade aspect of it got a lot of press, but a lot of the heavy lifting was projected to be done by energy efficiency. Thirteen percent from building codes alone. On the state side, California and Massachusetts both have their legislation that was enacted, and they achieved, respectively, 44 percent and 33 percent of their carbon reduction goals from energy efficiency.

This graph shows ACEEE's estimate that we can achieve almost half of our climate goals under Paris from energy efficiency. The red dots here are the climate goals, and the color bands are the various energy efficient policies.

So, energy efficiency is central. It's what we're doing, to the extent that we're doing anything, as Americans, for climate policy. And so, I think it's super important to ask, how well is it working? And I want to provide three pieces of evidence.

The first piece of evidence is this graph, which is pointed to by a lot of people as evidence for the efficacy of these policies. This is a plot of residential electricity consumption per capita in the State of California over time, compared to residential electricity consumption per capita in the rest of the United States. That's the blue line. It's been increasing. And a lot of organizations will point to this graph and say that the fact that those two lines diverge is evidence of the efficacy of the policies that were passed in California in the 1970's to regulate building codes and appliance standards, among other things. They're going to interpret this as a causal effect of those policies on that graph. And California was the first in the nation and the first in the world to enact these types of policies. And the story is compelling.

Here's an example of some of the organizations that have done this: the World Bank, NRDC, EDF, Rocky Mountain Institute, the US Department of Energy, the *New York Times*, the *Washington Post*… I have tons of these pictures, which essentially say, "If the rest of the world would learn from California, we could achieve California-style savings." And I think there are a number of reasons to be suspicious of that. It's a correlation, not a causation.

Here's one reason to be suspicious about it. If you look at the other five slowest-growing states in the nation (slowest-growing in terms of their electricity consumption per capita), they are Nevada, Oregon, Washington, Idaho and Hawaii--all California's western neighbors. That makes it seem like this is a geographic/demographic phenomenon, not necessarily a California-specific phenomenon. I wrote a paper a couple of years ago that tried to explain that gap by these types of demographic changes that occurred differently in California from the rest of the states, and argued that 88 percent of that difference is migration, household size, climate, and a bunch of other things that have nothing to

do with California's energy policies. So, this piece of evidence, which is highly touted as evidence of the efficacy of the policies, isn't evidence of the efficacy of the policies. It doesn't say the policies don't work. It just doesn't say that they do. So, I want to discount this piece of evidence.

The second piece of evidence I want to put forward on the table is the type of thing that we've been talking about this morning already, which comes from the regulators, that describes the efficacy of the energy efficiency policies that they've passed. So, this comes from California. Back in the 1970s, when California was the first in the nation to do these types of things, the first annual report of the California Energy Commission said that their long term goal was to, "reduce the electricity and gas now used in typical new buildings by at least 80 percent for new buildings constructed after 1990." Fast forward 40 years, and here's a document that's produced by the California Energy Commission that documents that success. So, the first column in that slide is the typical energy used by a typical home in California in the 1970s, before any energy efficiency bill codes were enacted. So, this is pre regulation, and that's for water heating, space cooling, and space heating per square foot. The second column is the projected typical energy use for buildings in California to that met the brand new, first in the world, 1978 building codes. And that looks like it's going to use about 20 to 30 percent less energy than the ones built before the codes. The third column is in 1984. California tightened those building codes then, and it looked like buildings built to the 1984 codes would be using another 25 or so percent less energy than buildings that met the 1978 codes, and almost half of the energy buildings built in the 1970's that didn't have any code, and so on, and so on, and so on. Every few years, California tightens the building codes, until you look at the 2019 standards, and the projection is that California buildings constructed next year should be using less than 10 percent of the energy per square foot that buildings constructed in the 1970s used.

The problem with all of these analyses, from my perspective, is that they are *ex ante* projections of the energy that will be used by those buildings, but time has passed. We know what energy is being used by these buildings. People have moved in. They're using their appliances. They live there. We can look at their electricity bills. And so, I wrote a paper that tried to look at actual energy use, and this graph documents the average electricity use for California single family homes as a function of when the building was built. So, this is not over time. This is electricity use by homes in the 2000s, averaged by when the building was built. So, the homes on the right are buildings built most recently. The homes on the left are built a long time ago. The red line, the vertical line, is 1978, when California first started regulating building energy efficiency.

What this says is that homes built post-building codes are using more electricity than homes built pre-building codes, and not less. Now, that's not a fair comparison, because these homes are larger. They are in hotter parts of the state. They have more occupants. They have richer occupants. And so, we would need to control for all those things. If I control for all of those things, then I can make that upward slope go away, but I can't make it go down, and I certainly can't make it go down by 90 percent. So, my interpretation of this is that homes built post-building codes are using about the same, or maybe a little less, energy than otherwise similar homes built before the building codes.

On the natural gas side, the story is a little brighter. This is the same picture, natural gas use without controlling for the characteristics of the occupants of the buildings, and this is the picture, once I control for the occupants of the buildings. And this suggests that if you control for all the variables, homes built post 1978 might be using 25 or 30 percent less natural gas than homes built pre-building codes, but certainly not 90 percent

less natural gas. This is not to say it's a bad policy, it's to say that, as far as counting that 90 percent and patting ourselves on the back for saving that energy and reducing that carbon, we might be crediting ourselves for things that haven't happened.

I'm not alone. There are other people who have looked at *ex post* savings, using actual utility bills and comparing those to the projections. Here are a few examples. In Michigan, there's a weatherization program that got a lot of press. It turns out the realized savings were about one third of those projected by auditors on a house-by-house basis. In Wisconsin, the program seems to be a little better. The realized savings were three-fifths of what was projected. In Mexico, there's a weatherization and home remodeling program that projected 26 percent savings, and the realized savings seem to be something closer to zero.

So, my takeaway from the two parts is that this is a really important policy. It's what we're doing as Americans towards climate policy. And there's not very much *ex post* evidence on realized savings, and what there is suggests that we may be over crediting ourselves with savings.

Last, I'm an economist. I would betraying my tribe if I didn't mention the carbon tax. [LAUGHTER] So, people like me have been teaching carbon tax, proselytizing carbon tax, for a hundred years, since Pigou in 1920, to no effect. I suspect I'll join that today. Here are two comparisons of the carbon tax and energy efficiency that you may not have seen.

Why don't we do a carbon tax? I think the most salient argument against a carbon tax, the one you see most often, is that it's regressive. There is bipartisan American consensus, from the *Wall Street Journal*, to the *Daily Caller*, to the *Huff Post*, to the Sierra Club, that a carbon tax disproportionately harms low income households, because they pay the largest share of their incomes in energy costs. Everyone seems to agree that this is bad for low income households. So, we don't do that, we do other things, like energy efficiency, instead. There are two reasons why I'd like to rebut that argument. First is the following. This actually comes from a Hilary Clinton for President Campaign. It's a working paper that she asked her staff to do when she was considering floating the idea of a carbon tax as part of a campaign platform. It never happened, but they did the working paper. The analysis they did suggested that a $42 per ton carbon tax would cost low income households $495 a year in extra costs of goods and services, and rich households $3,000 a year. Now, that's regressive, because that $495 is a bigger fraction of those low income households' incomes than the $3,000 is for the rich households. So, in absolute terms, sure, rich people pay more, but in relative terms, richer people are paying a smaller fraction of their income, so this picture is a picture of the regressivity of the carbon tax.

The first problem with that analysis is that it ignores what happens to the revenues. If, instead of just flushing the revenues down the toilet, or giving it all to Bill Gates, we returned it all to the rate payers or the homeowners, or just lump sum returned it to every family, every family in America would get a $1500 check. Low income families would pay an extra $500 in taxes, get $1500 in the mail, and come out a $1,000 ahead. The richest families in America would get $3,000 in taxes, get a $1500 check, and come out $1500 behind. This is a progressive policy that transfers income from rich households to poor households. So, we can design a carbon tax to be as progressive or as regressive as you want. Let the politicians figure that out. Implement the carbon tax, if it's the most cost effective thing to do.

The second reason to rebut the concern about a carbon tax being regressive is that it turns out that the thing we're doing instead of the carbon tax, energy efficiency standards, is more regressive than a carbon tax. A carbon tax raises the cost of fuel and electricity. An energy efficiency standard raises the cost of the appliances and cars

people drive. Both raise the cost. They raise the cost in different ways. The question is, which one is better or worse for low-income families relative to high-income families? I wrote a new paper, coming out next year, that says an energy efficiency standard is more regressive, in both theory and evidence. Here's a piece of the evidence. I can't do this for air conditioners, or lightbulbs, or home appliances, but I can do it for automobiles. Consider an energy efficiency standard for automobiles, and compare it to a carbon tax. It's a 29 cent gas tax, something like a $30 a ton carbon tax. That would cost the average low-income household in America $72 a year in extra fuel costs, and the average rich household in America an extra $287 a year in extra fuel costs. If we compare that to an energy efficiency standard that raises the cost of the vehicles that those households drive, it would cost the average low-income household $92 a year in extra vehicle costs, and the extra-rich household $260 in vehicle costs. So, whatever we do with the revenues that make these policies progressive or regressive, the carbon tax is less regressive than the energy efficiency standard.

So, my bottom line on this whole dialogue is that energy efficiency standards are less cost effective than a carbon tax, as measured by the dollars per ton of carbon saved, not comparing it to other sources of energy services. And energy efficiency standards more regressive, or less progressive, depending on what we do the revenues, then a carbon tax. So, why aren't we doing a carbon tax instead? I think a picture is worth a thousand words, and here's the picture [a news photo of yellow vest protesters and something on fire in front of the Arc de Triomphe]. I'll end on that. [LAUGHTER]

Moderator: Great. Thank you. Yes, those are those yellow vests we were reading about in Paris these days. Fascinating. Clarifying questions?

Clarifying question 1: Are any of you aware of what actually happens to RGGI revenues when they're returned to the states, and the proportion that actually go into programs, like the efficiency programs, for example, and the proportion that goes into the general fund? Basically, I think you're going in that direction. Politicians have a hard time keeping their hands off a several billion dollar flow of income into the states. So, that's where you're going right? You're commenting on politicians and political will?

Speaker 3: No. You maybe think I'm smarter than I am. [LAUGHTER] I want to divorce the two questions and say, what's the most effective policy tool? We could design that. We could have a separate political dialogue that's above my pay grade about what to do with the revenues. And we could give it all to school lunch programs. We could build aircraft carriers. That's not the environmental energy question. The environmental energy question is, how do we reduce carbon emissions at the least cost?

Comment: I just want to say there is an excellent analysis by Acadia, they do it regularly, and also one by Analysis Group of the revenues from RGGI. They do overwhelmingly go to energy efficiency. There has been much poaching over the years. You are absolutely correct, and that is a serious issue, but if you look, overall, over the 10 years, it has overwhelmingly…and the poaching has tapered. But the data's there. So, I recommend it.

Clarifying question 2: So, your theme is that the data doesn't bear out the effectiveness of many of these energy efficiency programs. And is it that the data shows otherwise, or that we don't have good data? I'm wondering if smart meters and more granular consumer-side data would provide a broader picture here. So, is it a lack of data that we have, or is it that the data, at least in your mind, clearly shows that these programs are less effective than other ones we could design?

Speaker 3: That's a good question. It's a conceptually difficult question, because, to me, "savings" involves asking the question, what would energy use be in the absence of these

policies? So, the charts that Speaker 1 put up, and the chart that I showed from the California Energy Commission, count the savings. Those charts forecast energy use with the program, and they forecast energy use without the program, and they show the gap between the two. My picture uses actual energy on one side and the forecast on the other. And so, I have data on one, and I'm forecasting the other. So, smart meters and all that stuff isn't going to help us forecast the other. It's just a conceptually difficult question. I don't think there are many studies that have done it. The utilities have all the data they need. So, there are two things we want to know. We know one, which is, how much energy is actually being used by places that have these programs? What we don't know, and it's hard to ask, and it's hard to figure out how to ask, is, how much would have been used had we not had those programs? So, it's not a data question, it's a conceptual question. Long answer, sorry.

Clarifying question 3: Thank you. There's a Canadian clarification to this French example. [LAUGHTER] And it's this. In Canada, the country's at war over carbon tax, because the Prime Minister has declared, "You will have one whether you like it or not," and four Premiers say, "No." And the Prime Minister says, "Well, I'm going to tax you, but I'm going to give you the money back." The problem is that you're reminded of the cost every time you fill up, and you only remember the payback when you get it once a year.

Comment: I actually wanted to defend the carbon tax idea, because I think you undermine your argument with the picture, where France didn't try to do what Canada did. They didn't offer the $1500, and I think the yellow vests are complaining that you're just putting another tax on top of all the other taxes and saying it's carbon, and it's just the window dressing you have for adding another tax. If they try to do what you suggest, it might have a different political feasibility. We see that all the time in the electricity market. We can't have scarcity pricing, because it's politically infeasible, and then we pay more on our average bills because of capacity, and other kinds of things. So, it's a pet peeve of mine. So, I thought you were on the right track before the picture, although it's a great picture. [LAUGHTER]

Speaker 3: So, the last thing an economist would advocate is giving the money back. We're raising money to build our aircraft carriers and public schools, and we're doing that with distortionary taxes that cause a dead weight loss. And so, what we should do instead is raise money from the carbon tax and lower taxes on those other goods and services. And I think that giving the money back, like in Canada, is a recognition of the political objective. Getting people to buy in.

Clarifying question 4: The revenue recycling literature is long and very immature in this area, whether it's with a carbon tax or other cap and trade programs, or whether you're auctioning allowances in that kind of scheme. So, I think that's something to keep in mind. This is not a new idea. I mean, this idea is at least 30 years old. But I'll leave you with this: the reason it hasn't happened, and I quote Mark Russel, is, "If it looks like a duck, and it walks like a duck, and it quacks like a duck, it's a tax." [LAUGHTER]

Speaker 4.
I'm not an economist. And I'm not trying to take a policy position. I just want to give you examples of where energy efficiency, traditionally, has worked.

First of all, to kind of give you a background in efficiency programs that we developed in my company, obviously, these had been developed during the timeframe when significant future load growth that was expected. And then energy efficiency programs were displacing future capital needs. Second, it was assumed that these programs would have equal penetration across various classes, so that everybody benefits, so everybody pays for the programs. The third thing is that it's assumed that these programs pass

through the same rigorous evaluation that traditional utility investments pass through. So, those are kind of the fundamental principles.

In our examples, there are states where this has not occurred. There's a confluence of events that has led to this. For two states, particularly, Kentucky and West Virginia, where you saw in Speaker 1's, ACEEE graph that they were kind of the 49th and 50th in the efficacy space, I just want to paint a picture of why that is the case. First of all, if you look at utility investments, particularly in Kentucky and West Virginia, sixty or seventy percent of the cost of utility investments are fixed costs. The remaining costs, which is 30 percent, or 35 percent, are variable in nature. Those are predominantly the fuel costs and the marginal costs that they incur. On the revenue side, when the utility collects these revenues, only 20 percent of the revenues are either collected through a direct fixed customer charge, or through a demand charge that has been imposed on the customers. The remaining amount is all collected on a volumetric basis. And that's kind of an important figure. The same patterns for West Virginia also apply. So, you have a huge amount of cost that the utility incurs that's fixed in nature. Collection of these costs is automatic. So, the implicit assumption is that the high usage customers are the high income customers. Energy efficiency reduces automatic usage. If the pricing is not right, at the end of the day, either you go back and increase cost through various rate cases, or the different about of costs that customers are paying will vary across the spectrum.

Secondly, you're talking about two states that have significantly suffered in the economic downturn, post 2008. Between West Virginia and Kentucky, Kentucky's probably much more stark. They suffered 20 to 25 percent load loss over the last five years. Dramatic movement, in terms of load losses. A lot of it is what is called the Eastern Kentucky load. It's not the Lexingtons and Louisvilles. It's predominantly the Ashlands, the Pikevilles, the Hazards of Kentucky. And most of the load was coal mining. That obviously had a significant impact. A similar impact on West Virginia. Not that dramatic, but on a similar scale, which is 14 percent load loss for West Virginia. That, combined with the average income of the customer…the average income of the Kentucky customer that we serve is around $30,000 a year. So, think about what it is like if your utility rates have gone up, because of load loss, 25 percent, because, at the end of the day, utilities still have to cover their investments. So, we go and file for rate cases, not because of any capital investments, just purely because the denominators just went down. And then, on top of that, you have a customer base that has a difficult time paying their bills, because the average income is $30,000 in Kentucky, and around $36,000 in West Virginia, whereas the national average is around $47,000. Even within our state, the average income of Western Kentucky is around $37,000, whereas Eastern Kentucky's average income is $30,000.

The last part of this trifecta is that (I don't know if you've been to West Virginia or Kentucky, but flatland is at a premium) most of the customers live in mountainous terrain, where the predominant heating source for these customers is also electric. So, if you look at, for example, Kentucky, 62 percent of the customers that we serve are also electric heating customers. So, low income customers have not only suffered the impact of loss of load, but they also are high usage customers, and they typically use 40 percent more electricity than a non-heating customer. So, for example, as this table kind of shows, your Kentucky heating customer uses 1400 kilowatt hours a month, whereas a non-heating customer is around 1,000 kilowatt hours a month. So, if you look at an average bill of 11 cents per kilowatt hour for Kentucky, a non-heating customer pays around $115 a month, whereas a heating customers pays around $163 a month, because of the way we charge fixed charges, right? Because most of the costs to serve are collected on a volumetric basis. And given that the average income is $30,000, the heating

customer effectively pays around seven percent of their disposal income on electric usage. So, think about you and I paying seven percent of our incomes for electricity (even though it's displacing, you can argue, a couple of bills—the natural gas bill and the electric bill). And the reason why electric is the primary source of heating is because all other competing sources, like the propane or natural gas, are not possible, because of the mountainous terrain. There is no gas LDC (local distribution company) in those places.

Moving on to look at the programs that we have, obviously, before this, we did have a pretty robust program for the number of customers that we had in Kentucky. We spent close to $5 million on energy efficiency in Kentucky for around 150,000 customers. And the low income spending was disproportional, and it was a small amount, similarly to West Virginia. So, needless to say, that the confluence of these factors led to a significant bill impact. Energy efficiency program costs contributed close to $10 to $11 per month to the average bill. And if I was a low income customer who also happened to be an electric heating customer, then, A, I did not participate in energy efficiency programs, because none of the programs were affordable to me--for example, appliance rebate programs--or because I can't change my heating load through getting a more efficient boiler, because electric heaters are electric heaters. So, what happened is that the nonparticipants in this case felt as if they were significantly subsidizing the participating customers. So, the Commission opened an investigation, and looked at the cost of the energy efficiency program and came to the conclusion that a substantial portion of the customers are unable to participate in these programs. And, effectively, the Kentucky Commission discontinued all the residential energy efficiency programs, except for the low income program. And that's a pretty stark example of when the efficiency programs that we ran at some point did reach a tipping point, for things beyond their control, and that obviously had an impact on the Commission's decision, in terms of what to do with the programs.

The second point I have to make is about the different standards of economic evaluation. And I'll give an example. The amount of review that a utility investment goes through is, in our opinion, significantly different from the review as we go through the stakeholder process as we file for energy efficiency programs. In West Virginia, we filed a CPCN (Certificate of Public Convenience or Necessity) application for a couple of the wind facilities, because, in our opinion, they were economical. And, needless to say, these are wind facilities that we were pursuing because of the expectation of tax credits in the federal landscape. And the Commission, for good reason, made a decision that all the forecasts of energy prices that we had, the forecasts of capacity prices that we had, and the fact that tax reform happened, made a significant dent in the benefits of these programs and said, "No, your forecasts are incorrect in terms of energy prices, capacity prices, and, in fact, the load forecast." And in their opinion the wind projects were marginal at best, and they denied the CPCN. I can't recollect, at least in the energy efficiency filings that we made, a time when the stakeholders have challenged similar forecasts and the rigor of these analyses, because it's a benign thing. Everybody saves, but at the end of the day, in our opinion, the standard that these programs are held to is a lot different from the standards that the utility investments go through, especially in the renewables space, because those are purely done from an economic basis. They're not done from a reliability or a capacity basis. And those programs do have in our opinion, a different kind of threshold to pass through.

So, what we do see is that we haven't taken into consideration the cost impact for non-participants, especially given the dramatic change that we've seen in certain parts of places like Kentucky and West Virginia. Also, you need to consider the impact on low-income customers. The traditional assumptions that apply to high-

income customers or high-usage customers might or might not be relevant in all cases. So, make your judgment based on the particular facts in that case, in that state. And the third one is most important. Consider the timing of costs and benefits, not just NPV, because, at the end of the day, these customers want immediate return, and that's significantly more important than telling them, "Yeah, over the life of 20 years you'll be fine," if, in the short term, you'd end up where the customers, especially the low-income customers, can't even afford it. So, the timing of the benefits is also important, not just the fact that you will drive benefit to over the long term.

General Discussion.

Question 1: Thank you. I'm going to challenge Speaker 2 on a few points, and I guess I'd like to start by saying that I strongly support what the NRDC has been doing, even though I am at odds with a few of things that Speaker 2 said.

First of all, I would observe (and this was really timely, because there is a front page story in the *New York Times* this morning) that carbon emissions, worldwide, are up 2.7 percent in 2018. And I would say, despite a modest success in generation in the US, where coal generation is down 40 percent in the last decade, overall, worldwide, coal generation is up, due largely to generation additions by China, India, and Russia. We obviously have no control over what they do, and that's a challenge, and that's been sort of an issue in terms of constraining the growth of solid fuel fired fossil generation in the US.

I would say (and this is consistent with another comment that was made) that the cost effectiveness of energy efficiency is really measured in the very same way as the cost effectiveness of the major renewables--solar, wind, hydro. That is, you make the investment upfront, and that there's very little, or no, cost going forward, but the value of that renewable generation that is invested in or made up front is a function of the alternative generation that it offsets over time, whether its gas fired, oil fired, nuclear, coal, et cetera. So, in effect, it's a bet upfront that capital investment in energy efficiency is going to be repaid to the customers and the utilities that have made that investment.

And I would just note that, Speaker 2, you used the term "utilities" generally in your comments, and utilities, as you all know, are very, very different in terms of their structure across the country. Some of them have generation, some of them don't have generation. All of them have transmission, and virtually all of them have distribution. But the generation part of it…well, in some cases the utilities are responsible for those costs in some way or another. They're not making the investment in generation in many, many jurisdictions across the country.

You also made a comment which I would appreciate kind of some further elaboration on, because it's an important perspective, and that was about electrification for the US. And I thought you said, and I may have been mistaken, but I thought you said that that was a responsibility of the utilities, or part of the mandate of the utilities. And I guess I would assert that that's a customer-driven mandate, in terms of the customer's desire to have electricity to power, at a minimum, the devices that we now love and hate, like smart phones and iPads and all of that good stuff.

The decoupling issue, in my mind, is, again, no different than the regulation of cost and expenses for any other investment that's made by a utility which has responsibility for making those investments. Over time, those investments may or may not be cost effective. They might not be cost effective in the short run, and they may be cost effective in the long run, but in any event, the benefits that are achieved by that investment are capped, or, in the case of a bad investment, are reflected in the financial status of the utility that's making that investment. And those things, in my experience anyway, do get revisited from rate case to rate case, where regulators do, in fact, look back at what happened in the last major investment that was made by the jurisdictional

entity that is able to reflect that investment. And the investment, I think, is generally measured by the effects of the investment, and the investing entity is not rewarded by the amount of money invested. That's an old argument that gets revisited from time to time about rate base maximization. But I think, in large degree, that's gone away, where the investing entity is rewarded by its results, as opposed to being rewarded by the amount of capital that's invested. Yeah, they do get a return on the amount that's invested, but that return is measured by the effectiveness of the current investment and the past investments that have been made, and if you disagree with that, that's a conversation that I would welcome having.

And then, I guess, finally I just comment generally that the whole process of determining what investments get made, how they get made, whether they're in generation or in the conservation of use, et cetera, is virtually always a political process, and it would be really nice to be able to take that out of the equation, but I don't, frankly, think that's ever going to happen. So, I'll stop there.

Moderator: I think we also had questions about the direction towards electrification, the effectiveness of decoupling, and the politicization of how we make those decisions.

Respondent 1: I don't think I disagree with anything that you said, so maybe I'm just speaking too quickly. I am from New York. I'll take your hook on China and promote my colleague Barbara Finamore's new book, *Will China Save the Planet?* It's number one on Amazon policy books. And it's very interesting, because China is doing what you said. They're still building coal plants, but they're also ahead of us on a lot of clean energy things. There are some advantages to having dictatorships, although I don't want them here. (We're already getting there.)

One thing I'll follow up on is the decoupling piece, because I agree that the rate making decisions still have to be made based on all the reasons and all the considerations that we have traditionally used, and decoupling doesn't change that. But I think there's a misconception about decoupling that it just makes everything automatic, and you never go back and look at those things again, which is not the case. So, I think we're in agreement on that.

Politicization, yes, it's a challenge. But on the electrification thing, it's not that utilities should be dictating the electrification of the world, it's that they are a huge player in these things where they weren't before, like transportation. Are the utilities going to become our transportation fuel providers? And what do we want the role to be, and what are they well suited to do, to integrate the rise of vehicle electrification into our system, and beneficial electrification, we call it, in buildings, if you're going to start electrifying heat with higher efficiency heat pumps, not the traditional electrification of homes which has had negative consequences over the years, as you alluded to? So, I think that's a whole meaty question that I'm not answering. I'm just saying it's right at our doorstep. We've got to grapple with that.

Respondent 2: With respect to decoupling, especially in the Kentucky and West Virginia examples, decoupling would have made the utility immune, because, at the end of the day, every time you go for a rate case you get the revenues back, if you have such a massive load loss. You're saying, my fixed cost are these, and my denominator's gone down. So, my rates have to go up. So, between rate cases, decoupling helps you. What it does not solve is the fixed variable cost mismatch that I showed you. If you don't fix that, all decoupling does is you've made the problem worse, sooner, as opposed to having a situation where, between rate cases, the impact on the customer is mitigated, and you go for the next rate case, and you get that back.

So, decoupling is a necessary step, in terms of making sure the volatility…both upside and downside…in certain parts of the country, like Texas, where we have a significant amount of load increase, then the utility doesn't participate on the upside under decoupling. And, similarly, in the Kentucky and West Virginia examples, where there's a significant load loss, the utility is really not hurt, because, at the end of the day, these are regulated entities, so you give them a fair rate of return, and you keep the utility immune to all these upside and downsides. However, the rate design needs to be fixed first. Until that happens, you still have the mismatch, as in our example, in which the low income customers also happen to be high usage customers. In that case, decoupling just makes it worse, between the rate cases.

Respondent 3: To the questioner, on the question about rate base maximization incentives, if I understand your point correctly, it was that utilities have all sorts of reasons to try to optimize all different aspects of their behavior, and getting paid for how much rate base you have is just one piece of the puzzle. I would agree, with the caveat that, absent an incentive to increase rate base, a utility has incentives to try to do all the same things its doing otherwise anyway, right? Trying to do its back office as efficiently as possible, and contain costs in all different ways between rate cases, so that it can pocket the difference. On the margins, we see in practice, when we sit down and try to negotiate with and regulate utilities in a decoupled context, increases in sales don't drive things. But, "Well, you know, if we can just put a 10 MVA transformer in here instead of a 7 MVA in the substation, that will give us these extra reliability benefits somewhere downstream." Well, it also happens to put an extra $50,000 or $500,000 into rate base. "If we can just own this asset, instead of contracting for it…" you see on the margins, bit by bit, drip, drip, drip, just like you see all the other kinds of incentives the utilities have on the margins. So, just being very careful about what each of those incentives are, and recognizing what they are…They may or may not be the dominant thing, but if you have a set of objectives, and you can align incentives to line up with those objectives, then all the better.

Respondent 4: I agree with the comment about decoupling and rate design. That's right on. And I guess I'd also like to empathize with what Respondent 1 said about transportation. If you look at the numbers behind the increase in carbon emissions worldwide, it would seem like most of that increase is coming from increased transportation and use of gas and oil in the transportation sector. So, it seems to me, the faster we incorporate electric vehicles into the transportation mix, the better it's going to be for everybody.

Question 2: So, the paradigm that we talk about routinely in this country is, what policy should we follow to squeeze a little bit more carbon out of our energy mix? I'm wondering if that isn't just the wrong way to look at things. The United States is about 15 percent of the total carbon dioxide emissions worldwide now. China and India together are 40. We're projected already to go down to 10 percent of the total by 2030, 2040, something like that. And China and India are projected to go up to over 50 percent. So, we're sitting here, and the electricity sector, which we're all talking about in this room, is about 30 percent of the US total. So, five percent of the total amount of carbon being emitted worldwide is from our electricity sector. And we have massive debates in this country, as if we're solving climate change, over whether we can squeeze a little bit more down. If you look at the Paris numbers, 25 to 30 percent reductions for the US in total by 2035, that would take our five percent down to four percent, and truly just a fraction of that, because it's coming down anyway. And so, I think, debates about energy efficiency, for example, and whether that squeezes a little bit of carbon down, is in the noise, and is not going to affect the outcome of whether or not we're under water in this room in 50 years.

So, I think that whole debate is kind of wrongheaded. And I think the right thing for us to be talking about is that American technology is likely to be the solution. And, rather than focusing on policies like energy efficiency, I think Bill Gates has it right. The one thing we ought to be focusing on is making sure that we are deploying our resources to maximize advances in technology as quickly as possible, and getting those commercialized, because it's those new energy technologies which are actually going to be the solution to the problem. And we ought to stop focusing on whether or not California's doing a little bit better job than Massachusetts, or something like that. There may be other good reasons for energy efficiency, of course, if it lowers cost. But I'm wondering if we ought to really be realistic about how little our reductions affect the outcome, particularly when they are by orders of magnitude overwhelmed by the increases anticipated in China and India in the next 20 years (who've gotten a pass under the Paris Treaty, by the way). And I'm wondering whether we ought to just be having a very focused debate about how we invest in new technology. That's my comment, and I wonder what people think of that.

Respondent 1: I guess my response is, why are we in an either/or, rather than a both/and situation? Say someone develops their breakthrough new technology. Where is it going to get deployed first? It can be deployed first in the country where it was developed. So that means having an active market to deploy those new technologies in the United States. The growth in LED lightbulbs, for example, that's an R&D win. But it's also a commercialization win. And the guaranteed early market for people who were going to develop LED lightbulbs was utility energy efficiency programs. So, the policies that we have are themselves driving, and are getting us down those learning curves which are an incredibly important aspect of R&D being able to win. You could invent it in the lab, and the first item is $10 million dollars, and the second item is a million dollars, and by the time you're at the nth unit, the mythical nth unit, you're down to a dollar a widget. That's the same kind of a learning curve we've come down with solar, and the same kind of learning curve we've come down with lightbulbs. So, there are R&D wins, and there are commercialization and deployment and scaling wins, and the US should be playing along that entire wide spectrum to develop those technologies so that they can be deployed here and around the world.

And, by the way, we get to win from selling them, and we get to win from the fact that they're cost effective at scale here. So, it doesn't seem to me that there is an either/or between a deployment argument and an R&D argument. The point is that all of the above need to matter.

At the moral level, one percent of global emissions is bigger than the total emissions from a number of developing countries. So, the United States may have a moral obligation to do its part, to not sit back and say, "Well, it's somebody else that's making the problem worse now." That's a whole separate political and moral argument. But, just from a pure economic self-interest argument, deploying those technologies here, along the way, allows us to benefit, as well as proving those technologies out, so that we can sell them to India, China and Africa, et cetera.

Questioner: And the efficiency fits into that how?

Respondent 1: When we talk about deploying energy efficiency we're talking about control systems, we're talking about HVAC, we're talking about new refrigerants, we're talking about lighting. Those are all technological. The fraction of our energy efficiency savings in the country coming from the behavioral change or conservation is very small, compared with the fraction of efficiency gains that we're getting because of technological improvement and replacing older technology with newer technology. So, the efficiency story is as much an R&D win as it is a policy one.

Respondent 2: Well, and I can see just by your facial expression that efficiency seems like just a tiny little nothing. We're talking about coal plants, hundreds and hundreds of coal plants in China. But efficiency is a bigger slice of the pie than renewables. You know, we used to be over one percent demand growth every year, and growth was definitely never projected to stop, because it goes with economic development. The divergence of economic growth and energy consumption growth was a revelation in this country that demonstrated that those things are not coupled, and there's a huge amount of shared learning in China and India with the US that's about commercialization policy, not just technology. All of those things are part of why that happened. So, I just want to push back on this sort of dismissiveness that efficiency is just like a piddly little thing. How many lightbulbs can you possibly change? It's bigger than the nuclear fleet. The entire nuclear fleet can be replaced by energy efficiency, because every single building, every home, every office, every factory reducing energy 30 to 50 percent…we'll talk about the numbers later. That's the lowest cost option, and we're not doing it because of all different kinds of market barriers. I don't know if you spend time in China. Just think about all the buildings that they're building, and the place is littered with cranes because there's gazillions of buildings. Are those going to be the typical building that they would build, or is it going to be using 10 percent of the energy that a crappy building from 20 years ago is going --

Questioner: They're going to be the typical buildings that they build, because they're taking a trillion people out of poverty. And they may say they care about this, but I don't believe them. And I don't blame them. And that's why I think that what we're doing here is getting overwhelmed by what's going on over there.

Respondent 2: I don't disagree with you that what they're doing really matters. But, to me, the question is, how does what we're doing matter? If you think about the leadership states that are doing more on clean energy than other states, they're not martyrs. They're not doing it because they care about climate more than the next guy. They're doing it for a whole suite of economic and public health and other benefit reasons, and that's why we should be doing it too.

Respondent 3: The problem is, if you take carbon out of the equation, then you're effectively doing these investments purely as pilot projects, or for R&D. Then the timing does become an issue. That effectively you're saying, "I'm doing certain things that are inefficient for the short term, but efficient over the long term." Certain customers might not appreciate the timing issue. Customers whose medium income is $30,000 don't want R&D benefits at this point. Yes, there are certain customers who are ready to take the long-term view of it, but that view is not shared across everybody, and that becomes an issue, in terms of who pays for it.

Question 3: It seems like with energy efficiency we do forecasting to see what are going to be the impacts of certain energy efficiency programs. And then, we compare that with actual electricity savings, either utility-wide or state-wide. And it seems to me that we don't have the same data available for analysis on building energy efficiency and electricity use that we do for, let's say, generation. I mean, the data exists. The utilities have it, but it's not necessarily in a form that researchers can use to do the proper analysis. So, we may have this total system data, but if we focus on whether certain customers or certain customer classes are harmed or helped by certain energy efficiency programs, don't we need to be able to analyze household data in a more sophisticated way, and measure changes once energy efficiency technologies are implemented on a household basis? So, am I right that that's a problem with where we are right now, and how do we fix it?

Respondent 1: Let me say one thing about that. Energy efficiency, by definition, would be output per unit of input. Miles per gallon is the measure

of energy efficiency for a car. Cooling per kilowatt hour of electricity is a unit of energy efficiency for an air conditioner. For a building energy code, we don't have a unit of output. So, how efficient is your house? Well what's the unit? I know how much energy you put it, but how much do you get out of it? And so, it's just a conceptually more difficult question. I'm going to answer it the same way I answered your prior clarifying question. It's conceptually challenging.

Respondent 2: I think that's right, but we can do benchmarking. It's complicated. It's not going to be perfect, but we could have better information, and we're starting to get it. So, there's a program called City Energy Project. Now we have American Cities Climate Challenge. And one of the cornerstone things is benchmarking, and getting that data and figuring out how to use it so people can see the opportunities. And, yes, every building is different, but there's a lot that's the same about big, Class A office space in any city in the country. So, that's an easy segment to tackle, and it's huge in terms of the potential savings. Getting that data and using it, we are building the capability to do that. But I want to separate that kind of end result data, or mega data, from the data around efficiency programs or standards and what they're delivering. I mean, Speaker 3 gave us data about crappy programs. We can analyze programs and show that they perform well or poorly. So, he pulled out two that performed poorly, and we can pull out dozens that perform well. So, we know how to analyze programs, and I think we're going to have a little debate about how best to do that.

But that is data. Can it be better? Yes. Should we improve it? But it's not like that data doesn't exist, therefore we should throw up our hands and do nothing. We know how to do programs. We've improved them over time. That's all done based on data about that performance, and so that is a tool that's there for people to use.

Respondent 1: I'll elaborate on that last point. I agree, there's a mismatch between the academics and the practitioners. Leading states, in particular, and people working in regional collaboratives and such, do what's called an EM&V. Evaluation, measurement and verification. And a good program will spend five percent of its energy efficiency money on making sure it's getting what it's buying. And that means planning out carefully, over years, doing studies of, OK, so this program ran, and we're going to go back, and we're going to sub meter, and we're going to figure out, does this implementation actually deliver what it said it was going to? Are we getting more widgets per unit of input in an industrial process? Is that weather-normalized? Is the heating and cooling system in this building delivering using less energy than it was three years ago, before they got their new system put in?

In the program implementation stage, it's called a "realization rate." You do the program. You model what you think it was going to get, and then you measure it and you say, "Ah. Well, we actually got 105 percent of what we thought we would get," or, "Oh, we only got 67 percent of what we were going to get." We go back, we adjust our models. We use those realization rates when a utility has to, for example, save two percent a year. Well, that's based on some baseline. It's based on some forward-going modeling, but its calibrated back to all of this literature of evaluation, measurement, and verification, measuring the impacts of actual programs. There are companies that look at the data.

There are others who are taking on sort of EM&E 2.0. The next round of, like, "OK, so we know that on this date, that building got a new air conditioner." We can look in that building itself and look at the smart meter data the week before or the week after. We can get that granular real world data, rather than having to go out and install a sub meter, and actually statistically sample, and all the rest. There is a lot of data out there, and a lot of analyses are done, and a lot of calculations are made, and there are databases,

and all the things around calculating what all these measures are worth and sharing best practices amongst states. That world exists. So, if we need to do a better job of making sure that that is well known to the people who want to study that, then that's a separate communication challenge.

Respondent 3: I think you can measure the effectiveness of the program on a whole. But what you can't measure is why certain participants enter into the program. I can give you examples of industrial customers that initially were excited about energy efficiency, but now don't like energy efficiency because, "I've done it. I don't want to pay for anybody else." So, you have some of that going on, too.

So, you can see that the program is working for various reasons, but you don't know why participants enter into the program. Was it for cost reasons? And you cannot analyze that. Because you lose the behavior pattern that tells you one way or the other, because we have multiple examples of industrial customers and commercial customers that said they were excited when the program launched, but, once they were done they said, "I'm good. And I don't want to pay for anybody else."

Question 4: Speaker 2 was focusing a lot on describing some of the issues regarding decoupling, which of course is something directed at utilities to reduce their opposition to energy efficiency programs, but which does almost nothing for customers. Speaker 4, on the other hand was focused on what the price signals are to customers, and how disconnected they are from the revenue stream, and also disconnected from the kinds of signals you would send to customers to be more precise about what they might be able to do if they wanted to be more efficient.

So, I wondered, maybe between the two of you, with decoupling, are we really going after the objective, or are we just trying to remove utility opposition by relieving utilities of other risks besides simply the risk of losing revenue because of energy efficiency programs? And then go juxtapose that with what Speaker 4 was postulating, that if we had the prices right we wouldn't have to worry about a lot of these other things. (I may have overstated Speaker 4's position.)

Respondent 1: I think we agree, at least I agree, that decoupling just gets rid of the disincentive. It doesn't tell you what you're rewarded for, and doesn't tie your financial health or your profitability to anything. It just takes away the disincentive. So, what should it be tied to? And how do you tie it to the customer concerns that Speaker 4 was talking about, like that you've got to scale up your low-income energy efficiency programs, but it's not structured in a way that you will deliver those savings to those customers and you'll overcome the participant issue because it's not going to cost them anything, or the cost is *de minimis* because the benefits to the system are so great. So, you need to address those issues through energy efficiency, and maybe through other things that are helping those customers, that have nothing to do with energy efficiency, but just because, if load is dropping out and you still have to pay for the system, maybe you don't have the right kind of a system for the customer base that you have anymore, but, meanwhile, you have to pay for the system. This is the same issue of the "death spiral" of solar. If all the rich customers go off the system, and now they're self-generating, and all the poor customers have to pay for the system, that doesn't work.

So, how are we going to address that? Saying, "Well, we shouldn't have solar? We shouldn't do energy efficiency because it creates this problem?" That is not the answer. The answer is, how do we fix that problem directly, in the smartest way that gets the benefits to the low-income customers as quickly as possible and have interim protections while you're scaling up that best solution? That could just be direct assistance to those customers.

Respondent 2: The only thing I'll say is, when we go through the process of filing for efficiency programs and doing rate cases asking for increasing the fixed cost, the same stakeholders that come and said, "Great" for energy efficiency say "No" to fixed costs. It's a pretty high number.

But that's the whole point. Without doing the latter, you're not helping the former. And I don't know what the rationale is for the opposition to increasing fixed cost is, but I think, for certain instances, it absolutely makes sense, because then you're not sending the price signal for the customer, and you're not incentivizing the reduction of volumetric usage that the energy efficiency program is trying to achieve.

On the other hand, when the fact pattern actually shows that it's actually hurting low-income customers, you've got to embrace that. And so, just to assert that raising fixed costs is bad, without being clear about what underlying assumptions you made in order to get to that conclusion...on a state by state level, in certain states, it actually hurts low-income customers and that's what we recently observed, and it takes a long conversation to change that mindset, because that's exactly what's everybody's been told, "Don't raise fixed costs." However, on the gas side, everybody's perfectly OK with it, where I pay $25 a month for my gas LDC, even if I don't use a single molecule of gas from the LDC. So, I don't know why suddenly the paradigm changed from the gas side to the electric side, as far as fighting fixed costs.

Questioner: Because the percentage of fixed cost is different between gas and electric.

Respondent 2: I understand. But that should change over time. But let's go on to a hypothetical world. Say you want to be more in the renewable space and in the solar space. You just made the fixed costs even worse. Because that generation has high fixed costs with a low variable cost. So, if you fight utilities collecting fixed costs, you effectively are fighting the new sources of generation, at some point, too.

Respondent 1: We want you to get your fixed cost, but that doesn't have to mean that customers have to have a larger portion of their bill be fixed cost and lose the price signal benefit that we also want.

Respondent 2: I don't know how that works.

Respondent 1: Well, I'm sure we can figure that out. [LAUGHTER]…time of use rated, minimum bills…there are ways to address this, so let's work on those.

Question 5: Pedantic observation about regulatory accounting followed by something else. [LAUGHTER] To Speaker 1's observations, you've got all of these costs that are front loaded associated with energy efficiency spending in order to deliver lifetime benefits. Usually, in that scenario, you would expect that, as the benefits are being delivered, the customers are paying for it by capitalizing the asset. Nothing in the big book of regulatory accounting prohibits that treatment. It would certainly, from a utility perspective, level the playing field between energy efficiency and other supply resources, and so I've never really understood why, if we're really serious about treating this as an alternative source of "supply," why we wouldn't expect it to be treated the same in those non-restructured, vertically-integrated marketplaces that invest in it?

And then, second, it seems to me sometimes that even as we've talked more and more about the need for flexible sources of supply, given the amount of zero marginal cost energy we're going to have in some of these systems, that the energy efficiency conversation hasn't exactly caught up to it. Because a lot of its profile seems to still be fundamentally non-dispatchable and being produced in a kind of lump baseload kind of a way. And I just wonder how energy efficiency can be brought into a world where it's actually

more responsive to price signals, either systemically, or where we expect more people for their own private profit motivations to be investing in it? It doesn't contribute to answering the question about low income customers who don't have the capital available, or who have an internal higher cost of capital than a borrower like a utility. But it seems to me, alluding to the moderator's opening comment about getting the prices right, that, fundamentally, all of these energy efficiency programs are still stuck in these sort of long-run regulatory guesses about avoided costs, as opposed to being genuinely responsive to actual systemic prices.

Respondent 1: The capitalization of energy efficiency programs does also provide the benefit that it takes advantage of cheaper cost of capital of the utility as opposed to the average cost of capital of the customer. So, you do have that initial advantage of, if you do capitalize, effectively you're not asking the rate payer for funding immediately; you're asking the utility to fund it over time. That does provide additional benefit.

Respondent 2: That capitalization piece is interesting. The question of what would be an appropriate discount rate for the customers to compare it to is an interesting one. If you look at your average cost of capital for a household, on a sort of long-term basis, for investment, you've got to put mortgage rates, you've got to put other things, in there. Average household cost of capital may actually be lower than utilities' cost of capital. And so, you'd want to think about that carefully. Obviously, it varies a lot by customer. Folks who have basically no access to capital at all…how do you define a cost of capital for somebody who simply cannot borrow?

Time variability is definitely something that folks in the efficiency world are starting to look at. The focus of programs more on delivering on-peak, rather than just delivering pure energy savings, is, I think, growing. And in states where the load shape is changing in some way, like California, they are thinking about delivering resources that are particularly designed to assist with the afternoon ramp. The conversation is getting going. Some aspects of the energy system will be sort of ready for the future faster than others. But I think a lot of people see where that's going.

Respondent 1: The only thing I'd add to the mortgage rate concept is that those are not apples to apples comparisons. Mortgage rates are for loans backed by the federal government. So, you got to unpeel that…

Question 6: I really appreciated the conversation. The whole concept of "energy efficiency," to me, is probably the wrong term for us to be focusing on. If the goal is to reduce emissions, maybe we should be talking in terms of "emissions efficiency," or something, because as the grid, for example, in the Northeast and California, gets cleaner, you approach zero carbon electricity. The value of energy efficiency will also approach zero, in that case. So, if we focus on the goal being carbon reduction, we might end up ranking all the alternatives very differently.

So, to Speaker 3's point, earlier, I think we should be looking at the next best alternative use of capital. And if energy efficiency isn't the one, we should be deploying it towards other uses. I'll give you a Massachusetts example, because we talked about it a few times. For the average household on MassSave, the spending's something like $4500. That's a lot of money. There would be alternative uses for that capital to be deployed to get significantly greater carbon reductions within those alternative uses.

So, in the really big picture, if we define the objective to be emissions reductions, I think we'll end up deploying capital differently, and we'll end up debating what is the best alternative use of those capitals. So, that's really point number one. The second point is about, how do you measure these outcomes? We're indeed looking at AMI meter data across a lot of places across the country. I'm trying to compare the deemed

savings numbers in the energy efficiency programs and what we see in the meter data. We increasingly have difficulty seeing the savings in the meter data that reflect the savings that are in the program goals.

Speaking to the regulatory reality, also, program evaluations sometimes take years. You can look at the meter data and within months see that a program is not working. But those programs continue for years. So, we have really inefficient allocation of capital, because of the deemed savings. There's sort of a mythology of energy efficiency that has taken hold, rather than really data-driven, evidence-based analysis of the outcomes, where it's frequent and quick and thorough. So, we're in agreement that we should be using data, but I would advocate that we need to be using the data far more aggressively, in far shorter timelines, and then act. Because we see these programs that are running for years, with no real evidence from the meter data that they actually produce energy efficiency results. They still continue being funded.

There's an interesting comparison related to some of the discussion today about data availability. There are actually comparison pools that we can ask, where we have entities with policies and entities without policies in those neighborhoods. So, again in Massachusetts, there are a lot of municipal utilities that don't have energy efficiency programs, and then there are investor-owned utilities, and we made an interesting observation. They've all had very similar energy use reductions over time. So, there are some policy experiments that can be done, and outcomes that can be measured, and when we look at the meter data, it's really been eye opening to us. We're not saying that energy efficiency shouldn't be done, we're saying, rank order, and then choose the best alternatives and go forward.

Respondent 1: On the emissions point, we still want least-cost energy services, with or without carbon. So, let's still look at efficiency as a cost savings measure, and then it still has to pass the cost effectiveness test and show results. If you also do emissions efficiency, I agree with you that that's a great thing to do. I don't agree with the conclusion, and part of the reason is because of what's happening in reality. I mean, RGGI is on track for 65 percent reductions in carbon emissions at $5 a ton. Why is that? It's because they're investing in energy efficiency. So, that's what the modeling showed. That's why they did it. That's what the data shows. This program has been going on for 10 years. Are there lots of other things going on, in terms of gas prices and everything else? Yes, of course. But we have done analysis of that. And it still shows that efficiency, and the signal of the cap, is driving. It's focusing the mind on what to invest in, in a way that other things haven't. So, let's do the analysis, but we do have analysis and real-world experience that shows, even if your standard is emissions efficiency, you're still going to go crazy on efficiency.

Respondent 2: I think I agree with the questioner in terms of looking at all our energy consumption, and trying to see how that reduction happens. But there are a lot of laws in various states that prohibit us from doing fuel conversions as part of energy efficiency programs. And that is an issue, because if you can't provide programs, whether it's called energy efficiency, or any program the utility wants to do to reduce overall energy consumption, because you've been prohibited from initiating programs that effectively act as fuel conversions, then, effectively, you're hamstrung, and you're kind of looking at this in piecemeal manner, as opposed to this holistic manner that you'd prefer.

Respondent 3: This comes back to the point I made earlier about how programs exist to serve some policy purpose. If the policy purpose is emissions reduction, your programs and cost effectiveness tests and whether you're allowed to do fuel conversions, all sorts of things will be different. The rules will be different, depending on what your policy objectives are.

So, we study electrification, heat pump conversions, and you can get a lot of emissions reductions from that. And broadening the conception of energy efficiency, broadening your policy objectives to be able to encompass that, can make a lot of sense, if that's your policy objective.

On the data point, yes. More data, faster. If you spend half your funding of the efficiency programs measuring the results of the efficiency programs, then there's the issue that your cost effectiveness got hit by a factor of two. You do have to be careful about that. But with better data, with big data, with other things, you can get a lot more analysis quicker, faster, and for less money. That all seems well and good.

I do think it will be critical to be able to get the data on the gas side. Particularly in the Northeast, weatherization, or whatever, are going to show up on people's gas bills, not on their electric bills. And you're going to see the impacts of a new heating system and a weatherization job, yes or no, a lot faster than you're going to see "I got a lightbulb," on your overall electric bill. So, getting access to, and working off, the gas data, and not just the electric data, would be essential in that context.

Respondent 4: Let me make one argument against data. [LAUGHTER] It's not against data, but it's against the argument that we need more data. I think that what we need is clever uses of the data we have to figure out the counter factual world in which we hadn't deployed energy efficiency yet. And the one that the previous questioner mentioned, let's compare neighboring households, one in a jurisdiction that had an energy efficiency program investment, and one that didn't, that's a clever use of the data that we have.

Question 7: I think this is an interesting panel. I just wanted to say one thing about the subject that came up about the incentive of regulated public utilities to expand rate base. And I think there still remain tremendous incentives, as a general matter, to do that. I don't think anything's fundamentally changed, as far as that general proposition goes. And if you listen to any of the earnings calls with analysts that the utilities have, the amount that they can say they plan add to rate base in future years is a huge applause line. And that wouldn't be the case if those incentives didn't exist. And I think there's also sort of a corollary problem to that, probably contributing to that, which is that authorized returns are much greater than the real cost of equity for utilities these days, when typically it's nine or 10 percent, and Wall Street is targeting a seven percent long-term return from the broader market. But that's a subject for another day.

Speaker 4, your slide about Virginia's wind projects was interesting, and I think we could update that with the decision of the Virginia commission earlier this year to authorize two offshore wind projects that will be rate based and are going to cost Virginia consumers an estimated $780 a megawatt hour. And we can't blame the Commission for that, because they said that actually the devil and the General Assembly made them do it. But it's a sad consequence of a rush to utilize some resources that are extremely inefficient, when we should be utilizing efficient renewable resources to the greatest extent possible.

On energy efficiency, I think it's extremely important. LED lighting produces twice the electricity generation reduction in this country as does all rooftop solar, and it gets very little attention. But I am concerned about whether we really have good data about many of the energy efficiency programs, and I must say, I would be interested in the panel discussing a specific study that was done, two of the three professors involved in it are at Berkeley, respected people in the field. Fowlie and Wolfram, and they did, over a long term, this study of a weatherization assistance program, focusing on Michigan and 30,000 potential customers. As I understand the

study, they found that, as an empirical matter, the program was not cost effective, and that the cost was twice the savings. The major problem was that the model was projecting savings that were more than three times the actual savings, and that the program had a negative rate of return, even if you factored in social benefits from reduced emissions reductions. And I must say, I was shocked, absolutely shocked, when I read that study, and I'm hoping that folks on the panel would discuss the study.

Respondent 1: I know the paper well. They used Department of Energy Recovery Act spending to incentivize homeowners in Michigan to retrofit/ weatherize their homes. This goes back to my point about the counterfactual. I know somebody did something to improve the energy efficiency of their home. What I don't know is the counter factual--what they would had done in the absence of that program. And we can't just compare people who retrofit to people who don't. Because those are fundamentally different people, and people who retrofit might be retrofitting because they expect to use a lot of energy, or because they're naturally conservers. And so that's not a fair comparison. And so, what these guys did was, they sent out a bunch of invitations to people to participate in the program randomly. And they compared the people who were randomly incentivized to participate in the program to people who didn't get that incentive. That's their sort of randomized experiment study. So, it's not organic data. It's a controlled, randomized experiment. And then they had auditors go in, and the auditors would point around the house and say, "Oh, if you would do this, and that, and the other to your house, you will save this amount of energy." And so, on a house by house basis they could then compare what the auditors said to, the next year, how much energy that household used. And the claim is that actual house savings were only 30 percent of what the auditor said the house would save. I don't know what else you want to know about the program. The startling thing about that program was that they had these people come around, and they said, "If you participate in the program, we will give you thousands of dollars of help. We'll come in, we'll help you fill out the forms…" I think they spent $1,000 per household on incentivizing them to participate in the program. And the uptake was still five percent.

Respondent 2: A couple of things. One is, the Virginia project that we talked about was not getting close to the offshore wind. It was onshore wind from Ohio and West Virginia that was more like $48 a megawatt hour. So, I don't want to be tainted by the other project you're talking about.

Second, I think there is a disproportional amount of interest in generation investments, renewable and non-renewable, by stakeholders, and a focus on the assumptions of power price forecasts and gas price forecasts that effectively justify the value of these investments. And we've seen this multiple places. In Oklahoma or Texas, where they don't care about carbon prices, you take the data, and you're absolute low gas forecast, and they cut it by half and do whatever they want, but that's some of the rigor that traditional utility scale generation goes through. I can't recollect the same rigor going to energy efficiency programs, which effectively use the same fundamental forecast. That tells you the discrepancy of the process that justifies the economic value of some of the energy efficiency projects, versus the utility scale projects. Because there's a bias. For right or wrong reasons.

Respondent 3: If we capitalized the energy efficiency investments, so people were skeptical about the utility making money on those investments, the same way they're skeptical about the utility making money on other investments, maybe…

Respondent 2: Maybe that's the solution.

Respondent 3: On the Michigan weatherization study, it's been a while since I've read it and the various critiques. But I think it's important to realize that this is a low-income weatherization

program. It's the weatherization assistance program out of USDOE. I think the first approximation is, none of these folks were going to have the capital to do anything, absent the program. But in places with high-functioning weatherization programs, and cold weather, I was surprised on the uptake piece of that. I have to go back and look, because I know, in Vermont, we had a many-year waiting list for people waiting to get support from the weatherization program to come work in their homes.

I think the important thing on that low-income front, though, is to recognize all of the other benefits that come along with a better building shell that are not captured and quantified in dollar value in that study. A tighter building shell has few rats. A tighter building shell is simply more comfortable. There are health benefits. There are indoor air quality benefits. There's mold and mildew remediation. There are all sorts of other things. There's asbestos remediation that comes from dealing with low-income housing stock. And trying to take all of the spending that goes on improving a building shell, and trying to justify it only based on energy savings…I think you're missing the whole picture. This question of how do you find cost effectiveness if it's on a pure energy basis alone, that's one thing, and if you get to count all the other benefits that come along for the families that live in these houses, you may come to quite a different conclusion.

Question 8: I'd like to weigh in on a couple of the conversations that have already taken place and push the panel to provide a little bit more detail on one of them. I'll start by agreeing that we do efficiency for a lot more than just carbon reduction. Our focus (I represent cooperatives) is on the consumers. Saving them money. Because of that, I'm also going to disagree with some of the comments about rate making. If we can buy energy efficiency improvements for consumers for less than a nickel, why are we paying them more than a dime, through rate design, to maybe incent them to do those energy efficiency projects? Wouldn't it be better to have a better rate design, and then focus on paying the right price for energy efficiency? So, that's piece number one.

Second, I'd like the panel to talk more about the answer to the question about multiple goals. We've got several different goals in mind. One is efficiency. One is electrification. And one is getting people to use energy at better times. So, I want people to use more energy during the belly of the duck, if I'm in an area that has a lot of solar energy. I want people to be using more energy at night, if I'm in a place that has too much wind. Some of the programs that are supporting energy efficiency are really looking at, how much power is the utility selling? That seems to undermine both electrification and efforts to get people to use energy at the right time, including more energy at some times. So, that question is, how do we do a better job of designing energy efficiency programs to be able to pursue these other goals as well?

Respondent 1: I think we are agreeing with that. There are not tons of great examples of where everyone's already doing it perfectly, but when you think, what is the utility of the future and how do you want to integrate when you want people to charge their car? Are they going to have heat problems? Is storage getting cheaper? How do you want to fold all of these things in? You might make decisions where you would chose something that's higher energy consuming because you can use it at the right time, rather than something that's lower energy consuming that doesn't have that flexibility. So, when you have that as a criteria that you want your programs to deliver, then you might make different choices. I don't think they're going to be wildly different, because there are other tools that can help with flexibility. Energy efficiency doesn't have to do everything for you. But we need to start folding that into the objective criteria, whoever is delivering efficiency, and whether they're doing it through standards or programs, or a non-wire alternative investment, and we need to then evaluate their performance

against those things. So, I think there's agreement on that, but not a lot of meat of really what's it going to look like, beyond the dream of what it will look like.

Maybe I don't understand your 10 cent cost on the rate design point, because, for me, the rate design is like, you have fixed costs, you have to recover them. How do you do that in the smartest way? You've got to pay for those fixed costs at some point. That's different than the idea that we also want to make sure you have every opportunity to be as efficient as you can, and it's the utilities', or somebody's, job to help you do that, with the programmatic intervention to help overcome market barriers and all that other kind of stuff.

Questioner: Respondent 1, let me ask you to be a little bit more specific there, because the issue that was between you and Speaker 4 there was about, why are we loading fixed costs into the variable rate? You said that it's an incentive to do more energy efficiency. But it's not an efficient incentive. It's like --

Respondent 1: Oh, yeah, yeah, yeah. I got you. Yeah, yeah. To me, that is not the driver of energy efficiency. It's just like, let's not have perverse incentives. So, we should get rid of perverse incentives. He still has to recover his fixed cost. They were approved, right? So, can we do better than that? And let's roll up our sleeves and figure out time of use rates, minimum bills.... Is there some other answer that doesn't have a perverse incentive? Let's just work on that. And there's not one answer. I think that's something that people are still grappling with. The interest in not having perverse incentives, in that specific example of it, is not the biggest driver of energy efficiency investments. So, I totally agree. If we had to lose on one thing, I'll lose on that thing.

Respondent 2: One of the previous questioners mentioned that on the gas side, the fixed cost is much smaller than the variable portion, and the spend on the LDC feeding the gas pipeline process is fixed. But you take the same extrapolation thing, "Hey, I should be at least getting my distribution investment through fixed cost," and you see the fixed cost that we recover on a traditional bill. You're talking $8 a month. And distribution costs, probably $30, $35 a month. So, you're not even making up the distribution costs, let alone everything else on top of that. So, there's a huge discrepancy between the fixed cost that we get today and our actual fixed costs. And, in our opinion, until you solve that piece, even if you can institute time of use rates and everybody actively participates in time off use rates, then, effectively you haven't achieved anything but transferring that portion of fixed cost. Because the ones who participated moved their fixed cost to somebody else. And everybody participates in the time of use rates, and everybody gets allocated a fixed cost anyway. So, you got to fix that thing, and then a time of use rate is clearly another way of addressing the variable cost issue. But it still doesn't address how you recover your fixed cost in a more efficient manner.

Question 9: There was a lot of conversation on the regressivity of different instruments to address twin energy and environmental goals. A big thing that's happening is that we're seeing an increase in out-of-market interventions, both in the restructured areas, of course, with bailouts and new entry, but also a lot more legislative determinations of what's in the public interest in regulated areas. I can tell you, from a manufacturer's perspective, we're getting hammered by a lot of these. And I'd be curious, from the low-income perspective, what's the regressivity of some of these instruments? Because this has got to be an expensive way to decarbonize. So, I'd be curious. Question A on that.

And then, part B, Speaker 4 mentioned how industrial perspectives on energy efficiency have changed. And when industrials are being compensated to do something that they were otherwise going to do, they love it. But when they

realize that they're paying more in other parts of their bill to subsidize their competitors, they hate it. Which takes me back to sort of the iron laws of regulation, where we say that when you intervene in this manner, you're distorting competitive relationships within and between industries. And so, we're seeing this going forward, kind of playing out very differently. I wonder, when we're talking about the counterfactual, at least of these energy efficiency programs, how the counterfactual is accounting for the fact that sophisticated consumers, the folks that had energy managers, are anticipating what these programs are going to be, and they're strategically altering their behavior in anticipation of these programs? That should be feeding back at the counterfactual list. So, your thoughts on either question would be great. Thanks.

Respondent 1: It's all public policy. There's not a pure market. This is a heavily regulated market, and the status quo is not some pure thing that doesn't have its thumb on the scale, for historical public policy reasons. So, just unpacking, why do we have the regulation that we have, and what is it driving us to do? And I think there's a big difference between propping up uneconomic mature technologies that can't win in the marketplace anymore…(Not that there's no reason to do that, because its real jobs, real tax base, things that people care about for a reason. We just had a huge negotiation over this in New Jersey on the nuclear issue, and there, it was a negotiated deal with a lot of different interests, not just the utilities' shareholders, that were involved in that.) Versus, on the other side you're trying to commercialize technologies so that they can become more competitive, more quickly, and in the long run that's going to make economic sense. There might be disproportionate impacts, and we have to account for that, but that's a different public policy reason to make that happen.

But are those all public policy things that are changing the economics of something other than the pure economics of just the cost of delivering a service? Yes. But I don't think that pure thing really exists. So, then you just have a transparent public policy debate.

On the industrial customers, we hear this all the time, "We're economically efficient actors. You don't need to make us do a program, because we're sophisticated," and then you see, actually, industrial energy efficiency programs customized, or a mandate to do it yourself. You want to do it yourself? Fine. You take your own money and do it yourself, but you must show efficiency savings. Oh, suddenly there is a huge amount of energy efficiency savings, and I think the real thing is more what Speaker 4 was saying, "Oh, now I did it, so I'm done, and I don't want to contribute to other people, because I'm just looking at my own economic situation, versus the system benefits." That is a real issue, and it's very different with different players. I would say there is cost effective energy efficiency on the table in the industrial sector, despite the rational-ness of those economic actors.

Question 10: Thank you. So, this is kind of to the topic of energy efficiency and this discussion about whether it has to shift. I feel like I still haven't really heard that answer directly. Does energy efficiency have to switch over to energy adaptability? I mean, coming from the California, that concept of the duck curve is very true, and the Public Utilities Commission in California is currently discussing this concept of load shift. But I don't feel that it's just because the Western Coast side has a little more renewables coming into play, or that that has to be the only area that has to kind of look at this energy efficiency and change that conversation. So, really, is that something that we should be seeing a shift in, or are some areas just going to continue just trying to figure out how to save costs and energy?

Respondent 1: Maybe I'll just elaborate further. I think this is another one of those "Yes, and" answers. Thank goodness. There's a lot of the not particularly time-targeted energy efficiency that

is still very cost effective. I do think that expanding and thinking more carefully about the roles of efficiency programs and how they're interrelated in with other sort of broader DER programs or grid operations, or what have you… I mentioned the states that have third party energy efficiency implementers are maybe not as well served by that transition forward, because they don't have the control room in the same building as them, so thinking about the time value of energy savings has to get mediated through policy makers and regulators before it gets back to the program implementer. And so, some places are going to adapt to that better, faster than others.

There's a question, should we reward an efficiency program deployment of smart appliances, for example. They may be more efficient, but they also have some sort of grid responsive chip in them, whatever. You're trying to deploy that technology more out there, to get a critical mass, so that it can be used by the utility. So, it's sort of figuring out what utility efficiency programs fundamentally are. They're trying to get technologies deployed out into homes and buildings and industrial facilities and what have you. And if there are particular control systems and a particular way of getting smarter technologies versus less smart ones out into those homes…smart thermostats and other things can be a larger portion of programs. Then you're developing that resource to be, not just a pure energy resource, but a flexible capacity resource.

Session Two.
Cyber Security and Electricity Markets: Risk-Based Security Design and Oversight

Cyber security is an important challenge and a major area of policy interest. There is little or nothing that has been identified as requiring changes in electricity market design due to the demands of cyber security. But it is self-evident that the design and operation of electricity markets have important implications for cyber security standards, implementation, and oversight. The call for risk-based strategies points to the need for knowledge about electricity operations and markets. Part of this is a design question; a related challenge is to provide the required oversight of implementation when the weakest link defines the strength of the system. All of this is complicated by the need for security; transparency is not the answer, and oversight will be required. Who should provide the analysis and oversight? Existing market monitors have the market expertise and confidential access. Alternatively, new organizations could be created to provide the ongoing analysis and monitoring capability. What are the costs and benefits of different institutional designs? What might be the unintended consequences? How can we protect the market while allowing for the dynamic innovation required in market evolution?

Speaker 1.

I thought I would try to help set the stage. Just to give credit, I've been spending quite a bit of time talking to David Patton of Potomac Economics. It's a complicated scheduling story, but he's not able to be here today. But this panel arose from the earlier discussion we had in a prior meeting, where we were talking about issues related to cybersecurity and the electricity system. And everybody recognizes, certainly I share the view, that this is a very important problem. It's something that we all are concerned about and attentive to. And it needs serious attention, and we're going to have to deal with it, and the expense, and all that stuff. So, I just take all of that as given in the background, and not a subject of dispute.

The prior conversation that we had was motivated (as you recall, for those of you who were there) by a slightly different perspective on the problem. We accepted cybersecurity as important, but the question we were asking was, is there something about electricity markets that is fundamental that would be different because of the cybersecurity problem? Is there a feedback effect, such that, because of the anticipated problems associated with dealing with cyber security, we should do something fundamental to change the structure of electricity markets, and how they work, and the timing, and all the other things that actually happen? And (although the Harvard Electricity Policy Group never speaks and never comes to conclusions on purpose, because we don't want to force that constraint on these discussions, and we're trying to stretch the boundaries, not to look for some internal common denominator) at least I came away from that discussion with the view that the answer to that first question was no. Basically, cyber security's really important, but it doesn't have any implications for how we design the markets and operate those markets, at least that we could see at that time. And then there was a lot of other discussion that took place with the group, and what we learned in that discussion is that people in the Harvard Electricity Policy Group are really interested in cyber security. Everybody had wanted to learn more about it. We had a lot of expertise from Homeland Security people and such who were here.

The way I think about what we're doing here is that we're trying to look more than six months and less than two years over the horizon. If you have to make a policy decision before six months, it's too late for this group to have much impact. And if it's something that's going to be so far down the road that it's more than two years over the horizon, the people in this room can't focus on it. The other thing we're always trying to do is to push the envelope in helping formulate the questions, as well as the answers if we have them, but actually I think questions are more important, so, getting at what is the issue and what are we trying to think about.

And so, with that in mind, I was talking to various people at the Federal Energy Regulatory

Commission and other places, and I was asking about a problem which I mentioned as a kind of joke last time, but it's a serious point, which is, when you think about what's actually happening with cybersecurity, everything important about this problem, I shouldn't know. So, there's a secrecy element to it. I hope people are doing a really good job. I assume they're doing a really good job, and I hope they're not telling me what is actually going on, because I shouldn't know. Because we don't want the bad guys to get that information, so they can go against us.

And that raised the question, what is the mechanism for having oversight and feedback and knowing what's actually going on and making sure the things are happening in the way that you want them to happen? And what's obvious from that slightly humorous, but serious, point is that transparency is not the solution here. That is the way we do a lot of other stuff, but that's not going to be the solution here. So, we need something else, and I was asking around about who's providing the oversight to this process. We need somebody to be providing that oversight. So, that seems to be important. Maybe people will disagree, but that's my premise. And then, secondly, because of what I said before, whoever's providing that oversight is going to have to be inside the security tent. They're going to have to be somebody who's on the inside and seeing what's going on. It's not going to be me, it's going to be somebody who's actually there and actually has access to confidential information and real-time information about what's actually going on. Further, motivated by the discussion from the Homeland Security people about risk-based security assessments, such that you focus on the things that are really important and you know how the pieces work, that entity is going to have to be somebody who is really intimately familiar with how these electricity markets operate. And one of the things we know from our discussions and from our own experience is that that's a smaller set than you might suspect.

So, in my conversations with people, particularly some of the market monitors, I said, "So, what's actually happening in terms of providing assistance and oversight into what's going on?" Without naming names, I will say that the answer I got back was that the outside people who are coming in…basically, my interpretation was that they're consultants, and they think we're a bank, and they think about it like a bank, and the information protection of the bank, and so on. And we're not a bank. We're doing something completely different, and as near as I could get from this, the oversight role wasn't actually being provided.

Now, who could it be who could provide oversight? And how would we get there? One candidate would be NERC, the North American Electric Reliability Council. They're very busy writing standards and doing all that kind of thing, which is an important part of the process, but it's much slower, much longer-term. It's not supposed to be a fast reaction and making sure things are identified when they're really problems and that we can respond quickly.

You can imagine that this role would fall to the Federal Energy Regulatory Commission and that would be their responsibility, and that's not an inconceivable answer, and we would create that capability there, but it certainly isn't there now. They don't have that kind of real-time response capability. The closest would be the FERC Office of Enforcement, dealing with market manipulation, and that is very much a forensic operation. They're looking at data from five years ago, and four years ago, and three years ago, and at how did people behave, but they're not looking at what happened 10 milliseconds ago, or something like that. I'm just overstating the case a little bit.

There's a third candidate, which is the market monitors that we have, at least in the organized markets. You can imagine that they would have this responsibility. And I asked them, "Do you have this responsibility?" And the answer was no. I said, "Is anybody doing this?" And the answer

was no. "And should it be you?" The answer was, "We haven't thought about that." And so I said, "OK, we've got to start pushing this forward."

So, that's how we got to where we are today. We should be thinking about this. When we wrote the question and the description and we asked the speakers to come, I tried as best I could to make this an open ended question, without knowing the answer, because I don't know the answer, but I do think the challenge is there.

Now, we do have people who are working on this problem in PJM. It's not like there's nobody doing anything. There's lots of things that are going on. But what I'm worried about here is, for all the people who interact with PJM, who's overseeing what they're doing and how that goes, and the information that's flowing, and who is worrying about the problems that are like the "weakest link" problems? Problems where the whole system could collapse because one part isn't actually doing this risk-based cyber security, where the risks are defined by people who actually understand how the markets and the physical systems work, and not by some sort of abstract principles that would also apply to banks, and where it's responding in a timeframe where we could either help prevent or respond quickly to and recover from various kinds of troubles and attacks.

If I'm wrong about this, and there's already somebody doing this oversight role who's inside the tents, and they're doing a really good job, and fortunately they haven't told me, then that would be good news, I suppose. But I suspect that this is actually a much more complicated problem. And so, I was hoping we would be able to talk about that today. And, by the standards of the Harvard Electricity Policy Group, where we have open-ended discussions about questions where we don't know the answer, and we're trying to push the envelope, this is right within that kind of a model. And I'm here to listen and learn, and I hope we can learn something from people who actually know something about this. Thank you.

Speaker 2.

I lead the IT cybersecurity division at an RTO. And cybersecurity is a critically important issue to us. We are responsible for making sure that 65 million customers have power, and we look at cybersecurity as core to our mission.

I'm probably going to say a couple of things throughout this that may be different than what Speaker 1 was going through. I want this to be a provocative type of conversation, and I really want it to be something such that we have good questions and answers afterwards. If I could leave you with one thing, it's that we do have this awesome responsibility to maintain power for all of our customers.

I want to set the context relatively quickly. The scope of this is huge. It's highly distributed, and it's very complicated. The solution lies in collaboration, coordination and communication. I'm probably going to push the envelope of transparency a little bit differently. At the end of the day, I think the thing that you'll hear me say is that these best practices and these standards, they need to be harmonized across multiple sectors, not just electric utilities. There are huge interdependencies that we have at PJM with the gas industry, with telecommunications, and you're only as good as your cross-sector partners.

There's a lot of risk facing the power grid right now. Some risks, like severe storms and geomagnetic disturbances, we've been dealing with ever since electric power was something that we had to manage. And severe storms, we're pretty good at dealing with them. If you look at the way that the utility industry has responded to all these events over the years, and particularly recently, it's something to be really proud of. Geomagnetic disturbances are solar flares. That's something that has been around for a long time. We have operating procedures around how you deal with those, and we're pretty good at it.

When you look at the rest of the list of risks, not so much. There's a lot of work going on to try and understand the impact of EMP (electromagnetic pulses). EPRI is doing a lot of studies on EMP. It's important to understand that an EMP event wouldn't just impact electricity. I think a lot of people think that, but, if there's damage to equipment, what does it do to telecom? What does it do to other things?

Something that's really, really important is that we have this huge dependency, related to our interdependent infrastructures, something I've talked about already.

The world is changed around risks like physical and cyber-attacks. These are intentional events that adversaries are looking to do that never happened in the past.

One of the big things that we all deal with is this notion of insider threat. Who do you give access to your property? Who do you give access to your systems, and what can they do to harm you? Very significant.

And then, finally, supply chain risks, and I'll talk about that in a couple seconds.

When you look at the cybersecurity framework (and this isn't unique to our RTO, and it's not unique to the electric industry, it is just a cybersecurity framework that makes sense for everybody, regardless of what sector you're in), it really starts with, how do you protect your assets? When you look at things like NERC's CIP (Critical Infrastructure Protection) controls, probably 60 percent of the controls are built around that. But the world that we live in now is changing. We need to be sure that we can see the adversaries coming into our environments, that we can respond to the adversaries, and, ultimately, if we are compromised, that we can recover. So, when we look at this notion of cyber security, it isn't just compliance. It's really an operating principle. We need to make sure that we can keep the lights on.

This next slide is a conceptual slide. It tells an interesting story. If you look at the purple line, what that's showing is, over time, what the adversaries are doing and how--what their capabilities are and what their intent is. And what we're seeing is significantly increased attacks on supply chains. In 2017, supply chain attacks increased by 200 percent. OK? And then, when you look at what we are doing about it as an industry, we're doing work to improve upon it, but we're not moving as fast as the adversaries are.

The thing I want to talk about there, and I want to kind of challenge the notion of transparency somewhat, is that we live in a world where people say, "This is secret. We can't be transparent. We can't tell you where the vulnerabilities are." I would argue, and this is my personal perspective, that when you look at things like critical substations, the adversaries know what our critical substations are. So, we can argue that we can't talk about that, but the people that can do something about it, whether it be the federal government, the state government, the utilities, the independent infrastructure owners…we need to come together on that, and we can't hide behind the fact that we can't share this information. We've got to find a way to share it. I'm not saying that we put it out on CNN, but I'm saying that we have to have a way to do it more effectively, because we've talked about the issue for ten years, but we haven't moved fast enough. And I think that's a really key thing to talk about.

The other thing that I would say is that I think everybody in the chain of cybersecurity needs to be responsive to controls. It's not just the ISO, or just the utility. It's the market monitor. It's the Federal Energy Regulatory Commission. Anybody that is maintaining data and information, they have to have good cybersecurity hygiene, good cybersecurity controls, and it's not just the utility organizations.

Now, I'd like to just spend a little bit of time to kind of prepare the conversation that I hope we can have in a few minutes. Looking at potential market oversight options, the first possibility is just to do nothing, to continue down the path that we're on right now, and let different entities make their own decisions on the market side in terms of what they need to do, and we just keep on our merry way. The second option would be to establish new third party oversight. I think Speaker 1 framed that. Another option is a FERC mandate for NERC CIP standards, with industry-led audits through Reliability Coordinators. Next option, self-policing, which similar to doing nothing, because that's kind of what happens now, but utilizing a consistent framework, like the one that I spoke to before. And the last option would be to seriously consider independent SOC2 and/or ISO 27000 standards, and that's where you're really looking at a cybersecurity set of controls and frameworks that an independent auditor audits you against.

Let me go back to transparency. I'm not suggesting that, when you do that kind of audit, you reveal all of your vulnerabilities. But what I am suggesting is that you would reveal how you're doing. And this doesn't not only apply to the utilities. Think about the vendors for a moment. In my world, I deal with a lot of the operational technology vendors that build our control systems. And none of them have any SOC2 compliance. We've asked them to consider it, but they don't. So, they're --

Question: Can you explain what that is?

Speaker 2: Oh yeah, I'm sorry. SOC2 is, essentially, a statement of compliance. One of the things that we do at my RTO is we do what we call a SOC1 audit, which is really an audit against your financial statements, which gives our membership some degree of comfort that we have the right controls around our financial statements. SOC2 is focused more on cybersecurity, and it essentially has a set of cybersecurity standards, and those kinds of things.

How do we think differently? I think some of this is probably further out, but how can we unleash market forces to stimulate innovation? What is the role of cloud computing? Think about cloud providers. People are afraid of the cloud, in some cases. I don't want to put my important stuff out in the cloud, but if an organization like an Amazon Web Services, or a Microsoft is spending a billion dollars or more a year in security controls, maybe they can do it better at some point. Do we need to think about that?

You've heard a lot about blockchain. But blockchain is just a way of securing transactions. Could we look at a market design that incorporated, maybe not blockchain, but blockchain-like activities?

How do we have market-driven behavior to influence vendors? I would like them to think of cybersecurity as a differentiator--how they could use cybersecurity and a way for us to select them, and it's something that we're certainly pushing.

I had mentioned earlier this notion of best practices and standards, and that they need to be harmonized. The one thing that I can tell you for sure is that if you're working across multiple standards, multiple frameworks, it's really, really difficult. And I think the key is, how do we as an industry, how do we as market operators, how do we as cross sector utilities come together and harmonize those best practices and standards? Because at the end of the day, we're all doing the same thing. And those security controls are the same across every sector. Now there's the argument, "Well, we control breakers." Yes, we do. But you've still got to stop people from getting in. You still need to manage it. And I look at that, I look at financial transactions, I look at water companies. I look at gas companies, and we all need to be doing the same thing.

I already talked a little bit about moving towards transparency and continuous improvement. I want to be careful with the transparency. I'm not

suggesting that we essentially pour out all of our crown jewels and let the adversaries see them. But I also think that the adversaries already know a lot of them. So, we've got to be more transparent in terms of how do we improve. And if we don't provide a mechanism for that, then we won't improve.

Utilizing common security requirements. A lot of people go out to vendors for building control systems. And they're all going out there with a different set of security requirements. Why? Isn't there a standard set of security requirements that vendors should be building to that builds security into their systems?

Probably a little more on the provocative side is the question, what's the role of crowd sourcing? Today, a lot of the information sharing that we get, it's kind of hub and spoke. What I mean by that is, the federal government has all types of information that they're gathering. Most of our communication, at least at the RTO, comes in from the ISAC, which is the Information Sharing and Analysis Center. And why wait? If I'm seeing a problem, how can I do a better job of sharing that? Again, it touches that issue of transparency. I think we can do a better job of information sharing, particularly around threats. Adversaries are in our systems for up to 200 days, generally, before we know it. So, if you know it, why not let your neighbors know it, so they can start to work on it? How can we use crowd sourcing in that kind of thing?

And finally, kind of to think differently, accountability and design must be directed to whomever has the greatest ability to manage those risks. And that's where I think we need to be pulling vendors in. We need to be pulling cross sector--telecommunication providers, the gas industry, and everybody, and I think that's something that is a weakness at the moment.

A couple considerations. Is market design for cybersecurity any different for pure reliability functions, or any other cross sector entity like finance, telecom, water, natural gas? I say no, it's not. Should all entities in the data chain of custody follow the same cybersecurity requirements and hygiene? ISOs and RTOs? Utilities? FERC? Market participants? Market monitors? I say the answer to that is yes.

I want to come back to the point I made earlier, where I said we need to recognize that the scope of cybersecurity best practices is huge, it is highly distributed, and does not fall into a single regulatory domain. I think we need to think centrally, but we've got to recognize that you have to act in a distributed manner.

Lack of a common view with information sharing is inefficient. Also, among cautions and unintended consequences, there are legal and regulatory constraints. I'll give you just a quick example of that. If you're aware, or I'm aware, or the government is aware of a vulnerability in the supply chain, there are legal reasons that they can't tell us that. So, we go on our merry way, continuing to use something that may be vulnerable, and we've got to find a way to break that down. And that's real. I could give you real examples. Maybe I can't give you real examples. [LAUGHTER] Some of that's in classified space. Certainly the key point there is that not everybody has to have a clearance for classified information, but how do you make sure that you can at least get them the information, so that they can act upon what the adversaries and the bad guys are actually doing?

My final slide is about consistency and coordination. I do think we need to eliminate the tendency to build another wheel. I think we've got plenty of wheels out there. We just need to pull them together. I talked about common requirements and best practices. I actually do believe that the answer really does lie in a similar path to the one that we currently use with Standards of Compliance 1 audits and incorporating SOC2, which is Standards of Compliance 2. Usually, the big five come in and the audit you against those standards. And you

should be in a position where you can share the results of your audit. And it really drives the right thing.

I want to emphasize that I don't think operators or participants or monitors will be successful if we're trying to operate under a multi-regulatory environment. We're operating under NERC's CIP controls for a lot of our systems. If another entity came in on the market side and said, "OK, we're going to use market monitors, or somebody else," and then we've got two people telling us how to execute security controls, that's problematic.

Let me close. I don't know if any of you recognize this picture and I'll probably butcher the name of it. Can anyone with a good French background help me out here? But this is a fort. Fort Boyard. And it was built to protect the west coast of France. They wanted to extend the range of cannons, so they built this fort. By the time they were done building the fort, the range on cannons was significantly greater and it was not needed. So, my message to us all is, let's not build a monument that we look back at and say, we didn't do something about it. Let's be proactive, and let's incrementally get better and better and better every day. Thank you.

Speaker 3.
Thank you. I'm going to do my best to give you a little bit of perspective from the public sector standpoint. I know each state government is different, and sometimes that's challenging, from a regulatory perspective. Without some consistency, it can be extremely challenging for those who are trying to stay in compliance with the standards and the requirements that are out there.

I want to start with a little bit of point of clarification. Not everyone working for public service commissions has much interest in learning anything about cyber security. And so, I've stopped trying to target those who have focused on different priorities. But those who do have an interest spend a lot of time constantly trying to stay up to speed on what's being put in front of them and how it relates to the utilities and the protection of the resources that they're trying to protect. A key component of that is groups like NARUC's Critical Infrastructure Committee. My team and my staff get on basically weekly calls with other commissions to discuss issues that come up and try to stay informed so that, if or when something occurs, the Commission as a whole is educated and up to speed on the potential threats that may come before us.

From a regulatory standpoint, "cybersecurity" is used sort of in a broad way. The term is used in a lot of different areas, but I see a big difference among data breach statutes that are out there for different states. Florida has one that I think creates some standards and sets a floor for some procedures that touch a little bit on what Speaker 2 was saying, in that there is some information that can be known. It's not essentially all something that can't be out there. Now, are those pieces of information potentially going to be used against you from a security perspective? Yeah, that's a reality of the field that we're working in. But I think the bigger component that's relevant to this discussion is the structure of the grid and potential for disruption to the grid. And so, when you talk about standards and application of information that relates to utilities, I think the data breach component is somewhat addressed, depending on what state you're in, by state statutes, and for the most part it doesn't treat utilities differently. They're treated as any other business that would be required to comply with the requirements that are set out in statue.

Now on the other component of the disruption of the grid, I can give you a brief little example. I guess a day in the life of a public service commissioner. So, as I'm interested in this area, I decide that it would make a lot of sense to have a conversation with one of the utilities about what they're doing and how they're addressing this issue, because I think it's extremely important. And so I mention that to our legal office, and five

weeks later, I get approval to sit down with the utility company to have a conversation about what they're doing. In Florida, we have probably the most open state government out there, as far as public records and public meetings. To have that discussion, we included the Office of Public Counsel, which is the consumer advocate, to be able to discuss some of the specific components. And a big component of that is the *ex parte* issues. From our perspective, if anything is sitting on the docket related to this issue, it does limit, to a certain extent, our ability to have conversations about what's going on. It does require us to really work with our chief advisors and our staff to allow them to constantly be communicating with the interested parties on these issues, so that they're up to speed, and they know, potentially, what might come in front of us.

And then, I think, the latter part of that is the response component. There's a lot of discussion as to what can be done upfront to prevent these types of attacks. And then, afterwards, if the analysis of what's been done makes sense, how that applies to the rate base, or potentially applies to the market adjustments for what has occurred, once something has happened. To a large extent, a lot of what the commissions do is a little bit backward-looking, to make a determination as to what was relevant or, more importantly, what was prudent in their decisions. And so I think, for commissioners, it becomes extremely challenging when you have a subject matter that is limited as it relates to transparency, but you still want to make an educated and comprehensive decision on how that relates to what's being requested by the utilities. That's probably an issue that comes up in a lot of states, not just ours, because of our public records. I think it will continue to be something that we have to navigate, but at the same time respect the protections of those utilities and what they're doing. It's also an issue that, as a commissioner, the more you learn, the more questions you have, and, probably more importantly, the more terrified you get, right? And so, you go home and start making your wife have, like, twenty-five letter-number passwords to get into everything, like your Home Depot account. I don't know why anyone would want to hack into that, but you notice that it is a very serious issue, long-term for this industry, and it's not something that is an issue that we will discuss and the experts are sitting up here discuss, and come up with one or two solutions and move onto the next issue.

I sort of think a large component of this I can relate to things like hurricanes. That's something that we're constantly dealing with. The staff and the Commission do analysis, as it relates to storms and the prudence of those decisions and how they relate. We're unfortunately getting pretty good at some of that, because we see a lot of it. I would love to be able to transmit some of that structure and some of that analysis into the world of cybersecurity to help us make better decisions that maybe are deemed more consistent with the valuations and the information that we have in front of us.

The components of security are changing so rapidly…almost daily, if not weekly, the significant threats change. It's going to require the government to rely on that expertise within the markets, and, really, when you spend time with a utility and talk about this issue, or look at what they're doing as it relates to cyber security, as it relates to the protection of the grid, you get in a room with these folks, and it's a bunch of younger people, typically former military, or former law enforcement individuals, who are using their skillset in-house for those companies to attempt to protect themselves. They're not cheap. I mean, these individuals are typically very well trained, and until probably in the past five years, you didn't see a lot of education, at least degrees, within universities, and you've seen a huge wave of that, including in Florida, where now we have universities that have masters in cybersecurity programs. And they're getting these individuals to be prepared to go out in the market to then work in all different industries, but the utilities are no different in their need for those

high-quality individuals, and the costs that are associated with bringing those people onboard.

I'll make one last point. There's a lot of Monday morning quarterbacking, when it comes to issues where the disruption and/or the costs are extremely significant. And economic damages can be extremely significant. But that analysis has to be done by somebody. And I know the mentality that maybe up front the work can be done and prevent this sort of thing from occurring. Call me paranoid, but I feel like it's going to happen, and I think the degree to which it occurs and where it occurs and how the industry as a whole is able to respond to it, I think will be something that the whole country will watch, depending on where it occurs and the severity of it. And so we have to remain extremely diligent and educated on how these things work and what the potential solutions are to preventing them.

This is my last point. I'll close by saying that I think that, when the strategies to address these issues are changing so rapidly, I think that there has to be a reliance on what Speaker 1 was saying, a reliance on the folks inside the tent. I don't think that it's something that can be done from the outside, to make an analysis as to what has occurred and what the potential cost are for moving forward. Thank you.

Speaker 4.

I have some bad news, I'm afraid. Usually I like panels where everyone disagrees, and we can really have an argument, but I'm afraid I'm going to agree with the other panelists, and say that looking inside the tent is probably our best hope.

So, thank you all. It's a pleasure to be here. Let's start with a short description. Bruce Schneier, cybersecurity guru (I think that's his official title), has a recent book out called *Click Here to Kill Everybody*. As you might imagine, with that kind of title, it's a provocative sort of book. And Bruce's point is that the contemporary challenges of cybersecurity are almost, not exactly, but almost, here. In Bruce's analysis, because of the falling costs of computers, pretty soon everything is going to be a computer. And not only is everything going to be a computer, but everything's going to be integrated and networked. And the future Bruce sees just around the corner is one where there's increasing harm, both to the digital and the physical world.

Now, I'm not exactly as skeptical as Bruce, and I think, in the context of looking at electric power, this actually come with some good news. I think the electric power industry and the larger institutional structures we set up are actually well positioned to deal with some of these challenges. But the problem that Bruce has framed, and that Speaker 1 mentioned, that Speaker 2 talked about, is certainly real. And the problem is that information and communication technologies, across sectors, and particularly in the electric power sector, are becoming increasingly complex. And as technology becomes more complex and more interconnected…we have a slide up here from a somewhat recent DARPA study. What we see is the attack surface, the places where attackers can get in keeps expanding. The problem is, defense is just getting harder and harder and harder, while offense continually is winning in sort of a rout. That bottom line there is malware lines of code. No matter how much anti-virus we seem to throw at this problem, we don't quite seem to be able to solve it.

Today in my talk, what I'd like to do is focus on what we can do, and what I call an institutional account of cyber security. Recently, my colleague, Vivek Mohan, and I completed a book that's coming out with Wiley in April. It looks at cybersecurity governance across 12 different case studies across the globe in different industries. And we have three core insights that we're bringing here today, and they echo things that Speakers 2 and 3 talked about, and it answers some of Speaker 1's questions about whether this is a problem for FERC, or for NERC, or for market monitors. And my answer is a firm yes. All the above.

In terms of the book, there are three insights that we're going to talk about. The first insight is that cybersecurity is dynamic. What do I mean by that? Well, it's not just one thing. Take Speaker 2's slide with the fort in the middle of the ocean that the cannons could not reach, and then all of a sudden they could easily shoot past. We don't just mean one thing when we're talking about cybersecurity. It's open to multiple competing definitions. The type of threats that we place under this umbrella are diffuse, and they're not going to stay the same. The things we're worried about today are not going to be the same things we're worried about even in two years, to take Speaker 1's time horizon. Threats don't stand in place. Unlike natural disasters and storms, attackers learn and they adapt. Cybersecurity is not now, and it's never really been, a single problem defined by a single threat model. It's many different things at once.

So, what does that mean? Well, it means we should rely on and look towards iterative prostheses that can shift and adapt along with the threats. We want to make sure that we learn from our failures. "No silent failure" is a very good motto to live by.

The second key point I want to talk about is that cybersecurity is contextual--and here, actually, there might be a little bit of disagreement with Speaker 2. When I say that cybersecurity is contextual, what I mean is that we can't necessarily take solutions that we developed for other industries and other sectors and bolt them onto electric power. It won't work. Looking at various sectors that we study in the book, we found that whenever this was attempted, at a very high level, it's fine, for the standard things that have very broad application. But we tried to take specific solutions and bolt them onto different industrial context. It doesn't work, and we'll talk a little bit about why.

The last and the final point I'm going to make is that cybersecurity is not the Wild, Wild West. It's actually defined by a number of competing institutions and points of control. And this is where I can leave you with some hope. I think the electric power industry is already well positioned to deal with a lot of the problems we face, contrary to what Bruce Schneier argues in *Click Here to Kill Everybody*. The future he has mapped out is not necessarily one that is going to occur. There are lots of opportunities to steer this in a different direction, and that's where we'll talk about what institutions we can rely on and what they might do.

So, the first point I want to make is cybersecurity is dynamic. It's a slippery problem. All sorts of things fit into this bucket. The reason is, we're talking about a variety of different things all at once, and I don't want to argue that we need to have definitional clarity or purity. We don't. We're going to have to confront these myriad of different challenges. We're talking about challenges to the confidentiality of data. We're talking about challenges to the availability of data. And challenges to the integrity of data. Some of these problems look like other industries, and they look the same whether you're a healthcare provider or an electric power company or a hotel chain. Others look very different in the context of electric power.

So, let's look at three recent examples thinking about confidentiality of data. Everyone here is in the cybersecurity business. Any company or organization that deals with personal identifiable information, they're dealing with something that is valuable. They have a responsibility, whether legal or sort of normative, to protect that information. Marriott, it was disclosed just last week, had unauthorized access into their system since at least 2014, and it was half a billion, that's billion with a B, accounts that were compromised. Well, what does it mean, they're "compromised?" Well, it means that people's passport numbers were taken, credit card information was taken, home address and rewards numbers (I guess rewards numbers is probably the least I'd worry about in that

sequence) [LAUGHTER] were all taken. And we're talking about electric power companies. Of course, they're dealing with proprietary information, both personal information and information that the company wants to keep secret, private. So, dealing with these challenges about privacy and confidentiality is something that electric power looks like, in many ways, other industries and other sectors as well.

The next sort of attack that we put under this bin of sort of cybersecurity problems or challenges has to do with availability of data. So, how many of you are familiar with ransomware? Some of us. So, ransomware is simply a very nasty form of malware that locks you out of your system. It's extortion. It asks you to pay maybe $50,000. That's what the Atlanta city government was asked to pay this year to unlock information that had been encrypted. And if you don't do it, your information is gone. It's a sort of problem that mixes both high national security concerns and sort of low initiative high impact events. WannaCry (this is a screenshot from this ransomware) sort of tells that story well. WannaCry was built on an NSA top secret tool that was released to the public by what we think now were Russian agents going under the name the Shadow Brokers. What happened was that this NSA top secret hacking tool was then recalibrated and redirected by, not the Russians, but it looks like the North Koreans, and used to launch a massive campaign of ransomware attacks. It impacted not only shipping and transportation; it had a significant impact in the UK health sector and elsewhere. Ransomware attacks are sorts of things that electric power is of course susceptible to. Anyone who's relying on old, unpatched machines (which, by the way, is all of us, all the time) is susceptible to these sorts of attacks.

Ransomware, though, is useful, I think, to talk about some of the things that Speaker 1 mentioned. On the one hand, it looks like it's the type of security problem that requires super top secret specialized knowledge--the things I don't want to know about. This is the NSA dealing with threats coming from the North Koreans and the Russians. What gets more high politics and international security than that? On the other hand, at bottom, what makes ransomware possible is the most boring sorts of things you could ever imagine. Who's running Windows 95 with unpatched vulnerabilities? Well, electric power companies certainly are. Hotel chains certainly are, because we need things that are backwards compatible, and it's expensive and hard to patch, and because, when we installed these things, we didn't realize they weren't going to have a shelf life of 20 years. And so, even though, when we're talking about security, we're often talking about international intrigue and things that you certainly do need access to classified information to deal with, we're also talking about the boring details of security, which is making sure your machines are patched, making sure your employees don't open up that PDF attachment, making sure that you have very good sort of general standard hygiene. So, that's the second scenario, thinking about integrity and availability of data as something that both electrical power companies and others also face.

The last sort of story I'm going to tell before I move on here is CrashOverride. How many of you are familiar with or have heard of CrashOverride? I'd recommend taking a look at the Dragos report on this. CrashOverride was the piece of malware that targeted Kiev and substations in the Ukraine a little over two years ago. It was nasty for all the reasons that malware is always nasty. It took advantage of known and unknown vulnerabilities to weasel its way into a system. But what was different here is that the lights just didn't flicker. They actually went out. CrashOverride was tailored to specifically target electric power systems in the Ukraine. It was launched by Russian operatives as part of their ongoing cyber campaign against the Ukraine. What makes folks particularly worried about this is that it was modular. It could be easily redesigned and programmed to target other types

of systems, including systems here in the United States.

This story (which I've told very much in brief, and the Dragos report does a much better job of giving you the details) tells us something important. It's that electric power isn't like other industries. When we're dealing with operational technology, rather than standard IT environments, it's different. The technologies have different lifespans. The threats are different, and the harm is significantly different. And so, this leads me to my next point. Cybersecurity must be iterative, because the threats are not going to stay the same. They must be iterative, they must learn, because we're dealing with a diffuse sort of threats. The one thing we don't want is to build a fortress that can be easily circumvented by cannons or airplanes, once they're invented. We can't fight the last war.

This leads to our next point, which is that cybersecurity is contextual. And here's where I sort of break with Speaker 2. I want to praise specificity. In the case studies and the edited collection that I worked on with Vivek, we looked at the financial services sector, we looked at electrical power, we looked at the airline industry. And the thing that we continually found was a very simple, but important and powerful, point. The cybersecurity solutions we developed for one industry don't easily translate to another. The reasons are fairly obvious. They rely on a different mix of technologies. They're situated within larger institutional organizational frameworks that simply do not look like one another. Looking at the challenges to aviation cybersecurity, they have to worry not only about the chips and the onboard components in their systems, they have to worry about the manufacture of their onboard inflight entertainment systems, and the baggage handling system as well. The supply chain looks different. Their partners look different, and the solutions must look different. Not only is the technological mix different in these different industries, but we also have to remember that the larger organizational institutional structure that surrounds them is different.

Now, what does that mean? That means that the opportunities to shape and mold how the technologies will be adopted and developed and used are fundamentally different. The solutions that we adopt for one set of problems will not translate to another. A good example of this has to do with crowdsourcing security and the current vogue for bug bounty programs. Maybe a few of you have heard about bug bounty programs. These programs are in operation in over 100 different organizations and companies in the United States and across the globe. They're fairly simple. They pay, sometimes six figures, to individual security researchers (or hackers as they're often known) for vulnerabilities they find in their systems. Starbucks operates a bug bounty program. United Airlines operates a bug bounty program. The Department of Defense operates a bug bounty program. Microsoft, Facebook, Google, Twitter…you name it. They all operate bug bounty programs. There's a real hazard, though, in trying to take this one particular model that seems to work in some context and applying it more generally. Recently, we've had legislation mandating the Department of Homeland Security set up its own bug bounty program for its internal systems. Bug bounty is becoming a way to solve all sorts of different problems, and I think that's risky. The problem is simply this. If you're Google and you're operating Chrome, every time you open Chrome something important happens. It updates. It changes. The underlying architecture shifts. The reason you do this is because you're constantly starting and stopping Chrome. It's light. It doesn't take up much memory or space. It's easy to start, and it's easy, in the background, for Google to push updates to that without you ever having to worry about it. This is why bug bounties work so particularly well for that type of architecture. They can push the updates without much problem. We're constantly starting it and stopping it, and the updates can easily load without interrupting our user in back of it. Bug bounties work well here,

because when we outsource the security, we can quickly run down, fix, and patch those problems and deploy them to users without much friction.

Now, compare that to industrial control systems in the electric power context. It doesn't look anything like that. Can you stop and start them at will? No. Do they update all the time? Certainly not. Do we have a team of smart security researchers who are going to take the information as it comes in the front door and quickly develop patches that can be deployed? Not really. The solutions we develop for one set of problems can't be applied to another. Speaker 2 is absolutely right. The NIST standard and other high level advice, including the advice I just gave you about being iterative, are some useful guideposts, but when we take those useful guideposts and those useful general ideas, they have to be filtered and applied in a very specific way, because electric power is just different. It just is.

The last point I'm going to make is that cyberspace is not the Wild West, despite what you might have heard. This is an ongoing sort of rhetorical trope. "There's no rules. There's no norms. There's certainly no laws. This put defenders at a significant disadvantage." Folks, including folks who should know better, continue to use this sort of language. It's not the Wild West. As Professor Joe Nye, Jack Goldsmith, Laura DeNardis, and David Clark have pointed out, there are multiple opportunities to think about and to shift how we use information communication technology. Contrary to what Bruce said in his book, *Click Here to Kill Everybody*, the future isn't just around the corner. We invent the future. And when it comes to information and communication technologies, the fact that their costs are dropping, and they're becoming increasingly embedded in all sorts of devices, is not an inevitability. What we want to do is look for points of control.

David Clark outlines this as well in his article on Control Point Analysis and his sort of larger approach. Think about the places where the choices we make, whether it's at the level of a firm, a standard-setting organization, or a regulatory body, help shape and define the choices we make around technologies. Clark takes a very simple example of accessing and starting a website, loading a website. And he shows, from that simple task, all the different organizations that sit behind it and the choices they make, how they influence, how that process unfolds, and how the choices they make can enhance or undermine security in various sorts of ways. Now, you can do a similar thing, and I encourage us, during the discussion to think about this in terms of electric power. And you're already starting to think about the role the organizations that are already in place are playing. Think about the institutions we already have here. This is looking inside the tent, not outside. This is not inventing a new wheel, to steal Speaker 2's phrase from a moment ago. With control point analysis, what we start to see is that built capacity that we already have is incredibly valuable, and if we overlook the things that it is already doing, and that it can do, we miss a huge opportunity.

And this is why I'm optimistic when it comes to electric power. We have a set of organizations and institutions that are already well positioned to shape how this market works. In fact, FERC, NERC, and PUCs are already doing this. The CIP standards are sort of what I've just described is an iterative process that learns over time. We're up to, now, half a dozen versions. They've gotten better, I think, each time. When we look at control points, what we want to start thinking about is, well, what can they do without disrupting their current job?

For FERC and NERC, this means high-level questions about developing standards and thinking about how they might be pushed out and applied to the bulk system. For PUCs, it's looking at things like acquisitions. Our goal is to make sure that there are no silent failures, and to decrease the attack surface. That often doesn't

mean investing in new, cutting-edge technologies. It means making the opposite choice. Prize the more expensive, older model. Invest in technologies that lack functionality, even when it looks like it might not be cost effective, necessarily, to do it. The list goes on and on. Thinking about market monitors and what they might do, unlike other sectors, we already have someone collecting real time data. This is incredibly valuable, maybe not for blocking or stopping attacks, but for forensics. Other industries would kill for that sort of data and that sort of opportunity.

When we looked at other sectors, what we found is, whenever we try to invent a new organization, a new standard-setting body, a new way of sharing information, inevitably it ran into problems that were often fatal. When we relied on existing capacity--the regulators who were already there, the authorities they already had, the partnerships they already made, the trust they already developed--the opportunities and chances for success were much greater. And this is why, when I look at electric power, I don't have the deep skepticism that Bruce Schneier and others have—the idea that the future we're going to have is one where immediately, with a click of a button, power is shut off. Rather, I see a great opportunity to continue the work that's already being done, to shape the ways in which the electric power industry adopts technologies and integrates them to make sure that future doesn't actually happen.

Clarifying Question 1: I'm having a little bit of trouble understanding where we think the gap is in terms of what's being done at present, because I had thought before I saw the panel description and heard everybody today, that NERC promulgates CIP standards, FERC blesses them. They are, I think, applicable to every electric utility either directly or indirectly, in the entire country, because NERC's jurisdiction is that broad. It doesn't exclude ERCOT or all that kind of stuff. And at the top of the food chain in the whole compliance arena are the reliability coordinators. Everybody has one somewhere. And I was under the impression, perhaps wrongly, that the primary responsibility for making sure that we remain cyber secure was principally in that framework being managed and overseen by the reliability coordinators throughout the country. So, I'm trying to get a feel for where the subject matter gaps and/or the sector gaps are that you all feel are there. Thanks.

Respondent 1: I can probably take the first shot at that. The NERC's CIP standards really focus on the bulk electric system. So, it doesn't go deep into the distribution system, and it doesn't cover things like market settlements, or a day-ahead market, or some of those other functions. So, that's where I think the gap is.

Clarifying Question 2: Are you talking about concerns of cybersecurity over things like settlements and customer accounts and things like that? Or, are you lumping that together with things like the SCADA systems, and the operations of the grid, and what hackers in foreign countries and bad people would do? Because, from the presentations, it all got lumped together, and, not to belabor the point, there is one hell of a lot going on. There are CEOs of utilities, I'm with them three, four times a year, who spend entire days, and some of them have told me they spend 10 to 15 percent of their time on cybersecurity. So, it seemed like maybe it was a miscommunication, or a misunderstanding, of how much is actually already being done. And maybe I just misunderstood what aspect you were talking about. Andy Ott references make it sound like customer accounts. Speaker 2 just said settlements. And then there's somebody in a foreign country doing to us what they did to the Ukrainians. So, what exactly are we talking about here?

Respondent 1: I think it's a great question. My presentation is in many ways deeply conservative. I think electric power is doing more than most industries, so I didn't mean to represent that nothing's happening. A lot is happening. CIP

standards are setting a floor. Other industries have nothing comparable to it. So, if folks want to pat themselves on the back, they should pat themselves on the back. That's why I say it's conservative. There's a lot to like here.

That being said, what I also tried to pull out is that the challenges that we face are not only about PLCs (programmable logic controllers) and the industrial control systems and planning for a Ukraine-like event. The CIP standards, in many ways, are targeted and designed around all sorts of processes and really looking at the bulk system and control system security. But that's not all cybersecurity is, and it can't be. It must be these other things as well. Things that maybe seem boring, about protecting PII (personally identifiable information). That's also part of the challenge. And so, trying to look for clarity and definitional purity is not going to work here. In terms of analysis, that's useful, but in terms of confronting the challenges of cybersecurity, it's all those things at once. And so, I'm very confident about what NERC and FERC have done. I think there are more opportunities for these other institutions to also play a role of points of control to help handle and manage and control some of those other challenges which Speaker 2 and Speaker 3 alluded to.

Respondent 2: I too am involved in the Electric Sector Coordinating Council with Andy Ott, and I believe the electric industry has done a phenomenal job in terms of addressing cybersecurity. The scope of this panel was focused primarily on market design issues, and when I look at market design, there are a lot of functions within the market that fall outside of those standards. So, my reference to the gaps is more related to things that are not part of the NERC CIP standard. I use settlements as an example, but we have a lot of back office applications that NERC doesn't look at, NERC doesn't care about, and that's where I think, as an industry, we need to strengthen.

I also appreciated, Respondent 1's comments. We talked about context, and we're probably not as far off as we might appear in the context. But where I was saying that the contexts were more alike than not, is all these systems, whether they're NERC CIP assets, which we have a good control over, or whether they're settlements assets, or whether they're internet applications, they're built on a lot of the same infrastructure, they're built on a lot of the same technologies, middleware, and all of that, and how do we protect all of that? So, I think that's kind of the point.

So, I think you certainly influence me not to swing too far in terms of context. But when you look at the Ukraine event as an example, they used the same type of attack vectors there that they use in finance. They're coming in through fishing, or they're coming in through a Microsoft vulnerability, or something else. And we've got to try to use as many of the similarities as we can, recognizing there are control systems that are very different. And I definitely get that.

I'll just say one more thing, because I think it's really worthwhile here. Some of you probably heard of the recent OSI software breach. It was just announced over the Thanksgiving timeframe. And OSI software is essentially a real-time database that a lot of companies use for visualization, and it's focused in the process control world. So, it's sitting in our control rooms, our member utility control rooms, in water control rooms, petro-chemical, and all of that, and to the extent there's a vulnerability there, it could impact all of us. Yet, deep into the bowels of our control systems, no one does supervisory control exactly like we do in the energy industry. So, I think there are certainly similarities, but I'd just like to emphasize that Respondent 1's point is well taken.

Respondent 3: I do think there's separation between the data breach component and the disruption of the grid component. I thought it was a good question, because I would argue that I

think most are much more comfortable that there are protections in place from the data breach component side of it, as far as what happens afterwards and what's provided to the consumer. And it's a disruption component that I see as being kind of the broader discussion as to what occurs after that disruption part.

Clarifying Question 3: Speaker 3, as part of your discussion, you were talking about looking backwards, potentially, in the event of a cyber event, to determine whether there was prudence or imprudence by the utility, and sort of its actions protecting against that event. Could you talk a little bit about what the state commission's role is in reviewing or setting criteria or standards in advance for the utilities under your jurisdiction, with respect to setting up cyber programs? Do you require certain criteria be met? Do you look to the CIP standards? How do you establish those requirements?

Respondent 1: The CIP standards are kind of the floor of what's required, and of course their reliability and notification requirements go to NERC. And it's not a totally separate issue, because the Commission's staff do communicate with NERC and are aware of all those things. Also, I think they put out a report annually with all the information in there, and our folks review that and provide recommendations to us.

On the prudence issue, I'll give you the public service commission answer. It's always looked at from a fact-based scenario perspective afterwards. And so, it's actually, I would argue, even more challenging than, for example, prudence for poles that are put up in Florida related to hurricane winds. If you put up a 140 mile an hour pole, and a Category 5 hits and takes the pole out, was that smart? Should you have put something better in?

A cybersecurity event gets a very similar analysis, afterwards, but the prudence evaluation is even more challenging, because of the complexity. So, for example, if you have a large utility that puts a million dollars forward for "cybersecurity," and you have a smaller utility, maybe one-fifth the size of that, that puts forward a million dollars for cybersecurity, you've now just put a target on your back, because there's a lot more data and potential disruption that could occur at the price that was paid, comparatively. And so, even those components, I think, become very challenging for the commission to separate them. But I do think, down the road, you'll continue to see more…I don't know if "bundling's" the right word, but you'll see both infrastructure and cybersecurity protections, so it becomes "grid security," and it's a broader request that's brought forward and includes both of those components.

General Discussion.

Question 1: Thank you. It's kind of funny what you guys are saying up there, because it's like apple pie and motherhood. Of course we should be doing all these things. Of course we should be coordinating. I'd like to focus a little bit on something Speaker 1 said, and what the topic looks like, which is impact on market design. And I don't know if everybody's aware of an initiative that PJM's taking. PJM has decided, through a manual, not even a FERC filing, that they have the authority to tell generation to re-dispatch if they have information, which can run from a compressor breaking (which would obviously violate pipeline rules if everybody in the market doesn't know about it, so we'll leave that silly one out and talk about the more interesting one) to having been notified of a cybersecurity threat. They have put in their manual that they now have the authority to call a generator up and say, "I want you to switch pipelines," which makes no sense, because you're not going to be switching to a firm pipeline, but in theory, I know there's a cybersecurity event, and I'm going to make you switch. If you're dual fuel, you switch. If you're storage, you go to storage. Or, I can tell you to go to a different pipeline. And, of course, the other piece of this that's not in the manual, because they don't have the authority, is, what does the

generator get paid for doing this? Is it lost opportunity? Is it the cost of switching? Blah, blah. You can see where this is going.

It's a very troubling move, in my view, because, from a load perspective, you're taking the responsibility of making these decisions from the generator's hands, and you may remember that the capacity performance was supposedly based on the idea that generators are responsible for being there, regardless of whether there's a major disruption on the pipelines and things.

But all that aside, I'm curious as to what you think is within the RTO rights and responsibilities, and how that cost compensation will be accomplished, assuming we're talking solely about a cybersecurity event. Because it's kind of interesting and a novel issue, what they're doing.

In all seriousness, it's a very troubling market move, so I don't want to make this a particular attack on PJM. On the other hand, if PJM does have cybersecurity information, what's their obligation to share it with the community? Is it just for them to tell the one generator? Should they be telling all their EDCs (electric distribution companies)? How do you treat that information? And is that authority bonafide that they tell the generator to change its dispatch? And how do you compensate for that?

Part of the complaint here is that this not FERC filed. It's in a manual. And we voted today on how we might compensate the units. That's why I was distracted this morning. And that will be FERC filed. But this is not FERC filed, and that's part of the objection, as well.

Respondent 1: I'm going to keep my response at a very, very high level, and thanks for the question. The first thing is, relative to any decisions that we make around how a generator dispatches, we do feel that's part of our mission, and grid reliability is our responsibility. It's in our tariff, those kinds of things.

The second thing I would say is, there isn't anything in our tariff that's not approved by our membership. So, we're not inventing these rules on our own, and we're communicating and coordinating that stuff. And then the third thing I would say is that the obligation that we all have is that, if there is a cybersecurity event that's impacting the bulk electric system, we have OE-417 (Electric Emergency Incident and Disturbance Report) reporting rules. We need to be reporting that to the E-ISAC (Electricity Information Sharing and Analysis Center) as soon as possible. And I would argue that it's incumbent on us to be having discussions with our asset owners if there's a concern around a cyber event. But ultimately, the communication authority is through the E-ISAC, and we have an obligation, within one hour, to file that we see a potential cyber event that could impact the bulk electric system. I won't get into the market stuff, in terms of how we're compensating folks. That's not my expertise.

Question 2: So, I don't know a lot about this, but I've got a partner who does cybersecurity law, and he's a former senior defense intelligence official. And from my discussions with him, I came away with two things. One, that our enemies are already probably inside our electric system. And, secondly, that the people in our government who are on the cutting edge of this, what they know they don't want to share with the utility industry, because of the dangers of having this made public, which leads me to think that the efforts you're talking about are kind of on the edge of accomplishing anything. By the way, his view is that the reason that we haven't been attacked is because the people who are in the system know that they will be attacked back. So, it's kind of a mutual assured disruption. You're shaking your head, so what are we talking about here, and why do we think that we'll be efficacious?

Respondent 1: It's a really good question. If you think the goal of the CIP standards, or anything that NARUC is doing, or anything that market

monitors might do, is to prevent the Russians from getting inside our systems, I think that's starting from a false premise. That can't be the goal. We can't expect individual utilities to be able to have the techno competency to do that. What we can expect them to do is raise the floor high enough that we can allow those other mechanisms, whether it's deterrence by denial or deterrence by the threat of response (which is basically what you alluded to) that would help target a nation state adversary… My view of the standards process and what is a reasonable expectation is to keep the floor high enough that we don't worry about those sort of lower-end actors, so that maybe we can live with the fact that we have this sort of nation state mutual assured disruption with our adversaries, because there are all these other mechanisms we have to deter them from flipping the switch and turning out the power, if it were only so easy.

What the standards can do is prevent someone who isn't resourced like a nation state, who isn't Russia, from having that same capability. And that's not working at the edges, that's actually doing something very important and powerful. And even something that, as we sort of alluded tom is still difficult, keeping the floor high enough so that as attacks get easier and less and less sophisticated, we're making sure that the systems we rely on are not that easily penetrated or subverted. So, I don't think that's working the edges. I think it's actually a very important and powerful thing we can do.

Respondent 2: The first thing I would say is, go out on the internet and look at open source as to who has been in the electric systems, and I won't comment on it beyond that. There's a lot out in the internet. But the point is, when we look at cybersecurity controls, it's not just prevention. That's the point, and I think, Speaker 3, you might have said it in your comments. We have been, as an industry, and we will continue to be, vulnerable, and people have gotten into our systems as an industry. OK. So, we've got to go well beyond protection. That's where we've got to be able to detect early on. We need to be able to respond.

So, what do you do when you're under cyberattack? We do a lot as an industry. I'll go back to the ESCC (Electricity Subsector Coordinating Council). We do annual drills around, how do we respond to a physical or cyber attack on the grid? And we train operators. We train our security professionals. And that response is critically important, and the fourth leg of that is, how do you recover? You've got to have plans for recovery. So, your premise is good that people are in systems, and you can have forensic experts like Mandiant and others come in and look at your system, and they will tell you if there's presence of malware that may be from a foreign country, or whatever. So, your premise is right on and …

Questioner: I was kind of hoping you guys would tell me my premise was wrong, but thank you.

Question 3: Thank you. I think I asked this question in the last cyber panel in Washington, DC, a couple of months ago. With the increased penetration of distributed energy resources into the grid, now we have these two-way power flows coming in from the distribution system which, although subject to certain State regulatory requirements, just increases the number of transactions and information flow across the grid. To what extent does that increase the complexity or vulnerability of the system in its entirety, relative to where we are today? And what kind of steps are being taken to address those concerns, if they're real?

Respondent 1: To answer the first part of the question, decentralization, or two-way power flows, it requires centralization somewhere. And the centralization occurs in the communication architecture itself, to manage and balance and do all those sorts of things. So, the premise, I think, is a good one. The premise is increasing complexity, doesn't that create new opportunities for malicious behavior, or accidents, or other

types of failures? And, generally, I think that seems right, as far as I can tell. Complexity with tight coupling, which is what we get when we have multipurpose generative computers combined with systems that need to operate in real time, create opportunities for failures, because of the interactions we can't forecast, interactions we didn't expect, and how they spin out in new sorts of ways. That's not a new phenomenon for electric power or for other complex systems. The new piece of it is the ways in which computing systems are now key players here. So, that answers sort of the first part which is sort of validating the premise.

The second part of your question is, what do we do about it, or what are we doing about it? I have confidence in the CIP standards, and I think the process itself is admirable. Other industries don't have something like that. Despite whatever flaws we might think there are, either in terms of process or substance, we set that aside for a moment. But the one thing the CIP standards don't do is, they don't work at distribution and local levels. As Speaker 2 mentioned, accurately, they're there for the bulk power system. And so, I'm really curious what State commissions can do and what they can't do.

Respondent 2: I know that the role varies for the state commissions. For my commission, I don't believe we've had something where it hasn't been a bulk generation system related to the issue. I would presume it would be treated in a similar way to bulk system, but the issue, to me, would seem to be, as you scale down, the resources that are required for an understanding of what the costs are and what's prudent are just so complex and require so much expertise that it seems to be becoming even more challenging to articulate and bring that forward to a commission. But I'll sort of hold my opinion on all of it, knowing that might be something that we will see in front of us, probably in the near future.

Respondent 3: That's a question that's asked a lot. And I think there are a couple realities. When you get into the whole subject of how more distributed technology is out there, and the internet of things, the attack surface is definitely broader, and the issue is, when you have common components across those systems that are sitting out there, could it be a broad vulnerability that could create a problem? And I think the answer is yes.

I think the other side of it is, there's some safety in the fact that it's a distributed technology, and maybe they don't get everything, but they get part of it. So, I don't think that there's a black and white answer to that, but I think it definitely increases the attack surface. And I think, to that point, it really does require that more than just the bulk electric system has controls. Because, when you look at security resilience of the grid, ninety percent of it is happening at the distribution level, and how do we make sure that we're doing everything that we can?

Respondent 1: I'll just add one quick thing. From the data I looked at, it seems like most of the breach issues are, by definition, human error--the intake of something into a system by an individual or an email or something like that. So, I think the more entry points that you create, the higher the likelihood that you're going to have an issue.

Question 4: If you took an example of an aggregator that was serving a large group of residential customers, as you said, there may be a concern that somebody could hack into the aggregated system and shut out a bunch of neighborhoods. Which, in the grand scheme of things, would be bad, and maybe if they got hospitals or other things it would be very bad. Is there an opportunity to kind of come in, through the aggregator, back up to the bulk electric system, and is there the need for some kind of firewalls, or safety systems, to be put in place to prevent that kind of opportunity?

Respondent 1: That's a very good question. The further down the chain you get, the smaller the target, so you arguably can have less of an impact.

But in most the research I've looked at, there aren't concerns about going backwards, mainly because those larger entities have better protections. They have additional firewalls and things that catch what some of the smaller entities don't have.

Question 5: I have a question that sort of compliments the question about the distributed energy resources. Let's take DC Energy. My understanding of what DC Energy is doing is that it's a strictly financial operation. So, they're doing transactions, and all kinds of rights and virtual transactions and contracts and all that kind of stuff. But they don't control any physical assets, and they're not dispatching distributed energy resources. So, in some sense, other than the settlements process, which happens after the fact, they're kind of working all before the real-time and they don't have any direct effect on the real-time. And I hope they're doing a really good job with their cybersecurity, so that they don't lose their database, and they can bill everybody and get paid and all that kind of stuff. I don't lose a lot of sleep over it, but I'm sure that they would, so I think they're doing a good job. And we've got the people overseeing PJM and the physical operations and all of these kinds of things. And they're doing a terrific job controlling the physical operations. But there is communication between DC Energy and PJM, in the day-ahead, and information and prices and things going back, so there are linkages there. Is there something about that that I should worry about? Even though they're doing fine for what they're doing, and you're doing fine for what you're doing, is there something about that interface which is going to create a challenge? The thing that makes me nervous is I think back about how Stuxnet was designed for what was supposedly an air gap system. And it succeed. They got in to something that was supposed to be totally isolated, but, in fact, it turns out it wasn't, because of these linkages and communications. There were people walking in with things that they stuck into the computers, which they probably shouldn't have, but there we are. So, is there a process underway which is overseeing both of those things simultaneously? Maybe what the previous questioner was saying is true, in which case, there might be a process I don't know about. But is that's true, or is it that DC Energy is left to do a really terrific job, and PJM is doing a really terrific job, and someone else is doing a really terrific job, and nobody's looking at that oversight across that system?

Respondent 1: It's a good question. I'm not overly concerned with that. I don't want to sound cavalier, but let me tell you why. When PJM has bids coming into the market, and they're being submitted into the market, that's totally isolated from PJM's energy management operation control system. There is a point, at the time that the market is cleared, and you know how you're going to operate the next day, where there are interfaces between those results and the operational system. But the interface is between two PJM systems, not a direct interface between a participant going right into the PJM control system. So, I've got some level of feeling pretty good about the design of that. I don't know if that helps answer the question, but it isn't like somebody's doing a bid into the market and it's pumping right into the energy management system without intermediary steps and having the proper network segmentation.

Respondent 2: The air gap network question gets to the question, how much confidence should we have in it? Creating lose connections is important, and it makes it so information and data that can be malicious is harder to transfer from one to the other. That being said, loose connections and air gap networks…as the questioner pointed out, everything's not failsafe. So, what I would worry about is not that malware is going to travel from network A to network B, but what I worry about is that the penetration of network A is going to lead to credential theft of network B. And so, now you're worried about, what could someone with insider access do? The connection isn't at the level of data. It's at the level of people, right? It's an email that looks like it came from a colleague,

but it's not really from my colleague. And now, I can get their credentials and create some mischief internally. And so, even air gap networks, of course, are connected, because we're connected. We have connections with our colleagues across the aisle. And they send us information all the time, and we read it, because that's how our jobs get done. And so, I'd be worried more, not about malware, but about credential theft, which is a related, but different, problem.

Respondent 3: I'll just add one thing. When you think about Florida's structure, you have a situation where, within the data breach, within FIPA, the Florida Information Protection Act, you had a lot of folks that said, "OK, so when we're breached, we're going to provide all the information to a government agency about that breach." How are they going to protect all that information? And we all kind of thought, that's a great point. They typically have the ability to invest more into these protections, depending on the type of agency and what data they handle, and so, to Respondent 2's point, you're able to use that information to then negatively impact another entity. And I think that becomes a real threat, and I think it's a great point.

Question 6: I actually wanted to touch on exactly this same question from a different angle, related to a distributed energy utility future. We've got batteries, and I guess my question is, how important are some of these changes to being able to address a resiliency problem or a threat? Just to be able to maybe send price signals or segregate circuits at certain parts of the grid, or just to be able to have demand response to make a problem that might happen less severe? And just thinking through how there might be market mechanisms or other kinds of things where you send high price signals to certain areas or even physically cut off certain individual circuits in certain areas in response to a resiliency problem, to use the latest terminology.

Respondent 1: On the one hand, when I think about decentralized electricity, the first thing I think about is a book I read a long time ago when I was an early college student, *Soft Energy Paths*. This is an Amory Lovins book from years and years ago. The idea is that decentralized is safe and secure. And there's lots to like in that. That was an argument being made in the late 70's. But when I look at how that's playing out in the contemporary scene, the thing to keep in mind is that decentralization requires reliance on common mode communication protocols and common software and operating systems, and so, if we're all relying on the same out of date, no longer compatible versions of Microsoft Windows, the fact that we're all operating in somewhat discrete connections is good, but it just has shifted the risk in a new sort of way. So, now the critical asset isn't that we're all relying on a centralized system, it's that we are all relying on a centralized operating system, or something else. Now, that might be a trade that's well worth it. But it's a trade that's worth thinking about, in terms of what the tradeoffs are and how that changes our threat model.

Question 7: This continues to be fascinating. I just want to ask about the distribution system, because it seems that, if there is a way for an intruder to get into the distribution system and do whatever damage they would do, the risk there, if it exists, is more than just to individual neighborhoods, because, you know, FPL (Florida Power & Light) doesn't have a local computer system running, just around here. It's a central facility. So, if it were possible, from there, to physically disrupt the operation of a distribution system, presumably it could do it over the entire FPL system by doing whatever it would do. Which leads me to the question, how vulnerable is the distribution system to a physical disruption of that system from a cyberattack at the central system of the utility?

I did have a second question, which is completely unrelated, but it is spurred by one of the earlier comments. It has to do with this idea that penetration of the utilities sector has already occurred, and what's really protecting us at this

point is only the mutual assured disruption that we presumably have relative to these other nation states. I just want to make sure I understand this risk. Is the idea that Putin or Kim or somebody else, if they just decided, for whatever reason, tomorrow, that they were going to shut down all or a part of the grid in the United States, do they have the capability to simply order that and have that happen? And so, does that mean the only reason why they wouldn't necessarily do it is because we could do something to them? Thanks.

Respondent 1: I'll address the second one very briefly, and then I'll let others talk about the first one. I only know what I read in the newspapers, so I don't know. But there's the Ukrainian example, and I think the reporting is pretty solid that foreign adversaries have had some amount of success getting inside our critical infrastructure, including electrical power. I think that's probably true. The point I was trying to make, and it might not have come through, is that the reason that the lights stay on, or our shipping containers arrive on time, is not just because we're technically so adept and we have these wonderful defenses. Maybe that's part of it. It's because it's not only technically difficult. Deterrence also operates in those domains. The reason they don't do it is because it would be politically suicidal to do it. Causing physical damage, even through cyber means, is something that everyone sort of agrees would cross a red line. It's not to say it's not going to happen. But for a nation state to do it… our attribution capabilities are now pretty good. You saw North Korea, you saw Wannacry, all these other things where we were able to attribute, publicly, a lot of information. The reason those things don't happen is not only because it's technically hard, and it is technically hard, but it's because of these other sort of nontechnical entanglements and threats and interactions that make it politically difficult. That's the point I was trying to make. So, that was the somewhat easier question. The larger question I'll leave for the others.

Respondent 2: I don't believe that we're so vulnerable that, on a moment's notice, a nation state is going to push a button and the lights are going to go out. I do not believe that. I do believe that there is malware in people's systems that is coming from nation state adversaries, and they've established some level of presence. That doesn't mean that they can actually do command and control-type activities on that work. It doesn't mean they can even take actions on that work. And when you read that the Russians have a presence in the financial sector, in the utility sector, and all that stuff, yes, there's some malware in there that's attributed to Russian actors, but it does not mean that they can unilaterally control the systems. I don't mean to be cavalier when I say that, but the bottom line is, what you really need is, you need people that are looking at your system, that are scanning your system, that are identifying malware, and if it exists, cleaning it out. Not everybody can afford the same level of analysis. And I think that's where we could probably do a better job, in that some people have that malware in their system and they don't know it. And I think that's really important.

I'm certainly not saying that the only thing that's saving us is this notion that if they act, our government's going to act in a bigger way, because we need more than that, and I think we have more than that. And, again, I give the electric sector a lot of credit for a lot of the work that they've done to put us in a decent position relative to that.

Respondent 3: The theft of data is something that, once it's occurred, it's occurred, and there's no specific fix for it. The disruption of the grid, arguably, is somewhat temporary. It will end at some point. And most of the utilities, I think, they practice these things, and I think they really are in tune to trying to prepare for the potential likelihood of something, and what it may look like, and how they can test it and run all of these test scenarios to be prepared for that. And I think, as an industry, the mentality is much more

protecting your castle than it is trying to fire back. And I think the idea behind that is much more a government analysis than it is a utility one.

Question 8. You kind of categorized the instruments that are needed to kind of make sure you can resist or are immune to these attacks. One is kind of physical upgrades, on the grid side. And then you have software/IT, making sure there's no malware.

Are there any efficiencies to be had, given the electric sector has kind of moved ahead and probably has kind of done this initially? And given the fact that, at the customer level, you have gas, water, and electric, all being served in some ways? Are there any cost efficiencies that could be gained by making sure that no duplication of upgrades happens, as opposed to every company, as oppose to every utility, doing things themselves? Is there anything that we could leverage that makes us more cost effective, as opposed to just letting every entity do by himself?

Respondent 1: I think a lot of those entities do share information. So, even if they aren't specifically sharing the cost of some sort of software that would be used between them, I think you do see patterns in the cybersecurity world where, if there's an attack to try to open one door for utility and it can't be opened, they'll likely move on to the next one, and attempt that same type of scenario until they can get in somewhere. So, from my experience, you do seem utilities communicating about what they're seeing, to help them all prepare for it, but I'm not sure that that creates a specific cost reduction.

Respondent 2: I think that's a great question, and I think the answer to that is that there really could be, if we organized ourselves a little bit differently. And I touched on that just briefly in that comment I had earlier on crowd sourcing, but if you stop and you look at it, everybody is doing vendor assessments. They're looking at, is my control system vendor doing all the right things? But we don't do that as a single entity, so everybody's doing it. Everybody's making investments in it, and they're probably doing it half way. What if we pooled people together on things like vendor assessments? If you look at things like threat sharing, we do a lot of that, but I think there are still more opportunities. If we could do a better job of sharing threat information across entities, that would be really, really helpful. So, that notion of the value of a crowd, and the value of many, to defer costs in this area, there are definitely places that I think we could do that, and I think your questions right on.

Questioner: I know the software side is easy to scale and share information. Is there anything you could do to the hardware side (and that's where most of the dollars are, I'm assuming) where you can actually leverage and minimize duplication of resources?

Respondent 2: Yes, on the hardware side, there is work that the government is doing and others are doing around supply chains. If you want to check the supply chain of hardware vendors, whether it be relays or whatever, does everybody need to do it, or could you pool yourselves together and have the ability to share the investment in determining whether your hardware gear has been compromised? And the important reason to do it now is it that there could be something in there now, but no action has been taken yet. So, if you're able to pull together and find those things out before action is taken, I think there's a real opportunity there. And I think it does extend into the hardware environment, for the transmission and distribution and typical IT hardware.

Respondent 3: Allowing you to scrutinize the code library and other components across the supply chain to give you insight--that would be a core function the government is trying to provide—aggregating that information sort of like an underwriter's lab would to provide tests and some sort of, if not certification, information, so that you'd be able to make your reasonable judgment. That seems like a core government function.

Question 9: As we get to a more distributed generation mix, isn't the nature of the threat more outside-in than inside-out, because of the nature of the Internet of Things (IOT), in terms of the vulnerability of parts of the generation's supply chain that are way down the road?

Respondent 1: There is some merit in the way that you're framing it. As you decentralize more and more, you've got to be looking at that threat from the outside coming in. When you look at something like central station, and you don't have the distributed element, you've got all your eggs in that basket. So, maybe the prize is greater, in the centralized view, for the adversary. But, certainly, the surface on the distributed generation is making sure that you're looking at all that. So, I think your observation is correct. I think the reality of it, regardless, is that all of those entities need strong cybersecurity controls. They need good threat information, and they need to be protecting their systems. But it does change the nature of the threat. I think that's fair.

Question 10: Thanks. In cybersecurity, data breaches are common enough now that insurance markets are developing products to compensate companies. I'm wondering whether you're seeing similar products being developed in the electricity sector, and, if so, whether that raises any regulatory concerns.

Respondent 1: I know we've been hearing that cyber insurance was going to bail us out for the last decade, and I have yet to see it. It always seems to be just about to mature. Maybe that's true now, but I've been hearing that story for a while. I can't speak to how it relates directly to electric power, though.

Respondent 2: There are probably two different points here. One is, the underwriters are very interested in what we're doing around cybersecurity controls, and it's definitely a consideration and a discussion in our insurance policies. The second thing is, there are new instruments being developed around pure cyber insurance. It gets pretty tricky, because it's really hard to calculate the cost of a significant cyber event. There are some realities that you can look at from other industries, but if you had a major disruption of the electric grid, you're talking potentially billions of dollars, and nobody's quite ready to take on all of that.

Question 11: Thanks. I have one public service announcement. A few years ago there was a really nice book that came out entitled *Blackout*, and it's sort of a fun book, in the way that watching horror movies might be a fun thing. But it's quite informative. That author is now doing a lot of consulting for RTOs and ISO's around the world. His name is Mark Elsberg. So, that's the public service announcement.

I'm a little confused. There is sort of an "existential threat" kind of language being used, and the last conference there were a bunch of ex-military folks, and the way they presented this whole thing was like, "Well, this is how the US is going to come to its end," kind of thing. A lot of the things that are being discussed are in the range of best practices and basically wash your hands three times a day in the winter months. But then there are other extremes. I've heard people basically advocate, as a response to this, no devices that don't have a hand crank kind of thing--nothing can ever be connected to the telecommunication infrastructure, because otherwise it increases the threat surface.

So, there must be a cost-benefit thing here. There are certain things we can do that are probably in the best practices realm such that it is just a matter of figuring out what those are. But I suspect there are also much more drastic measures that one could take, which would be costly, either in dollars, but, more importantly, in terms of serious impacts on the way we lead our lives. So, I'm curious whether any of you have any thoughts about how to approach even developing sort of cost-benefit type assessments of how far one

needs to go before we start encroaching on the real functioning of our society.

Respondent 1: It's a very good question. My personal take on it is that, knowing as much as I know about this industry, I don't see how, other than a basic floor, you can create some metric such that you know beforehand what would be sufficient or not. I think that's the problem. And I hope I'm getting to your question, because I think what you're saying is that there are the extremes on both sides in how you make a determination as to what costs are relevant to expense going forward. And then, in hindsight, a utility could be potentially criticized for not going far enough, and/or spending too much on something that may never be used. And I think, unfortunately, that's the stuff where they, on a day to day basis, make an analysis of what those threats look like, and there are very qualified people doing that. They make that determination based on what they're seeing. And I'm using the "in the tent" analogy again, but I don't see how, from the commission perspective, you're able to review that, unless you literally put someone in that division every day to go to work and sit with them to see what would work and what potentially wouldn't work.

Respondent 2: I think the wide range of scenarios is very significant, and I think, when you look at the existential threat…and you've probably seen some of those simulations and it gets pretty nasty when you start losing electric and the water system is impacted. People are dying. It's really bad. I don't think anybody has the capital investment to address all of that.

The way that I know we like to think about it, and I'm not saying it's the exact right way, but the way we think about it is, you look at the things that could happen. And then you look at, how do you operate through it, and how do you recover from it? So, at 100,000 feet, that's your resilience.

But the thing that people don't say in that discussion is that you've got to recognize that you're operating in a suboptimal world. And, when an event is occurring, everybody's not going to have their power. Everybody's not going to have their water. You need to plan for it. You need to exercise, and you need to drill. Look at a Black Sky EMP event, and all the communication and coordination that needs to occur between state and federal government agencies, FEMA, service restoration, all those things. It's really, really important. I don't think you can ever be totally prepared for it, but I think you need to think about it. You need to plan for it, and then just recognize that you're in a suboptimal state, and then you try to recover from as quickly as possible.

The cost-benefit is really hard. We had a discussion about that over lunch. And there was a gentleman that I had worked with a few times, an ex-defense official. I don't know if it's the same gentleman that they referenced over here. But he had a good point, and his point was that it's really hard to plan for something that's never occurred. It's really hard to do that. It doesn't mean you shouldn't think about it, you shouldn't build something with incremental plans and try to address it, but you're never going to get to a perfect solution. I don't know if that helps, but you can't calculate the cost benefit of that necessarily.

Question 12: I wanted to sort of back up from the question about insurance products. Who is liable for what? If there is an incursion, whether it's a data breach, or whether it's some disruption of the system, what liabilities do RTOs have? And should there be something in the tariffs about the limits of liability, or should you not have any limits on liability, in order to assure vigilance?

Respondent 1: For my RTO, we are an LLC, so there are certain protections within that. But, at the end of the day, a liability is transferred to our members. And it depends on the scenario. It depends on the event. And we're liable, up to certain levels of insurance and all of that. But if there's a major event, it's going to be shared

across all of our membership. And that's like the easy answer to that question.

Questioner: Let me make it a little more difficult. What are the liabilities of an operator, or, if it's Florida, for example, Florida Power and Light, which is a vertically-integrated utility, and there is no ISO? So, I mean, if you look at the exposure as an operator, what is the exposure?

Respondent 1: If we could just use corporation A, B, C for this example?

Questioner: That's fine. We'll take a hypothetical utility that's not located in an organized market.

Respondent 1: I would say that it depends. If you look at California right now, and you look at the wild fires, there are huge liability issues that the utilities are dealing with. That's not the same everywhere, and there are certain state regulations that impact it, so I don't know that there's a simple answer to that question.

Respondent 2: This might not be the answer you want to hear, because it sounds like you want some certainty, but I think that's going to depend on what the issue is. We've talked about the disruptions, economically, being really difficult to value, and when you read these estimates in the billions, and then you hear others that say, "Well, it's a disruption for an hour and its back up, and there's minimal damage," I think you're going to have to look at when that disruption occurs and see how significant it was, and look at what the utility potentially did to prohibit that, based on the knowledge that they have.

Questioner: Yes, but let me just clarify a bit, because the part of the question about the tariffs relates to whether, as a matter of policy, regulators ought to take a look at tariffs and impose some sort of limits of liability in advance. I mean, you're certainly right. We don't know what the consequences are, but an issue that regulators always have to deal with is, what limits of liability, if any, do you put in the tariffs? So, how would you approach this question?

Respondent 2: That issue has not been raised as a tariff issue at this point. It doesn't mean it couldn't be.

Question 13: We have a standard for liability for the RTOs. It's gross negligence, and that's hard to breach. That was ordered in a series of orders, and there was a case in PJM involving a guy who cooked his arms…so that's been litigated, and each state has its own rules about limitations on liability.

So, my question. What is the right way for a regulator to look at the recoverability of costs that utilities undertake to protect themselves from cyber things? Should we relate to them as things that any corporation would have to do? If First Energy wants to protect its HR records, that's not really about it being a utility, that's more about it just being a corporation. If you're vertically integrated, and you're responsible for everything from generation all the way down to distribution, do we need to separate out those pieces? Let's say you're an independent power producer, and we say, "You've got to do this special cyber protection." Has that just now become a cost of doing business, the same way we just said, "Hey, you're intermittent. You now have to put in frequency controls on what you do, and it's just a cost of doing business. It's nothing you can recover." Is there a place where people will have done any sort of scholastic categorization of what things seem like they're recoverable and what isn't recoverable?

There was a question before about exercises. Exercises can be super expensive. When I was doing exercises in the Army, it was super expensive. Is that a special rate recovery issue? Does PJM need to have its own special schedule, or do they just augment their already existing admin schedule to get recoverability for new cyber things? I don't mean to be rambling. My deeper question is, has anyone parsed these out

into what looks more like it's recoverable, and what looks like it's not recoverable?

Respondent 1: I'm not aware of it, but you guys?

Respondent 2: This is a question I would love to know the answer to as well.

Respondent 1: What I would just add to that is, I'm not aware of it either, but, having said that, when you look at your cybersecurity investment that you're making at a utility, there's a lot of it that for which you're not distinguishing whether you're protecting an HR system or customer data or whatever, if you put cybersecurity controls in that are really capturing all of those. So, that decoupling by function is tricky, because there's shared investment. I'm not aware of anyone that's actually done it.

Respondent 2: I've been interested in this for a while. I've gone out and looked at rate cases, and also talked to commissioners, and the answer I got at that time, which is now maybe three or four years ago, was that spending on cybersecurity would never, in their eyes, or had not at least yet reached the level where it would be pulled out as a line item. So, it was never something that got to that level. But that question about how you justify it…are there worries about gold plating? Are there worries about over and under investment? That question is one I'm fascinated about, and I sought the answer, but couldn't find it, and I'm still curious.

Questioner: It's very possible that the amounts they're talking about are so little, as compared to, say, building around a critical substation, that it's just not worth the transaction costs associated with the discussion. That's another viable answer. Thanks.

Question 14: Since we're here in Florida, and we get hit by a lot of hurricanes here, what's the economic value of lost load due to weather disruptions related to hurricanes, floods, tornadoes, et cetera, wild fires, even, that we do get in North Florida, relative to cyber interruptions that we've had in the utility industry? Do we have any sense of magnitude here?

My other question is, what is the regulatory treatment for cybersecurity? Is it something that's capitalized? Or is it something that's expensed, in which case utilities in a regulated rate environment had very little incentive to do much of anything?

Respondent 1: It's a fair question. It's one that I would have to look at on a case-by-case basis. To your first question, in Florida, unfortunately, we have hurricanes every year. And so, the economic impact is starting to become somewhat obvious, in that you know certain areas and certain types of storms and what's required to rebuild. We were just hit by Michael, and the devastation on the coast was something that the state hadn't seen in an extremely long time. Before that storm, I probably would have said that we've got a pretty good handle on what all these costs look like from hurricanes. We're starting to get pretty familiar with what it's like to rebuild these substations and put new poles in and that sort of thing. We get a storm like that, and it changes everything. It changes the evaluation, because of the severity of what it did to that area. The unfortunate component about the cyber requirement is that you get even less consistency in terms of what that potential economic impact would be. I have seen articles, but I've not seen good research, on how to quantify those components. Even outside the utility world, from a data breach perspective, there's been a lot of debate as to how that really impacts a company and how many customers they lose in the long term. It's going to be very challenging to figure out what that dollar amount is, but it's going to need to be done.

Respondent 2: At my RTO, we don't spend a ton of time trying to calculate the economic value of lost load. Certainly, our members do. For them, the meters aren't spinning, and there's revenue loss, and there's all those things. I'm not aware of

anything that we've done there. But the thing that we do, whether it would be for a cyber event or a storm event is ask, how do we operate through lost load? We're looking at voltage stability. We're looking at minimum generation. And a lot of people, during an event, look at the ISO and they say, "Well, how are you going to get all this generation back?" and it's usually just the opposite. We've lost so much load that we've got plenty of generation, how do we deal with the excess generation? So, we look at it from an operational perspective, but I honestly don't know of anything that we've ever done around the economic value of lost load.

Questioner: Just a quick follow up. The reason I'm asking this is because we've talked about cybersecurity, and the attack surface is beyond n-dimensional, as we see it today. At least with storms, we see the damage from storms. I know how to do vegetation management. I can cut a tree down. I can decide not to underground a power line so that an oak tree pulls it up after I've had a foot and a half of rain. That's happened, back in the '04-'05 hurricane season. I know how to do that. I don't necessarily know how to protect against some of these other things. And so, I guess I'm looking at that cost-benefit analysis. Is there some way to quantify these things in terms of the value of lost load? It just depends who you are. But it's probably north of $10,000 a megawatt hour.

Respondent 2: I think if you had a cyber event and you were trying to determine the economic impact of it, it goes beyond just the lost load from a revenue perspective. It's the impact of that lost load to your commercial and industrial customers and your rate payers and all of that. So, it's a pretty complicated thing. One time in my life I did try to do a business case. I tried to calculate the impact of a blackout in a region. And you can do the math on it. They collected information about watt hour meters not spinning. There are lost opportunities that your members or your customers have. There are legal costs…and you can put a number of it. But boy, it's very much scenario-based, and it just depends on how bad it is.

Respondent 1: Couldn't there be a cybersecurity insurance analysis that would start to lead to some of that data at some point? They might be the ones to start putting some numbers on it.

Respondent 2: We're fixated on cybersecurity right now, but when you see what happened in Panama City Beach and Mexico Beach and along the coast of Taylor County, there, it is devastating, and are there things that we should be concentrating on more than maybe just cybersecurity? Not to say that it's not important.

Comment: With the utilities in Maine, we reached a gentleman's agreement with them about a year and half ago to proceed with great diligence on cybersecurity issues. Gentlemen's agreement, because there's nothing in their Terms and Conditions to that effect. There's nothing in tariffs, but we didn't want them to be behind the ball if things went bad. So, a year and a half has gone by. That particular utility has made investments, mostly in personnel training and some travel. But I took it as an action item to inquire, in the rate process about exactly what they did. I didn't see it broken out in their details that they presented, but I know that they hired individuals. I think it's a question that's interesting to ask, after a year and a half, particularly in the rate process. So, I will do that and let you know.

Question 15: Thank you. So, I'm hearing about three different kinds of attacks. There's the targeted data theft. There's the onetime malicious attack that could damage the operational system. And then there's the all-out, cross sector, repeated war. Which of these are we really talking about? Are we focused on a prevention of the "end of civilization" attack? Are we capable of handling an end of civilization attack? Or are we really just trying to deal with that midlevel, some jerk is out there trying to take us down for a day

or two days, kind of threat? What are we capable of handling?

Respondent 1: We have to deal with all those things. You can't pick and choose. It's dealing with data breaches and loss of personal information. It's dealing with potential attacks. The point that's been circling the room for a while now is, "Well, OK. So, let's assume we're all worried about it. How do we justify the cost? How do we assure it's not gold plating? How do we assure that they've done enough? We have a gentlemen's agreement, how do we know if they're abiding by it?" These are hard questions.

One of the points I tried to make here is that whatever answers we think we've come up with here are going to be provisional. We're going to not solve this problem. We're going to have to keep returning to it again and again. So, we want to a design processes that are iterative (rate cases are already one such process), so that we look and see what happened before and we try to do better the next time. I think that's the best we can hope for. That might be skeptical, and it might be sort of thin soup, but I think it's actually pretty good, particularly since we're dealing in an area with high uncertainty. We're dealing with real possibilities of significant and also insignificant forms of harm. Likely and unlikely events. And so, an iterative process that we can put in place that learns over time, that takes failures and that makes them accountable and visible, is, I think, one that should be lauded. That's a useful mechanism. That's a good way to approach it. It's not something that we're going to fix. It's something we're going to continually manage. So, unfortunately, we're going to keep having this conversation.

Respondent 2: From what I've noticed in the cybersecurity sector, the protection approach tends to be a layered one. I've heard the analogy where it's your castle, and you build a moat, and then you put gators in the moat, and then you put cannons on the top, the idea being that these guys and girls that are so good at this stuff and able to see these things, when they get past that first layer, they can be seen. And so, to your question, it's about keeping all of those folks out, and sometimes you don't know which one is trying to get all the way to the finish line. Maybe they're trying to get one or two layers in to get certain data. But with that layered protection, it does allow the folks, both within government and out, to pick up on those things, and hopefully then prevent them in the future.

Respondent 2: Let me give you an example. When I opened up my presentation, you saw the control room and the operators and all that stuff. And if there were a cyberattack that rendered our systems inoperable, and we couldn't control the grid, what would we do? We have plans for what we would do. We have systems that we would spin up to allow us to operate in a suboptimal mode. I would want to give my operators as much visibility to the grid as they could get. Gold plating would be, I'm going to build another control center that's totally disconnected, it's on different technology, it's diverse, it's redundant…we can't afford that. Nobody can afford that, but am I prepared? If there's an attack on the control system, do I have a plan for what I would do? The answer is yes. And it's suboptimal. It's not perfect, but that's kind of how we look at it, because we're not the business of gold plating. We're in the business of trying to operate through an event.

Question 16: I'm just curious about whether there really will be a need to make significant investments. The reason I'm curious is because no deed goes unpunished. And everybody in the RTO is likely to get punished. And by that I mean, if PJM says, "You must do this," the generators are going to fight with the market monitor about whether they get any kind of return on the investment, where the transmission owners just go and rate base it and get a return on investment. So, I'm wondering if you think there will be any significant investments required, and about the best way to handle it. Is it through a FERC NOPR? Is it through PJM assigning the

costs? How do you make sure that they are equitably collected and assessed?

Respondent 1: First and foremost, there has already been a significant investment that's been made in cyber. And, when I look at the RTO footprint, I would say that our transmission owners have done a tremendous amount to support cybersecurity. Our generation owners have done a fair amount around there. But I think, as you look at your business, I think each entity is calculating, what is their tolerance for a cybersecurity event? I don't see our role as an independent system operator ever dictating to our members, "This is exactly what you need to do." I don't know whether FERC would do that at all. But if I'm the transmission owner, or I'm the generation owner, I'd better be thinking really hard about cybersecurity. And it's important. Does everybody need that same level? No. I think it needs to scaled, based on what that business imperative is.

Question 17: As the previous questioner brought up, there is, at least conceptually, a framework for value of lost load, which we've done for short duration outages. Dan Shawhan at RFF did a quick scan of the econ lit, and there's basically nothing about these value of lost load estimates for extended outage events. So, that's a big issue in and of itself. It also raises the question of whether there's a different economic apparatus, down the road, for restoration services that would go even beyond your conventional black start capabilities.

From an industrial load perspective, typically, the value of lost load for us and for brief outages is exceptionally high, relative to other consumers. But for long duration outages, it's much lower--in fact, probably lower than for any other consumer classes. So, there's a differentiation in value of lost load across customer classes. And that just seems like a huge area to try and inform this policy dialogue. I want to see what other areas, in addition to that, would be helpful in framing the conversation around the cost-benefit framework or an acceptable risk level. Because there's no barometer for socially acceptable risk. Reliability standards, right now, are made irrespective of costs, and oftentimes with no basic attempt to even quantify benefits. So, what types of research or framework development do we need to be able to ensure that we're undertaking prudent actions, and not gold plating the system?

Respondent 1: This is, to me, a very fascinating question. This seems like a question that it would be valuable to figure out and research closely. I'm curious to know if there are other similar types of hazards or risks, moving beyond cybersecurity, where we have emerging risks that are hard to quantify and that are into sort of the institutional process that is geared towards cost-benefit analysis. This can't be the first and only time we confronted that sort of challenge. Maybe the way to think about it as a research problem is not to look at cybersecurity, but to look at those other sorts of emerging risks, and work backwards towards cyber security.

Respondent 2: I personally think it would be extremely beneficial to have some of that. I originally thought about this, and I thought hurricanes, and I thought "Well, there are some similarities, but it just becomes extremely challenging to compare something like that." And so, to your point, you've got these short term losses and short term reliability analysis that maybe can be scaled in some way to appropriately calculate those. I don't know what that is, but I love the idea and the question.

Respondent 3: I would echo that. I think it would be great to provide as much transparency as we could around the economic value of lost load. I think everybody's got a different perspective on it, and I think doing research on it would inform the discussion. Because right now, everybody's all over the place. We've done some work around fuel security. And we've recently published a paper that's on our website. We looked at issues having to do with retiring plants and potential disruptions of gas pipelines and all of that, and

we've gone as far as doing an analysis for hours of load shed. So, we didn't do the economic analysis, but you can go out in the website and look at that. But you can actually see, at least, what our analysis says, and it's very much scenario-based. It depends on the scenario, but I think that should help inform investment and all that. So, I think I would take that value of lost load, and I'd keep running with it. I wouldn't add much more to it right now. I would really try to get the analysis of that in a very concrete way to get discussion around it so we can all debate, so we can make the best decisions we can make.

Respondent 4: I think the problem is actually, in many ways, easier than it sounds, because the current situation is so bad. If you want to read about this, there actually has been a lot of discussion of this in front of the Public Utilities Commission in Texas, where they've tried to look at this very issue, asking the question, what's the implied value of lost load in a lot of the existing reliability standards? And the numbers are stunning. And when you face up to the reality that we're designing reliability standards, or risk based standards, that imply that we think the value of lost load is $500,000 a megawatt hour, you think that it wouldn't be hard to do better than that. And they've had explicit discussions about this. They've had studies done, particularly by the Brattle Group, which have been very important in that process. I mean, getting away from $500,000 is not very hard, but is the number $5,000 or $10,000 or $20,000? Who knows? But in some sense that's so far away from what we're actually doing with a lot of these reliability standards that error doesn't matter very much. And that is in the record.

The other thing is, as we have discussed here in the past, the Public Utility Commission has actually said that they were not going to enforce the one in 10 reliability standard, because the value of lost load implied was just too high. And so, they were going to report it, because they have to, but they're not going to, anymore, at least for the moment, enforce those reserve requirements.

Question 18: I have concerns about the development of an insurance market, partly because it's a two-sided problem. It's the supply side of the utilities. It's the demand side of consumers and businesses. The more that utilities are to invest in resilience of any kind, the less likely consumers are to self-insure--buy generators and so forth. So, it's an even tougher problem to solve, but when you've got insurance markets involved, I get concerned with the moral hazard problems that can occur. I'm thinking of the Price-Anderson Act of 1954 and the $25 million cap on damage from nuclear accidents. And maybe that played a role in the Three Mile Island. I don't know.

Respondent 1: I think it's a fair concern. We've seen, in Florida, that when the first hurricane hits, you don't buy a generator. When the second one hits, you don't buy a generator. When the third one hits, you go buy a generator. And so you do start to see the difference in human behavior to offset the fact that maybe for a few days your power's going to be out.

You don't hear the same dialogue in the cybersecurity sector. You don't hear, "Maybe the grids going to go out for a few days because of an attack, so I should have a backup generation at my home." But I do think, because of the other acts and the risks that are involved, if you do see those things occurring, to your point, I think human nature will apply.

Respondent 2: The only thing I would add to that is that I think even the insurance companies have the limit of liability, and there's a recognition that nobody can insure for the Black Sky event.

Question 19: Just a clarifying comment to something that was just said about the Utility Commission of Texas deciding not to operate to the one in 10 day standard. There's nothing in the NERC criteria that says you must operate to it. All it says is, "Thou shalt do a study." After that,

you can do whatever you want with it. You can toss the study in the garbage can.

The other thing, as we close this session which has been very enlightening in many ways for me, is that we should start collecting data on the cyber outages like we do for any other outages. I mean, after all, EIA just came out with data for '16 and '17 comparing them for the SAIDI (System Average Interruption Duration Index) and SAIFI (System Average Interruption Frequency Index) duration and frequency increases for system interruptions for customers. Why don't we have the same thing for cyber security?

That was a great point about hurricanes. The issue is, how often do we see these cyber events on the grid? We know we've got the 2003 blackout. We know we've got the '65 blackout. We've got the '77 blackout. We had the 2003 blackout in the Northeast. And we had the 2003 blackout in Italy. We've got Ukraine. And does anybody else have a cybersecurity blackout? No. It seems a lot less likely, is my point, unless there's a Trojan horse sitting there somewhere, and we're just banking on mutually assured destruction. So, that's just a casual observation, but I think having that information would actually help us bring this into focus.

Session Three.

***CHEVRON* Deference: The Impact of Its Demise on Electricity Markets**

The Federal Power Act is written in broad strokes that leave room for considerable discretion by the regulators. In Chevron U.S.A. vs. Natural Resources Defense Council, Inc., the U.S. Supreme Court called for deference to administrative agencies as long as they were operating within the scope of their legal powers and applying their expertise based upon evidence and reasonable judgment. The broad language of the Power Act, coupled with the principles enunciated in the Chevron case, provided the FERC with considerable powers to re-shape energy markets, a course which they have been pursuing for more than a generation. What would the weakening of the Chevron doctrine mean for FERC and its ability to shape electricity markets and enforce its rules? Would appellate courts effectively "retry" matters FERC decided and reconsider all of its aspects? Would the courts require more explicit congressional delegation for FERC to act? Do courts, or Congress, for that matter, possess the expertise to resolve the arcane issues regulators deal with? Would judges seize on issues such as process and jurisdiction and pay short shrift to the substantive issues before them (a course that some saw exemplified in EPSA vs. FERC, where the Courts focused in on jurisdictional questions and virtually ignored the central question in that case, how to price demand response)?

Moderator.
This panel this morning is really motivated by a couple of things. Obviously, there's a debate about how much deference courts should pay to findings of regulatory agencies, both in terms of how they view the facts, but also in terms of how they interpret the laws that they're operating under. Given that the Federal Power Act is a classic delegation of very broad authority using such very precise terms as "just and reasonable," this issue, how this debate turns out, has kind of a big impact on how FERC does its work. For that matter, you can extend it to what happens at state commissions, as well.

Related to that, then, are a couple questions. One is how much deference the agency is given for determining what the factual situation is, and also how they interpret the law. But also, to the extent to which judges don't defer on either of those questions, what does that mean in terms of who's going to be making decisions about electricity markets, and where they're going to go? Are we going to take those decisions and move them from an agency with expertise to courts where it's hit or miss as to whether the judge has any idea what he or she is deciding, in fact? And so, what does this do to markets, and how much would this actually slow down the ability to make regulatory decisions in a dynamic market?

Our first speaker is going to do kind of a *Chevron* doctrine 101, introduction to the issues, and then each of the panelists will give their take on those things. One other question that comes up, of course, is, even if the courts cut back on the deference under the *Chevron* doctrine, how much practical difference does that make? Does it make a lot of practical difference, or is this a debate with the significance which may not be as great as a lot of people think?

Speaker 1.
Good morning, everyone. So, as you saw in the program, the title of this panel is "*Chevron* Deference: The Impact of its Demise on Electricity Markets." I think the word "demise" is overstated, or at least premature, so I was going to call my contribution "Recent Changes and Trends in *Chevron* Deference and their Impact on Electricity Markets." But I don't actually know anything about electricity markets, so I'll just call my part [LAUGHTER] "Recent Changes and Trends in *Chevron* Deference."

Before we get to the question, of the recent changes and trends in *Chevron* deference, let's start at the beginning. What is *Chevron* deference? *Chevron* deference is the principle that when a court has occasion to review a federal government agency's interpretation of a statute that the agency administers, the court will show deference to the agency's reasonable construction of an ambiguous provision in its governing statute. For every agency, Congress will have passed a statue that created the agency, gave it its structure, gave it its mission, vested it with powers, and told the agency what to do. And then the agency goes forth and implements that statute. It frequently happens that, as the agency is implementing its governing statute, questions arise as to the meaning of the statute. There are ambiguities in the statute. How are those ambiguities to be resolved? That's where the principle of *Chevron* deference comes in.

Let me give you a concrete example. The *Chevron* case itself that gave rise to this principle was an environmental case. It arose under the Clean Air Act. Among other things, the Clean Air Act regulates stationary sources of pollution. The Act said that if you want to modify a stationary source of pollution so as to increase the amount of pollution emitted from that stationary source, then you have to get a permit. And the permit requirements were very stringent. So, as the EPA was implementing this statute, the question arose, what exactly is a stationary source of pollution? And it particularly arose in the following context. Suppose someone has a manufacturing plant, and it's got two effluent pipes, each of which, let's imagine, pumps out 50 units of pollution every day. And the plant owner says, "I want to upgrade the plant in a way that will be good for my business, and when I'm done with this upgrade, one of the effluent pipes will be shut off entirely and the other one will then put out 70 units of pollution a day." Is this a modification that requires a permit? Well, it depends what you think a stationary source of pollution is. If each of the output pipes is considered to be a stationary source of pollution, then the lower output pipe has increased its output from 50 to 70 units of pollution, so a permit would be required. The EPA said, "No, knowing this situation, we think of the stationary source as being the plant as a whole." This was called the "bubble concept." The EPA said, "Imagine that the whole plant is encased in a bubble. You can't see inside the bubble. All you see is what comes out. If you look at it that way, what you would observe is that at first 100 units of pollution are coming out of the bubble every day, and then only 70. So, if the stationary source is the whole plant, then pollution output from the plant as a whole has decreased. And so, no permit is required." As I said, the permit requirements were very stringent. So, this would make a big difference. So, the EPA said, "That's how we see it." Environmental groups were upset. Environmental groups said, "No, we want you to be more stringent. We think each pipe is a stationary source." So, they brought a lawsuit. They said, "What the EPA is doing is illegal." And this went up to the Supreme Court.

Now, in the pre-*Chevron* days, the Supreme Court would simply have said, what does the statute mean? We're a court. We interpret statutes for a living. It had always been the Supreme Court's practice in this kind of case to give respectful attention to what the agency said the statute meant. But, in the end, the Court said, "We're the Court. We interpret the statute. If we think it means something different from what the agency thinks, our interpretation is controlling." That's how things used to work. In *Chevron* the Court said, "No, it's going to work differently." *Chevron* said that in this kind of case, the court should ask two questions, which have famously become known as *Chevron* Step One and *Chevron* Step Two. In *Chevron* Step One, the court asks, does the statute clearly address the precise question at issue? If the statute is clear, then we're all bound by it. The court, the agency, we all have to do what Congress clearly commanded. So, if the court thinks the statute is clear, it just orders the agency to do what the statute clearly says. But if the statute isn't clear, the Court said, then, step two, the court asks, is

the agency's interpretation reasonable? Has the agency come up with a reasonable interpretation of the statute? Could a reasonable person think that's what the statute means? If so, the Court said in *Chevron*, the court simply upholds the agency's interpretation, even if the court thinks it's not the best interpretation, as long as it's a reasonable one.

So, this is very significant. If you imagine an ambiguous statute that has a range of reasonable interpretations, *Chevron* says the court is to uphold the agency's interpretation, because it's reasonable, even if it's not the best one. So, coming back to *Chevron* itself, the Court said, "We've looked at the statute. We don't think it resolves this issue of what constitutes a stationary source--whether it means each pipe, or whether it permits the bubble concept. That's ambiguous. And we find the agency interpretation to be reasonable. So, without regard to whether it is the best interpretation, we uphold it." And that's been the rule ever since.

That was 1984. Ever since, the court has applied this principle that reasonable agency interpretations of ambiguous provisions in their governing statutes should be upheld. Ever since, however, there has been a lively debate about, of course, whether this is a good or a bad practice. Also, about details of how this principle applies in particular situations. And the trend over the last, say, 10 to 20 years has been that the Supreme Court keeps coming up with new situations in which it says, "Oh, the *Chevron* principle doesn't apply in this situation." There seems to be some increasing question about whether we really like the *Chevron* principle.

I think the reason there's so much debate about the details of how *Chevron* should apply is because we never really agreed on why we have this deferential principle in the first place. It is somewhat surprising. If you think about how judicial review works in ordinary civil litigation, when an appellate court reviews findings of a trial court, a very basic principle is that the appellate court shows deference to the trial court on questions of fact, but not on questions of law. Questions of law are reviewed *de novo*. *Chevron* is unusual because it involves deferential review on a question of law.

Why do we have this standard practice in civil litigation? Well, I would say there are two main reasons. One is a reason of comparative expertise. We think a trial court is in the better position to find the facts of the case, because it sees the evidence live. The court of appeals just reads a transcript later. We don't think the trial court is in the better position to know the law. The court of appeals knows the law just as well as the trial court, perhaps even better. And then the other important reason is uniformity. If courts of appeals would uphold any statement of law from the trial court as long as it was reasonable, even if it wasn't best, then the law would vary depending on which trial judge you happened to have in charge of your case. That would be undesirable. We want the law to be uniform from case to case. We don't want the facts to be uniform from case to case. What would that even mean? That doesn't mean anything. But we want the law to be uniform from case to case.

So, that's how it works in civil litigation. Why do we have this very different principle of deference on questions of law in administrative cases? There isn't really general agreement on that. You might observe that the reasons I just stated for civil litigation could be thought to suggest deference on questions of law in administrative cases.

Take expertise. You might say, if the question is about the meaning of the statute the agency administers, the agency actually would have more expertise and would be more likely to know the correct meaning than a court, because the agency works with the statute every day. The court sees the statute two or three times a year. And the agency sees the whole statute. The court just sees a little piece of it. The *Chevron* case was about two words in the Clean Air Act. That's very

typical, that a court case would be about one phrase within a statute, whereas the agency sees the statute as a whole. So, you might say expertise suggests deference.

Take uniformity. You might say that the desire for uniformity suggests deference. The reason *de novo* review promotes uniformity in civil litigation is that you have one court of appeals reviewing decisions from many different district courts. In administrative law, you have one agency with national jurisdiction, the output of which is reviewed by many different courts. So, deference might promote uniformity in the administrative context.

However, either of those concepts are the main reasons the Supreme Court gave for *Chevron* deference in the *Chevron* case. It kind of talks about both of those concepts. The most official reason the Court gave is that the Court said, "When we see that Congress has told an agency to administer an ambiguous statute, we will understand that. We will deem that to be a delegation of power from Congress to the agency to resolve the ambiguity." So, the most official reason, I think, for *Chevron* deference is that's our understanding of what Congress wants. Not that Congress ever said that, but that's how the Supreme Court understands it. And then they also threw out a couple of other ideas. They said, "Look, someone's going to have to resolve these ambiguities. Wouldn't you prefer that they be resolved by the at least somewhat politically accountable agency administrators, as opposed to the totally unaccountable judiciary? There is so often a fine balancing of policy involved. That's also better done by the agency. We like the process by which the agency comes up with the interpretation." So, they threw out all these different ideas about why we have this deferential review without perhaps clearly settling on any one of them.

How has this impacted subsequent puzzles about when *Chevron* applies? There was a case in the 1990's, in which the Court said, "We will give an agency less deference if it changes its interpretation over time. If the agency just tells us what the statute means and sticks with that, then we defer. If the agency changes its position over time, we give less deference." Does that make sense? Well, going back to this diagram, if you think that an ambiguous statute has a meaning, it has a particularized meaning, and the reason we defer to the agency's interpretation is, we think the agency is the expert and more likely to know the meaning than a court, then you might say, "Well, if the agency changes its mind over time, wait a minute. Are you really the expert if you said the statute meant this, and we said, 'Alright, you're the expert,' and then later you said, 'No, it means the opposite?' Maybe you're not as expert as we thought." So, if you think the basis for *Chevron* deference is expertise, then giving less deference to the agency when it changes its mind makes sense. But if you believe more in the political accountability theory, or the delegation theory, if you say, "Look. The whole point of this is that there is no determinant, meaning that Congress delegated this to the agency to allow it to come up with a good meaning for the social circumstances that exist at the time," then maybe the agency should change its mind as circumstances change. Then you would give just as much deference when the agency changes its mind. And in a case a few years ago called the *Brand X* case, that is what the Supreme Court said. So, I think the rule today is that deference applies whether or not the agency has changed its mind, but it's still a little murky.

Another interesting topic that came up recently is, what if the question is really momentous? There was a case called *FDA vs. Brown and Williamson Tobacco* about the question, is nicotine a drug within the meaning of the Food and Drug Act? And if it was, then the FDA could regulate cigarettes and perhaps ban them. Well, after years of saying no, the FDA said, "Well, looking at the statutory definition, looking at recent scientific evidence, we think nicotine is a drug." And they came up with some regulations for cigarettes. That went up to the Supreme Court. Tobacco

companies were not happy, as you can imagine. The Supreme Court said, "This is so momentous. This would have such a huge impact on our society that we can't believe Congress implicitly delegated this to the agency." So, again, if you think the basis of *Chevron* deference is this implicit delegation theory, the Court said that some things are so huge they can't implicitly delegate it. So, there is a new exception to *Chevron*.

And then the biggest exception to *Chevron* the Court came up with recently is they asked the question, does this deference principle apply regardless of how the agency came up with its interpretation? And they said no. They said, "If the agency adopted its interpretation by a process that is too informal, we're not going to apply *Chevron* deference." So, as I say, there's been this trend of cases in which the Supreme Court keeps saying, "Here's a situation in which *Chevron* doesn't apply," causing some to speculate that maybe they're not so thrilled with the whole concept anymore.

And so, the result is that before you get to the two steps of *Chevron*, there have been so many exceptions that you have to have a third step. The numbers one and two were taken. So, this is now known as Step Zero. You start by asking, does *Chevron* apply at all? And you have to go through these various exceptional circumstances that the court has articulated. That's Step Zero if you get past that, then you apply steps one and two.

The other big thing that's happened is there's been this argument raised by a professor named Phil Hamburger at Columbia, saying that *Chevron* is unconstitutional. His argument is the Constitution assigns the interpretive power to courts. Courts are supposed to interpret laws. No one, not even Congress, could say, "We're taking that power from the courts and giving it to the agencies." I recently wrote an article saying that I think that's incorrect. If the interpretation of the statute is that it lets the agency make a certain decision, that's still an interpretation. So, I think that's wrong. But two justices, Thomas and Gorsuch, have said, "Yeah, we think *Chevron* is not constitutional," essentially for the reasons stated by Professor Hamburger. So, there's an increasing question about *Chevron*.

Just to wrap up, *Chevron*, is it good, bad or indifferent? Well, certainly the biggest impact of *Chevron* is that it greatly enhances the power of the executive. If it's up to the executive agencies to decide what their governing statutes mean whenever they're ambiguous, well, they're very frequently ambiguous. So, *Chevron* shifts a lot of power to the executive. From where? Obviously from courts. Without *Chevron*, the court would resolve the ambiguity. Courts have less power because of *Chevron*. Somewhat less obviously, it also decreases the power of Congress. If you tell Congress, "Unless you write your statute really clearly, we're going to let the executive resolve any ambiguities," you're forcing Congress to work extra hard. The English language in which statutes are written is only so precise an instrument for expressing what you're trying to say. If you tell Congress, "Any ambiguity will be deemed a delegation of power to the agency to resolve the ambiguity," Congress has to work extra hard to express what it's trying to say.

And so, for these reasons, *Chevron* is under attack, somehow mostly from the right. I'm not sure why. It's become somewhat ideologized. What I've said so far, I think, should show that *Chevron* is not inherently conservative or liberal. It's good for the executive. So, when the executive is controlled by conservatives, it's good for conservatives. When the executive is controlled by liberals, it's good for liberals. So, I'm not sure why it's become ideologized, but somehow it's mostly the right that's attacking *Chevron*. So, the trend does seem to be that *Chevron* is being limited. I still think it's there. I would say it certainly has not suffered a demise. It is still the law today, but it's trending in a negative direction, and who knows where it will be 30 years from now.

Speaker 2.

I'm going to pick up where Speaker 1 left off. My main goal is to try to answer the question of, does this even matter? Does it matter whether we keep *Chevron* deference in its current form, or whether we narrow it, or whether we get rid of it? I'll focus primarily on a dataset I have on 11 years of decisions by the circuit court that deal with *Chevron* deference.

I did want to spend just a little bit more time on the *Chevron* skeptics and flesh out some of those arguments. As Speaker 1 mentioned, we have a number of Supreme Court justices now that have joined a lot of lower court judges…it seems like to get a judgeship these days, you have to express concern about *Chevron* deference. It's like a Trump calling card. But you do have some Supreme Court justices who have weighed in, and Justice Clarence Thomas, as Speaker 1 mentioned, in *Michigan vs. EPA*, wrote separately to express some concerns about *Chevron* deference. I'll get back to what those concerns are in just a minute. Justice Gorsuch, if you watched his confirmation hearings, *Chevron* deference was front and center, because, when he was a 10th Circuit Judge, he wrote a concurrence where he expressed similar concerns. I think it's probably the most detailed account of the constitutional concerns. The Democrats on the Senate Judiciary Committee had a hard time dealing with this, because it was an immigration case. And that kind of underscored what Speaker 1 was saying about the ideological neutrality of *Chevron* deference. Justice Gorsuch was arguing that the federal government misinterpreted the Immigration and Nationality Act to extend a 10 year bar from re-entry in the United States to a non-citizen. And so, those are the kind of concerns that you had then. Justice Kennedy, in one of his last decisions on the Court, earlier this year, expressed similar concerns in an immigration case, saying that the way that the lower courts are applying *Chevron* deference is raising these constitutional concerns that my colleagues have mentioned.

So, what are those concerns? I just want to kind of flesh them out a bit. Like Speaker 1, I don't find them persuasive, at least in the way they're currently formulated. But they are worth grappling with, because judges across the nation are thinking about them and because, even if it's not unconstitutional, constitutional concerns can be reasons to get rid of the doctrines as a matter of *stare decisis*.

When we're talking about the constitutional concerns of *Chevron* deference, I put them in two big buckets. First, Article 1 concerns, referring to the constitution of Congress. So, Justice Thomas and Justice Gorsuch have said that *Chevron* deference raises an Article 1 concern, because it encourages Congress to over-delegate power to federal agencies. If we didn't have *Chevron* deference, the argument goes, Congress wouldn't delegate as much law-making authority to federal agencies, because it would go to the courts. So, they'd be more careful, more detailed in their statutory analysis. On the flip side, you have the Article 3 concerns about the judicial branch, going back to the famous *Marbury vs. Madison* case that it's the judges' duty to say what the law is, and by Congress giving that duty to agencies, it takes that power away from the courts. I floated what I'm calling an Article 2 concern that hasn't gotten much traction. I'm not really convinced by it myself. But it turns out that agencies play a really substantial role in drafting the statutes that they actually then administer. And so, there could arguably be a self-delegation concern that the same actors are drafting the laws that they then have the power to interpret and implement. I think Judge Jordan on the Third Circuit is the only one that's even cited me for that. But there is that kind of concern, as well, that agencies aren't just involved in adjudicating, enforcing, and interpreting, but they're also involved in helping Congress legislate.

For me, the Court doesn't have to find that *Chevron* deference is unconstitutional. All they have to find is that it raises enough constitutional concerns that it shouldn't be there. And this gets

back to the statute that governs judicial review of federal agencies, the Administrative Procedure Act of 1946. The statute says that courts shall determine all questions of law. Now, we've read that to mean that *Chevron* deference can exist along with that. It's not the most easy interpretation of that. The statute says "courts," not "agencies." It doesn't say anything about *Chevron* deference. I think there are some good arguments. In the Q&A we can go back and forth on that, if you're all interested. But I do think that's important. We're talking about these constitutional concerns, but I think that if the Supreme Court gets rid of *Chevron* deference, it's not going to be because they say it is unconstitutional. They're just going to say that it was a battle to start with, and the constitutional concerns would probably push them in that direction. Now, there aren't more than two or three votes on the Supreme Court right now to get rid of *Chevron* deference. But there are a lot of votes to actually narrow it further, along the lines that Speaker 1 had said.

So, now I get to kind of the main event of what I'm going to talk about. Does it even matter? There are a fair number of administrative law and federal court scholars out there who just say, "Who cares about this? Judges determine, decide what they want to do. And then they backfill it in with reasoning. So, deference doctrines don't matter." There's a famous study by Bill Eskridge and Lauren Baer where they looked at all of the Supreme Court decisions dealing with judicial deference and they were like, "The Supreme Court applies *Chevron* deference when they want to, and they don't when they don't. They just kind of conveniently cite it when it's helpful to them." And that was somewhat my anecdotal experience, working at the Court. I will say that there's a newer study that came out this year that tried to replicate the Eskridge and Baer study. And they did something different. So, Eskridge and Baer read each Supreme Court decision and coded it, like I've done. I'll go through my data in a minute. And the new study went back and read all the briefs. And it turns out that if you control for whether the parties cite *Chevron* deference, a lot of that gamesmanship goes away. So, in other words, sometimes the parties agree that the deference doctrine does not apply, and thus should not be cited. Having worked at the Justice Department of Civil Appellate staff, I might add that they might strategically decide not to raise the deference doctrine, because they were worried it might be narrowed or eliminated, or for some other reason.

There is this argument that judges are just going to rule however they want to rule, and the deference doctrine's not going to matter. I'm not in that camp. For at least three somewhat related, but independent, reasons, *Chevron* matters a lot. And before I get to the main one I'm going to talk about, I want to list two others. One, I spent over a year interviewing agency rule drafters about how they draft regulations. I asked them 195 questions about things like, which tools do you use, and how do you approach it? And the tool that most reported using when they draft regulations is *Chevron* deference. And I asked a number of follow up questions, like, well, how do you use *Chevron* deference? And the evidence isn't quite as strong, which doesn't surprise me. But you got this theme coming back, that we use it in the sense that, if we know it applies, we're going to win more in court. And therefore we, the agency, are going to be more aggressive in how we interpret the statute. If we don't think it's going to apply, we're going to be less aggressive. We're going to be more faithful, or more constrained, in how we interpret the statute and that regulation. So, one thing I think you'll see is that if the Court continues to narrow *Chevron* deference or get rid of it altogether, agencies will respond in a way that might be more conservative, more narrow, more constrained, to the statutory mandates that they have.

The second reason *Chevron* matters is that, for those that are either in house, or at firms that are litigating these issues, when you're counseling clients, if you know *Chevron* deference applies, you're going to tell your client, "You're not going

to win. The money you're going to spend to challenge this agency statute interpretation is not worth it, because of the heavy deference that courts give to the agency interpretation."

And then the last reason, which I'll spend the rest of my time on, is that looking at the Supreme Court is not the right answer for trying to figure out the impact of *Chevron* and the courts. The Supreme Court hears about 70 cases a year. Of those, two maybe three are *Chevron* cases. The vast majority of *Chevron* cases are in the circuit courts. And so, you have to get a much better sense of the impact of *Chevron* deference in the circuit courts? And that's what a co-author, Kent Barnett, and I tried to do. We looked at 11 years of every case that's cited *Chevron* deference or *Skidmore* deference, which is a lesser deference standard, in the federal courts of appeals. We had a dataset of a little over 2,000 decisions that cite Chevron. About 1,300 of those were actually relevant, in terms of dealing with an agency's statutory interpretation. We had about 1600 interpretations in that dataset. We coded for a bunch of different variables to kind of get a sense of what's going on. In our dataset, when the court decided to apply the *Chevron* deference framework, agencies won about 80 percent of the time. When they refused to apply this *Chevron* deference framework (at Step Zero, as Speaker 1 was saying) the agencies won 40 percent of the time. That's a really awful win rate for an agency that's advanced an interpretation.

Now, if we split it up by Step One and Step Two…remember, as Speaker 1 said, Step One asks, is the statute ambiguous? If you went to law school, or if you advise clients, you will say that almost all the action happens in Step One. The case is won or lost in Step One. And our data definitely confirms that. When cases are decided at Step One, when the court decides the statute is unambiguous, in other words, the agency wins about 40 percent of the time. That's the same as if they don't apply *Chevron* deference. Whereas, if you get to Step Two, the agency wins nearly 95 percent of the time. And so, if the statute is ambiguous, the agency wins almost 95 percent of the time in the federal courts of appeals over this 11 year period. Only in 51 cases did an agency lose at Step Two. I'm happy to talk more about what those cases look like in the Q&A, if that's something that interests you.

So, the big picture suggests that *Chevron* matters. When you drill down to the data, the story gets a little bit more complicated. It matters a little bit differently, depending on what circuit you're in and what agency or subject matter is being addressed. In terms of overall win rates, it's not surprising to me that the Ninth Circuit's at the very bottom. [LAUGHTER] The best place to challenge an agency action, especially in immigration cases, is in the Ninth Circuit. I don't know if you all saw that Rod Rosenstein had an op-ed last night (or this morning), suggesting we should create a new Immigration Court of Appeals so that the Ninth Circuit doesn't hear any of these cases. The Fifth Circuit, as I'm sure you all know, this is where the US Chamber takes all their regulatory challenges, because there's a nice set of judges down at the Fifth Circuit that are pretty receptive on the other end. So, I'm not surprised to see overall agency win rates pretty low down there. The DC Circuit being near the top doesn't surprise me either.

However, when you separate out overall win rates and look at how they apply *Chevron* deference, things get kind of interesting. So, the DC Circuit, which is the expert administrative law court in the United States, applies the *Chevron* deference framework about 90 percent of the time. The circuit where I'm at, the Sixth Circuit, strangely only applies it 60 percent of the time, which is weird. I don't exactly know why that would be the case. To kind of show it in a different way, when the Sixth Circuit applies *Chevron*, the agency wins 90 percent of the time. When it doesn't, the agency wins 40 percent of the time, which suggests the kind of gamesmanship that I was talking about at the outset, that maybe some judges are just going to backfill it. I don't know. I don't have enough to drill down to the data on

that. But you kind of see how the circuits are different.

How does it break out by agency? At the bottom of that list on this slide is FERC, and it's not the bottom of the list. The list keeps on going. I didn't mean to be too deceptive there. 16th isn't too bad. I think we've got 22 agencies. For FERC, we have 38 cases in our dataset over 11 years that deal with *Chevron* deference. *Chevron* deference is always applied, in the FERC context, in our dataset. Agencies win 60 percent of the time. So, you kind of get a sense that they don't win as much, but the court always applies it.

Let me just pick up the question of, why do we have this doctrine? I'm in the Congressional Delegation camp. That's why we have it, because Congress delegates. But one reason why Congress delegates is political accountability. In the *Chevron* decision itself, the Court recognized political accountability as one of the rationales for delegation. And, basically, as Speaker 1 said, judges are not experts in the field, and they're not part of the political branches; agencies are. So, comparatively, agencies are more politically accountable. I want to just focus on that, because this is now Justice Kavanaugh's approach as well. One of his goals is to "help make statutory interpretation…a more neutral, impartial process where like cases are treated alike by judges of all ideological stripes, regardless of the issue and regardless of the identity of the parties in the case…" In other words, he doesn't want judges to appear or be politically motivated. I would guess the next sentence would be "Therefore I want to keep *Chevron* deference, because it removes judges from being involved." No, his next step is that we need to get rid of *Chevron* deference, which is a little bit of a head scratcher to me, because if your goal is to try to lessen the amount of politics in judicial decision making, you want a doctrine that shifts power to a more politically accountable agency that's supervised by the President and is overseen by Congress.

In another paper that just came out in the *Vanderbilt Law Review*, we did a deeper dive into the ideological impact of *Chevron* deference, looking at the probability of circuit-panel agreement for a liberal agency statutory interpretation when *Chevron* applies. What you would expect to see, if ideology mattered, is something like 100% agreement, when it's a really liberal panel and it's a liberal interpretation, going down to zero if the panel is really conservative. With *Chevron*, you don't see that. I'll kind of end there. *Chevron* removes a lot of the ideology from judges that you would expect to see, if you believe in kind of an attitudinal model and ideologically motivated judges.

So, if Chief Justice Roberts is right, that we don't have Trump judges and Obama judge (he is probably only partially right on that front), one way to make sure that that looks right is to have deference doctrines that give deference to political branches. And, as conservatives start to argue about getting rid of *Chevron* deference, if they're actually judicially conservative and not Libertarians, being judicially conservative may mean that you defer to political branches unless they're clearly wrong. *Chevron* deference, I think, is kind of a key part of that.

Clarifying question 1: I had a question on some of your data. The slide that shows deference by circuit, the first one that you put up, where it's got the Ninth Circuit being the least deferential…the Ninth Circuit's also the most reversed circuit in the Supreme Court, right? Is that true, or not? You hear that. I don't know if that's true.

Speaker 2: It depends on how you measure it. In terms of absolute numbers, I think they still are, but they hear like five times more cases than any other circuit, so...

Questioner: OK. So, let's assume that's true. Does your data at all show how many of those reversals are *Chevron* deference cases?

Speaker 2: I don't know.

Questioner: It would be interesting if there was a correlation between those two—if those high reversal rates were because of, or at least somewhat correlated with, the lack of deference.

Speaker 2: I don't know. I can think, anecdotally, of a number of cases where the Ninth Circuit has been reversed, but so has the Fifth Circuit. The Federal Circuit gets reversed a lot on *Chevron* deference issues. But I actually don't know.

Questioner: That could be your next paper. [LAUGHTER]

Speaker 2: Yeah. I'm a little *Chevroned* out at this point. [LAUGHTER]

Comment: I think a lot of us are.

Clarifying question 2: Thank you. Very interesting. Do you use a multivariate approach, or regression approach, to identify and control for type of agency, type of docket, that type of thing?

Speaker 2: In the descriptive stuff, obviously not. The *Michigan Law Review* piece is all descriptive, and just kind of presents it. In the Vanderbilt piece that just came out, we definitely control for everything. So, when you saw the charts at the end where you see ideology, that's controlling for everything else. I mean, there are severe methodological limitations with the study. We didn't look at cases that did not cite *Chevron* or *Skidmore*. And you could imagine, I don't buy it, but you could imagine that judges might strategically not cite it. I think a more plausible limitation is that litigants don't cite it when they don't want it to be... And so, that is the limitation to this study, for sure.

Speaker 3.

I think my job on the panel is to take the discussion that we had so far and sharpen the pencil on some of the questions. So, what does this mean for FERC? First, I think I agree with the previous panelists that the winds appear to be blowing in a somewhat anti-*Chevron* direction. The transition from Scalia to Gorsuch is a big deal. It's a significant shift, for administrative law types. It's not quite Thurgood Marshall to Clarence Thomas big, but Scalia was the Court's most ardent defender of a strong *Chevron* doctrine. And I think he did as much as anyone to make *Chevron* into the thing it is today. And, as Speaker 2 noted, Gorsuch has openly questioned the constitutionality of the doctrine. It doesn't get any more stark than that.

I'll put my cards on the table. I'm a bit more sympathetic to the *Chevron* skeptic view than either Speaker 1 or Speaker 2. But it's less clear to me that FERC will be affected as much as some other agencies by a gradual decline in the *Chevron* doctrine. To understand why, it's important to distinguish between sort of New Deal agencies and what I would call second wave agencies. The New Deal agencies, of which FERC's predecessor, the Federal Power Commission, is one, were created at the height of Congress's trust in agencies as sort of non-partisan technocratic engines of governance, so their animating statutes are really broad and really vague. The idea is that Congress is going to sketch the broad strokes of design, and then leave it to the agencies to run with it. Now, compare that to the second wave of agencies which come in the 1960's and 1970's. By this time, political elites are a little more jaded on agencies. They recognize phenomena like revolving door agency capture, which means that agencies aren't necessarily the do-gooders that the New Deal thought they were going to be. So, for agencies created during this period, Congress felt the need to add detailed, complex statutory frameworks to help govern agency behavior as a way to check what might be a tendency towards capture. I think it's the second wave agencies that are more likely to feel the pinch of a narrow *Chevron* doctrine, because there is more statutory language out there for courts to seize on in order to rein them in.

To put it a different way, *Chevron* is about interpreting ambiguities in statutes--what Speaker 1 called "implicit delegation." I don't think the Federal Power Act is ambiguous. It's clearly broad. Congress explicitly intended to delegate to the Federal Power Commission, and now FERC, a lot of authority. Now, one might argue that this runs afoul of a different doctrine, the non-delegation doctrine, which is the idea that Congress should be making the big decisions, not abdicating power to an unelected agency. But that's an argument for a different day. The point is that the Federal Power Act is not ambiguous; it's clearly broad and clearly gives FERC a lot of discretion. And I think you see this even in the amount of deference that the Federal Power Commission got in the pre-*Chevron* era.

One of the famous early modern administrative law cases is *Hope Natural Gas* in 1944. This is interpreting the Natural Gas Act, but the Federal Power Act has the same operative language. This is involving the duty, under the Act, to determine just and reasonable rates. And the *Hope Natural Gas* court held that this language, "just and reasonable," was inherently delegatory. It's up to the Commission to decide what is a just and a reasonable rate. Congress intended the Commission to be deciding those terms. And the court explained, moreover, the Commission's Order to be a product of expert judgement which carries a presumption of validity, "he who would upset the rate order under the Act carries a heavy burden of making a convincing showing that it is invalid because it's unjust and unreasonable…" Much of what FERC does today stems from this authority of setting just and reasonable rates.

That norm of deference on these issues, I think, both predates *Chevron* and will survive any narrowing of the *Chevron* doctrine. The reason for that is that *Chevron* is a legal doctrine. It's about how you interpret statutes. But once you decide that the statute is broad enough to delegate the tough questions to FERC, then we're in the realm of factual questions, like policy judgements. And I think that FERC is going to continue to get deference on those issues because of the Administrative Procedure Act's explicit statement that the arbitrary and capricious standard is what courts should be using to judge agencies' policy decisions. Electricity regulation is hard. It's complex. It's intricate. It's not for the faint of heart, and courts know that. So, I think when complex questions are being presented to courts, they're likely to avoid second guessing the agency too closely.

The *EPSA* case is a great example of that. As you all know, demand response incentives are a way to improve grid performance by paying customers to reduce demand during peak periods. Experiments with demand response incentives began in the 1980s and picked up in recent years. And they were historically done at the state level. And the reason for that was because they were creating incentives to reduce retail consumption. That was thought to be on the state side of the regulatory line. Now, I don't vouch for the accuracy of this slide. It's meant to represent, sort of conceptually, the states in which demand response has been effective. Congress found this was an exciting new toy. And so, in the Energy Policy Act of 2005, it adds this provision requiring FERC to take a more active role in demand response. But it didn't grant FERC any additional authority to do that. So, FERC had to get creative. It used its authority over wholesale markets to incentivize demand response. In Order 719, it required RTOs to accept bids from demand response aggregators, and then in Order 745, it ordered that those aggregators be paid the market price for energy. States challenged this interpretation of the statute, arguing that the statute didn't give the agency authority to do that under the language that allows it to regulate wholesale markets. This is I think, a classic *Chevron* question. Is demand response something that affects the wholesale rate for electricity? If you look at the government's brief in the Supreme Court case, it is all about *Chevron*. But the Court ducks the *Chevron* question. It states, very quickly (and, I might add, in a footnote), "Because we think FERC's authority is clear, we

need not address the Government's alternative contention that FERC's interpretation of the statute is entitled to deference under *Chevron*." So, if I'm in the Solicitor General's office, I'm thinking, "Well, I guess we're going to win, and that's good, but, man, I put a lot of time into those arguments. Could you at least address them?"

There are three things that I think are interesting about the way the Court treats *Chevron* here. First of all Scalia, in dissent, agrees. The majority and the dissent disagreed about whether the statute allows the program, but the Court is unanimous that this isn't a *Chevron* case. And that's a little odd, I think, in light of the fact that one side says that it clearly says one thing, and one side says it clearly says another. That sort of suggests ambiguity to me. But it's consistent with this thesis that, on a 10,000 foot level, the Federal Power Act is not ambiguous. It's clearly broad. Secondly (and I think this is a minor thing), the Court says that, because the statute is clear, we don't need to address the *Chevron* argument. So, that's a kind of unusual way to describe the *Chevron* framework. Normally, when a court hears a *Chevron* case, it says, OK, there's a statutory ambiguity; I'm going to apply *Chevron*. At *Chevron* Step One, I find the statute is clear. And so, maybe this is mere semantics, but the idea that we find it's clear and therefore we're not going to apply *Chevron* at all really jumped out at me as a little bit odd, although it is consistent with the few Supreme Court cases that we have on the Federal Power Act. There's something of a pattern of the Supreme Court kind of ducking *Chevron*, not really addressing it head on. Third, and this is my main point, the Court goes out of its way anyway to signal that it's going to defer to FERC on this question. When the parties sought *cert*, the question on which *cert* was sought was limited to the jurisdictional question, does the statute allow FERC to do this? But when the Supreme Court granted CERT, it added *sua sponte* a second question, which is whether the demand response program is arbitrary and capricious under the Administrative Procedures Act. In other words, once we decide this is something that the agency can do, did it make a good policy judgment or not? The Court went out of its way, not only to add that to its docket, but then to discuss that second question in really broad deferential terms. Justice Kagan's majority opinion says that "A court is not to ask whether a regulatory decision is the best one possible or even whether it is better than the alternatives… And nowhere is that more true than in a technical area like electricity rate design. We afford great deference to the Commission in its rate decisions." That could have come straight out of *Hope Natural Gas* 60 years ago. And it's not just Justice Kagan. In oral argument, Justice Sotomayor makes the same point. She asks, "How do we choose to go into the weeds of something as technical as that?" "That" meaning demand response and the relationship between wholesale and retail markets. So, courts, I think, are reluctant to get down and dirty, second guessing FERC on detailed policy questions, and I think that's unlikely to change, even with the reduced *Chevron* doctrine.

However, to contradict some of what I just said, I don't think that means there's going to be no change to FERC practice. I can see a more forceful judiciary impacting FERC operations in two ways. First I think you'll see a shift in litigation strategy by petitioners who are challenging FERC actions away from detailed policy questions and towards what you might think of as more court-friendly claims, arguments that seem to be more in the courts' wheelhouse. If courts are generally signaling a desire to review agency actions more closely, but they remain squeamish about technical policy details, then litigants are going to give them claims that don't turn on these sort of in-the-weeds technical analysis questions.

I think that's a little bit of what's going on in *EPSA* itself. Petitioners aren't really arguing about the wisdom of demand response. They're arguing about the legal question of where the jurisdictional boundary is between states and the feds. It's presented in a federalism framework.

The classic example of these kinds of cases are due process claims. Procedural hurdles. Did the agency cross the T's and dot the I's, regardless of what substantive conclusion it came to?

Another approach might be challenges that the agency didn't adequately consider its previous decisions. That sort of sounds like inconsistency with past precedent which is court-like business. As a judge, I don't really want to get down into things like incentives or rates. I don't really understand this, but I can read a past decision and say, is this current decision like that one or not, because that sounds like what I do all day, every day. So, I think you're going to see an increase in cases where policy battles wind up being waged by proxy through these more legal claims.

Secondly, I think you might see the erosion of *Chevron* deference likely to come at the edges of where courts currently apply *Chevron*, and that might have some effect on FERC, if that erosion happens in places where FERC operates. So, the core *Chevron* case involves interpretations of an agency's original statute. Right here, the Federal Power Act. But there are a lot of cases, particularly in the DC Circuit in the 1990s (which absolutely loved the *Chevron* doctrine), where courts started to apply *Chevron* to a lot of other things as well. For example, there are DC Circuit decisions out there suggesting that *Chevron* doctrine should apply to an agency's interpretation of government contracts. Justice Gorsuch recently issued a statement in a case where it was denying *cert*, challenging whether this is a good idea. Regardless of what everyone things of *Chevron* and statutory interpretation cases, it seems quite another thing to suggest that the doctrine should displace the traditional rules of contract interpretation, too. So, this is one area where I might want to take up the case and begin to carve back on the *Chevron* project. Now, I rated this something that's low impact for FERC purposes, because my sense is that FERC doesn't rely a ton on interpreting traditional governmental contracts. But it's medium impact change if the court takes this lack of deference approach to interpreting tariffs, as well. Because the DC Circuit currently reviews FERC interpretation of tariffs under what it calls a "*Chevron*-like" deference.

Perhaps most importantly, there are a number of members of the Court that have signaled a strong desire to revisit *Auer* deference. *Auer* is *Chevron*'s little brother. It involves whether the Court should defer to an agency's interpretation, not of statutes, but of regulations that the agency drafted. And even Justice Scalia, who was both a strong *Chevron* supporter and the guy who wrote *Auer*, was suggesting in a concurrence toward the tail end of his career that maybe the *Auer* doctrine is ripe for being reconsidered. Now, unlike *Chevron*, *Auer* is premised on the idea that the agency wrote the regulation and therefore is in the best position to explain what that regulation actually means, clarifying ambiguity. But, in practice, allowing *Auer* deference can incentivize agencies to write vague regulations, side step the comment process, and then do the real policy work at the application stage. And that's why some courts are a little bit uncomfortable with the doctrine. This could be a really big deal for FERC, because much of the modern RTO structure runs on interpretation of FERC regulations and orders. So, a repeal of *Auer* could have courts reading these regulations, these orders, much more closely, and it can limit FERC flexibility when administering these orders in response to changes in market structure. And I think you see at least one example of this in a decision by the Ninth Circuit earlier this year, *CPUC vs. FERC*. At issue was Order 679, which is an order that allows FERC to approve incentive payments to utilities in order to incentivize them to continue participating in RTOs or ISOs. PG&E, out in California, had filed a tariff that included this kind of incentive payment, and FERC allowed it under Order 679. But then the CPUC challenged it, saying that PG&E is required by California laws to participate in CAISO, and as a result no incentive payment was necessary or warranted in order to keep PG&E in the CAISO system. Now, although this case

involved an interpretation of a FERC order, was this incentive payment legitimate under Order 679? The Court declined to give *Auer* deference to the agency's interpretation, and declined to give any deference at all. In fact, it found that FERC's interpretation does not reflect thorough consideration, nor is it persuasive in its own right. So, the Ninth Circuit had no problems stepping in and really digging deep to analyze the FERC rationale and find its rationale lacking. Why was the Court willing to second guess? Here, I think, as in *EPSA*, part of the issue is that you had federalism issues implicated, so courts are more comfortable sort of getting at that. But I think one takeaway for FERC is that if narrowing *Chevron* leads to a narrowing of *Auer* deference, then FERC is going to have to be more careful and more precise in the way it is drafting its regulations, and it might see that it's not going to have the nimbleness that it's allowed under the current doctrine in order create a framework and then make quick adjustments in response.

Finally, I want to make the point that a decline in *Chevron* or *Auer* deference doesn't necessarily mean that courts are going to engage in *de nova* review of these issues. Speaker 2 had mentioned the *Skidmore* doctrine, which is the doctrine that applies when courts find that *Chevron* or *Auer* is not appropriate. *Skidmore* says, we're going to give an agency's view on the meaning of a statute or a regulation some deference, out of acknowledgement of the agency's expertise and its experience with this, although how much deference we give it depends on whether the agency's view is considered, and whether it's persuasive. In the *CPUC* case, the Ninth Circuit found that FERC's explanation was not well considered. *Skidmore* is kind of like weak tea deference. And I think it's always going to be around, not because Congress demands it, which is sort of the Congressional Delegation theory of *Chevron*, but because the agency's expertise has earned it.

Speaker 4.

Good morning. I believe I'm supposed to say something about how these are my own individual remarks and don't reflect the views of anyone.

I think that this has been a very illuminating conversation so far. I'm sad to say I might be deflating some expectations, in that I tend to agree with most of what particularly the last two panelists have had to say. I would have liked to have reached an analysis that said, "Hey, if *Chevron* goes away, things will change." But I do not think that that's actually the likely outcome.

The first thing I'd like to do is talk a little bit more, as I may be the most skeptical person, Speaker 2 here being a possible exception, on the reason why we had the *Chevron* doctrine in the first place. I may be the most skeptical person about *Chevron* here, which is odd, given the position that I'm speaking from. But I do think that it's worth explaining, from someone who is on my end of the spectrum, why it is that we're skeptical about it.

Many of the issues have already been touched upon a little bit. The first thing I wanted to do to help flesh out the debate a little bit is to look at why Scalia, who was an arch conservative, would be associated as one of the most ardent defenders of *Chevron*. And the reason for that goes to a *Duke Law Journal* article that he wrote in the early 90s. He thought *Chevron* Step One would be very rigorously applied, and that there'd be very few cases where you would ever get to a question of ambiguity. If you applied the usual rules of construction, it's very rarely the case that there's going to be something left to defer about. I think that society's changed in a lot of ways, and judicial decision making has changed in a lot of ways that make that expectation unreasonable. As folks have discussed here, there has always been this expertise deference. I sometimes call that *Skidmore* deference. Sometimes it goes by other names. But in modern society I think there's a reticence to judge and to forthrightly reach

conclusions, and with some sense of self-confidence to say, that's right, that's wrong, and I think that *Chevron* plays into a cultural malaise, where it's just easier to pass the buck down to people who are supposedly experts. And that has a lot to do with reasons that people who are for limited government aren't a big fan of the *Chevron* approach.

In answer to the question, why are we seeing more now about questioning the original doctrine, it's because of the way that it blew up, although we've seen certain controls on *Chevron* in the form of *Mead*, a case about whether or not something is a day planner, and then it turned on the question of whether or not the agency was actually doing something in its real rule-making or adjudicative role, or just sort of announcing something. That was kind of a weak check, and there was another attempt to place a check on it, with something called the "major questions doctrine." It goes by various different names, but the idea is that, to quote a trucking case, "The Congress does not hide elephants in mouse holes." So, let's say you're the EPA, and you're going to interpret two words to mean something exactly opposite of what it meant before, and now, all of a sudden, you've radically increased you jurisdiction. That's probably something Congress would have said a little more openly, and wouldn't have required that kind of tortured interpretation.

So, those were some controls upon the doctrine, but things got a little bit different when, first, *Chevron*'s Step Zero, the idea that, hey, this doesn't even seem to be something you're supposed to be administering…to pick an example out of the energy sector, can FERC regulate the price of cement or steel if it's going to be used in a transmission line? I think everyone instinctively and deeply understands that the answer to that question is no. That would be the kind of thing where you know that FERC's pushing it too far even if they're expressing a practice affecting rates-type approach. But when Brandeis told us that agencies can just change their mind, and that's OK, as long as they have a good story to tell. I think that a lot of people thought, "Wow. There's *Chevron,* and there's like uber-*Chevron,* because now, not only do you get deference, but you can change your mind, and you get just the same amount of deference on your explanation."

Another area I think that many people were holding out hope as being a final check was ultimately disposed of. In *City of Arlington vs. FCC*, this question of, "Hey, if the agency's making a decision about the breadth of its own jurisdiction, perhaps that's an area where we might want to apply a little more skepticism about the quality of their interpretation, since it's distinctly self-interested," that failed, too.

So, I believe that what you're seeing in terms of more recent traction against *Chevron* is driven, not by the original *Chevron* decision, but by the ways that it has morphed to absorb more and more things.

There is a difference, I think, in terms of the way people want to approach deference issues on the accountability principle. I heard some people talk about the many different rationales you would have for *Chevron* deference. There's expertise. There's the idea that somehow the agency is more accountable. And I think, on the accountability line of reasoning, that begins to wear down if you're in an independent agency instead of a standard governing agency. It's true that the EPA is in a sense more accountable than FERC, because the President is appointing officers beneath him. They're being confirmed by the Senate. There's a lot more buy-in on a standard executive agency, but you cannot get rid of an independent agency commissioner except for cause, and that's extremely, extremely difficult to show, so I think it's worth saying that, whatever notion people have that the *Chevron* doctrine is to some extent driven by political accountability is undercut if you're in an independent agency, as compared to one that's more directly controlled by the executive.

There are, nevertheless, a few pitfalls the government can still fall into when it comes to *Chevron* deference. One thing that I'm proudest of having helped advance is the PSEG resources exception. It's just a 2011 decision that clarifies that, in situations where the government is purporting to rely on *Chevron*'s Step One question, claiming the statute is completely unambiguous, and then it turns out you convinced the court it is actually ambiguous, so that they have to go to *Chevron* Step Two, if they've only relied on *Chevron* Step One, and you beat them on whether or not there's ambiguity, you win everything. So, the practical lesson for agencies since then has become to never ever, ever rely on a "plain meaning" argument only. You have to acknowledge, "To the extent there's some ambiguity, then we still would find this way." Otherwise you just might find yourself fatally destroyed if the court thinks things are more ambiguous than FERC may have originally thought. So, I commend that decision by a Judge Garland to everyone.

There's one more transition question before I get to the guts of the FPA (Federal Power Act) and the NGA (Natural Gas Act) text that we care most about. And that is the peculiar nature of rate making. Rate making is not quite the same thing as what other agencies participate in when they're issuing prescriptions against certain kinds of behavior, or deciding what a controlled substance is. It is an inherently legislative process, more so than other kinds of agency proceedings, and rate making actually holds a special position in the pantheon of government activities because of that. This is not something many of you would have had a reason to track, but there's something called "issue preclusion doctrine," where you say, "Hey, we've been here before. We've looked at this before. This issue is settled." That doesn't apply in rate making. It's why we can continually have a new capacity market case, year after year after year. It's, hey, it's October. It's time to redo the ISO New England capacity rules. It's March. Let's redo the PJM capacity rules. And the reason is that rate making occupies this very peculiar, as the Court has described it, "quintessentially legislative" function where people come in, they have new feelings, they want to go in a different direction.

So, that's just something about rate making in general, and now I'll move to the actual text of the statute that we care most about. And Speaker 3 is exactly right. Almost all cases at FERC are decided on the grounds of whether or not a rate is just and reasonable, or unjust and unreasonable. As Justice Scalia explained in *Morgan Stanley*, this is a phrase that is obviously incapable of precise judicial definition. And he's right about that. So, to use Speaker 3's word, it is not an ambiguous statute. It is, instead, a clearly broad statute. And the reason why that formulation is used is because Congress did not want to have to set these rates. They wanted to allow leeway for the folks at FERC to do it, on the theory that they would become experts, over time, as they became exposed to these things.

There are some controls on what "just and reasonable" means, but they are very minimal. The *Morgan Stanley* decision itself upholds the *Mobile-Sierra* standard, which is a very important way of understanding what it means to be just and reasonable, and the scope of FERC's ability to change things shrinks markedly in the context of a voluntary contract between two people, because you can presume that the two of them knew what they were doing and meant to reach a just and reasonable agreement between themselves.

There's a constitutional limit on what "just and reasonable" means. No agency, including FERC, is allowed to impose a confiscatory rate. They can't make you outright lose money. This is not a question that is often litigated, the confiscatory rates rule, but there was *Duquesne Light v. Barasch*, a mid-1980s decision, and there was the *Jersey Central Power & Light v. FERC* DC Circuit decision in the early 80s that had to confront these questions. And it really goes to the

question, can the government just order you to lose money? We see some echoes of this reflected in questions like, if you decide you're going to retire in PJM, can PJM force you to stay? And the answer to that question right now is no, because of this background notion that we can't force people to stay in business if we know that they're going to lose money. That's really a Fifth Amendment limitation. *FPC v. Hope Natural Gas* hinted at another…not hinted. I would say it was stronger than that…another limit.

Something we knew about the scope of what it meant to be just and reasonable was this idea that, for the people who are on the supply side, in order to be just and reasonable, the rates would have to give you a commensurate return to attract capital for your business. But that's softened. Back in the era when we had more vertical integration, it was easier to say, "We're responsible for making sure you get a sufficient rate of return." But once we made the transition to markets, and once we made the payoffs for folks to get their stranded costs recovered as a result of the transitioned markets, now the approach has become, "We're not guaranteeing you're going to make money. We're only guaranteeing the opportunity to make money." So, that limit has also, has also been eroded a lot.

A second item that we sometimes get to is not just whether rates are just and reasonable, but also whether or not they are unduly discriminatory or preferential. That's a separate fight. It's even a third prong under the *Mobil Sierra* analysis. It doesn't say, "no discrimination," it says, "no *undue* discrimination," and what on earth does "undue" mean? This is not an area where the meaning of "undue" is ambiguous. It is an area where the statute was instead deliberately intended to be broad, and for the people who deal with these cases on a daily basis to be able to be better informed about related cases and get people into their appropriate spot in the spectrum of things that are happening to other similarly situated entities. This gets me to the test. The threshold question is, are the entities that you're dealing with here similarly situated? And this involves all kinds of spinoff questions like, "All right. We're in a capacity auction. Is a DR entity similarly situated, compared to a guy who actually buys fuel in order to generate power? Are they similarly situated, compared to energy efficiency? Is an intermittent supplier similarly situated to a nuclear baseload plant?" These are areas that are much more difficult to define, up front, and I think that we would not be advantaged if the courts were making them up, instead of the people who are at FERC getting a first pass at deciding what those are. That's the majority of the battle, as far as the overwhelming number of FERC orders that are issued.

The other brand of things that are worth discussing in terms of the way that people here might be affected in a practical way relate to the subject matter jurisdiction. I don't think that we're going to have any fights anymore about what is or is not transmission, although there are a few things that are left over. The *New York v. FERC* Supreme Court case in 2002 pretty much settled all those disputes. The seven part test that Order 888 produced began to give us a pretty good line between distribution and transmission. There are a few outlier questions on that front. Again, just on the subject matter jurisdiction piece, I think most of those things are going to probably evolve around the bulk transmission system, but less about what the definition of the bulk transmission system is, which is really pretty clear, then the more ambiguous savings clause in the reliability section of the FPA, having to do with when a state's police power may end or not end. So, for example, if you have a FERC-related transmission line, and the state changes its vegetation management practices, on the theory that that's a normal state exercise of the police function, having to do with health, welfare, and safety, it doesn't matter if it's a FERC-jurisdictional transmission line.

Now we get to a case we've already discussed, which is *FERC v. EPSA*. Certainly the DC Circuit thought that the notion that FERC regulates sales

for resale was pretty crystal clear. So, the question in the *EPSA* cases ends up being, OK, so if FERC can't regulate DR as a sale for resale, because it's instead a non-use for sale, then how does FERC exercise jurisdiction? And the answer is that it's a practice affecting rates. I think that the burden for people who are unhappy with the result there is that if FERC couldn't regulate sales for resale, as part of its primary jurisdiction, how can its "practices affecting rates" jurisdiction push further than what they originally were allowed to do? But that is now the law, so we all get to live with the result.

Just by way of a footnote, someone earlier asked a question about why it was that that the second question was added *sua sponte* in *FERC v. EPSA*? The answer is that was because the DC Circuit independently found both that FERC lacked jurisdiction, and also that the rate that they proposed, allowing full recovery of LMP, was arbitrary and capricious, so it wouldn't have done the court any good, as they discovered during the beginning of the briefing, to find that FERC had jurisdiction, it still would have left the DC Circuit's other holding. (That was just to correct a matter that we'd already gone through.)

So, to return to the idea of practices affecting rates, the Supreme Court has now adopted the CAISO standard. Right now, the only thing we know is not a "practice affecting rates" is the composition of the board of an RTO. That's about the only thing that we know.

I think we know, from the way that the decision was made about Rights of First Refusal in South Carolina (it was an Order 1000 case), that the Court would balk at FERC deciding that it gets to regulate the price of coal because coal is used in a coal plant and that will affect other rates, or at the idea that FERC gets to regulate the price for concrete or steel because they will then be used to build these plants. All of us have an intuitive sense of where the clearly too far line is, but there's still some room for the "practices affecting rates" piece.

There is an area where there is some fun activity going on in terms of questions about how to apply deference to FERC on the enforcement front. Even with the benefit of *Chevron* deference, FERC lost at least six cases about whether *de novo* means *de novo*, with regard to the level of review that's given in an enforcement proceeding.

There is an open question (it should be interesting to read the briefs in February) about whether or not the generic statute of limitations, which is five years for an enforcement action, restarts as soon as FERC issues its Order to Show Cause. The Fourth Circuit will be deciding that question sometime this spring.

I'm just trying to illustrate the point here that sometimes, even when FERC gets deference, it still loses, if its interpretation is bad enough. There are other particular matters that I'd be happy to discuss if you ask me, but I think right it is appropriate to wait for some questions.

Clarifying Question 1: I'm just trying to make sure that I understand how the *Chevron* doctrine intersects with the *Skidmore* doctrine. Does the *Chevron* doctrine supersede the *Skidmore* doctrine, or do both doctrines co-exist?

Speaker 4: They co-exist, but they would typically not each apply to the same case.

What is *Skidmore*? In the pre-*Chevron* era, as I think I mentioned, it was already the case that federal courts would pay respectful attention to what an agency understood its governing statutes to mean. And in a case called *Skidmore* (this is, again, before *Chevron*), the Supreme Court said, "We will uphold the agency's interpretation, according to its power to persuade. We will defer to it if it persuades us." Now, some people (Justice Scalia was one of them), said, "What does that mean?" You can argue that to say, "We will defer to something if it persuades us" is like no deference at all, because if a thing persuades

you, you don't need a deference doctrine to say that's what you're going to do. If you found any litigant's argument persuasive, then that's what you would do. So, *Skidmore* deference is like no deference at all, Justice Scalia said.

Speaker 2: The words are, *Skidmore* deference is appropriate depending upon "the thoroughness evident in the agency's consideration, the validity of reasoning, its consistency with earlier and later pronouncements, and all those factors which give it power to persuade, if lacking the power to control." Talk about ambiguous. [LAUGHTER]

Speaker 4: So, in cases today, in this *Mead* case that we mentioned, the Supreme Court said, "Where *Chevron* deference does not apply, we will still apply *Skidmore* deference." And to give it its due, I presume they're not saying, "We will act as though there were no deference." They seem to be saying that they will do something other than that. I guess what they mean is that sometimes they will recognize that a matter is really complicated, and the agency really knows it, and maybe the Court doesn't quite understand it, so maybe it's a tie breaker. For example, with the tax code, I think the Supreme Court realizes they're not that great at the tax code, and the IRS knows a lot more about it than they do, and so they give a little extra preference to the IRS's interpretation. But I think there's a good argument that *Skidmore* deference is like no deference.

Comment: Just to add to that. From the dataset about decisions, no deference cases go about 40 percent with the agency. *Skidmore* cases go with the agency about 56 to 60 percent …

Speaker 4: But, again, couldn't that data just say that where the agency is going to be upheld, the court is more likely to say, "This is a result of Skidmore deference?" Whereas, if they're not going to uphold it, they say something else.

Speaker 2: The only other amendment I'd make to that is that in *King v. Burwell* (which was a statutory challenge to the Affordable Care Act), the Chief Justice did not apply *Chevron* and did not apply *Skidmore*. When we teach administrative law, we usually say that if *Chevron* doesn't apply, *Skidmore* does. It's a less deferential standard, but it's better than *de novo*. That's how I usually teach it. I'm not even sure that's the case anymore, and in that case, Chief Justice Roberts didn't even go to *Skidmore*. They went straight to a pretty clearly *de novo* review.

Speaker 4: Well, but that was a case where they explicitly invoked the doctrine that the case was too momentous for deference. And then they ended up agreeing with the agency, but they said, "We're not deferring."

Speaker 3: When I teach *Skidmore*, I tell my students that if *Chevron* doesn't apply, then the court is going to essentially treat the agency's view as kind of like an expert witness in a trial. I don't have to believe you, but I'm going to presume that you know what you're talking about and give you more weight than a typical witness would get. [OVERLAPPING VOICES]

General Discussion.

Question 1: This has been really much more interesting than I even expected, and I came in with high expectations for this panel.

I think maybe the observation to make in relation to why *Chevron*'s taken on a more partisan dimension is that ultimately, it just ends up favoring whoever happens to be in the executive branch at any given time. But I think that, as a practical matter, one of the reasons why it's taken on a partisan dimension is that Republicans are just much worse at administering the administrative state than Democrats are. They don't have as deep of a bench. They don't have as deep expertise. When they do take it over, you get people who are so conscientiously abstentionist in their exercise of authority... And I just don't see the GOP being as assertive as the Democrats often are.

To the degree that *Chevron* is kind of a political topic, I'd like the panel's view on something that I remember reading a couple years ago, where Adrian Vermeule was sort of speculating on whether there would be a change in the political dynamic around the *Chevron* conversation. And he postulated two different possible futures for administrative law. One where left-leaning scholars, realizing that deferring to the Trump administration might not be so great in terms of its practical outcomes, would suddenly get religion and join with legal conservatives to sort of peel away at *Chevron*. And then he speculated about a separate view, which he called the "Merchant Ivory ballroom scene." Think of the moment in any movie adaptation of a Jane Austen novel when two lines of dancers switch to opposite sides of the ballroom, and then the dance goes on as before. The structure of the dance at the group level was preserved, none of the rules of the dance changed, but the participants end up facing an opposite directions. Using this analogy, you could say, "Well, the right will suddenly just switch its position and suddenly believe in deferring to the powers of the executive." So, I guess the question is, is anyone seeing movement from left-leaning academics or legal scholars or judges where they suddenly start to embrace the conservative legal fury or criticisms around *Chevron* a little bit more, and are you seeing perhaps the opposite happen with the conservative right-leaning scholars?

Respondent 1: I think the answer is no. I had a similar expectation that something like that might happen--that perhaps the reason *Chevron* was being attacked from the right is that we had the Obama administration in for eight years, and conservatives who had previously liked *Chevron* were starting to see what problems it would create for them when the liberals were in power. And so, maybe they were conveniently attacking it, and then, when someone who at least is apparently a Republican took over the Executive, they would change their tune. But I haven't really observed that.

There have been a few statutes pending in Congress (for example, there's something they call the Separation of Powers Restoration Act) that would overturn *Chevron*. There's the REINS Act (Regulations from the Executive in Need of Scrutiny Act) which would say that whenever an agency promulgates a major rule, Congress has to approve it before it takes effect. The supporters of that, who were Republicans, seem to still support it. They haven't conveniently changed their minds. So, it is true that you see the parties taking very convenient positions and then changing their position when convenience suits them on issues like federalism. Many people who claim to have commitments to federalism, what they really seem to mean is that they want the states to have power because they generally like what states do more than the federal government. But then, when it comes to something like, should we have tort reform? Should there be a national rule against large pain and suffering damages? They're happy to promote those things. The Democrats are really no better on that particular score. They will invoke federalism when it's convenient to them. So, there's where I see people doing things that are convenient. But on this particular issue, I haven't observed it.

Respondent 2: I want to jump in there, because I do think that the *Chevron* battle is really much more, on an intellectual level, for the right, about the non-delegation doctrine, about Congress not doing its job. I think the end of the Obama administration kind of propelled it even further. President Obama did a lot by executive action that he couldn't have gotten through a Congress that didn't even want to look at him. If you look at the 114th Congress, it passed 300 and something public laws over two years. Federal agencies promulgated over 7,000 final rules. For traditional conservatives, that's just not what the constitutionalists set up to do.

Chevron might be the wrong battle ground, as we already discussed. The non-delegation doctrine is

likely the right battleground. But it is, I think, quite concerning to conservatives.

On the flip side, if you're a progressive, you've locked in some pretty significant gains in the 70s, and Federal agencies are implementing your policy approaches quite well. And so, you're pretty happy with Congress not intervening, because it could probably only get worse, at this point, for you. And so, in that sense, I would kind of disagree with Respondent 1. I think it is quite ideological, with progressives seeing the administrative state as a way of preserving a lot of the gains they made decades ago, and conservatives being concerned that Congress isn't doing its job, and that those gains are being implemented by non-elected bureaucrats.

The one thing with *Chevron* deference is that the Trump administration is not pushing for deference. I've been trying to think of *Chevron* cases where they've actually asked for *Chevron* deference. I can't think of one. And so, the left's ability to kind of join this great coalition of bootleggers and Baptists…I don't think is going to happen unless the Trump administration's asking for deference. Even in the travel ban case, they asked for more kind of plenary power deference, not *Chevron* deference. And there you saw the pushback, but that's a very ideological deference. That's not like a *Chevron* deference.

And so, it's interesting to see. I was somewhat hopeful that the Democrats would join on regulatory reform, and at least get some of the common sense ones that are in the Regulatory Accountability Act through, but I just don't think that's going to happen. I think the parties have decided exactly where they're at and are going to stay there.

Respondent 3: I think that's right. It's interesting to look at how *Chevron* is evolving with regard to the civil war within the Federalist Society between older conservatives and the Scalia generation, who are very pro *Chevron*, and the up and coming generation now. I think it's part of a broader story about where the threat to power is.

One of the reasons why *Chevron* was so attractive to Scalia and his generation was that it's a huge tool that you can use to combat what he called judicial activism. It wasn't so much empowering agencies as much as it was disempowering courts, because courts were the counter majoritarian influence of the 70s and 80s. And so, A, *Chevron* takes some interpretive power away from courts, and, B, it tells courts that, to the extent that you should be doing any work, the work is focusing on the text of the statute, which coincides nicely with his textualist philosophy. I think Scalia largely won the textualist half of the battle. Textualism is a thing, in a way that was really just an idea when he was a law professor and on the DC Circuit. And so, as the pendulum swings, then agencies begin using their *Chevron* deference to do the thing that courts used to do, and that's why you see the young generation of conservatives focusing their ire on agencies, for the same reason that Scalia was focusing his ire on judges.

Respondent 2: Respondent 3 is right about the notion of there being a civil war among conservatives about what to do about this, for exactly the reasons that he just laid out.

In terms of what the Trump administration's doing on this front, I don't know if you all followed the ALJ (administrative law judges) decision. So, we get the Solicitor General of the United States, who was previously in a case called *Free Enterprise* about what the status of ALJs is, and about the SEC and who is the head of the agency for purposes of appointing ALJs. Then, in a follow up SEC case, where now he's speaking for the government, he reverses the SEC's position. And they have to, in fact, appoint an *amicus* person to argue the former position of the agency, now that they're in front of the Supreme Court.

And what is really at issue there is the non-delegation doctrine and whether you can even have independent agencies. If our Appointments Clause requires that only our principle officers can appoint our inferior officers, we have to know if the person who runs FERC is just the Chairman. Is he the head of the agency, which the Constitution talks about, or is it everyone collectively?

We could have a whole different panel on why the FERC statute is different than all the other ones. Looking back to when we did the Department of Energy Reorganization Act in 1976 and created FERC out of that, I think you will find very, very important differences in the way that FERC is set up as compared to the other New Deal agencies. I know this is really getting in the weeds, but when the APA required a reorganization of how you parse out power among the different statutes, all the agencies submitted, in 1950, these reorganization plans. And those then determined a lot about things like who is the most important in an agency. The Chairman? Or how are we going to parse the powers between the Chairman and everybody else in the organization? But FERC's statute is very unique, and we could have a whole panel on how FERC is different on that front. But FERC's special.

Question 2: My question is, how easy is it to sidestep *Chevron*, and how frequently is *Chevron* sidestepped by the mere artifice of deeming ambiguous language unambiguous? The case I think of is *Piedmont*, where it came down to interpreting the term "withhold approval." And there are really two possible ways to interpret it. It was clearly ambiguous. FERC adopted one, let's call it X interpretation. Then, when it went to the 4th Circuit, all three judges said, "No, no, no. It is unambiguous," and then they split on what the unambiguous meaning of the term was. [LAUGHTER] I always thought the dissent should have said, "No. It is ambiguous, and FERC's interpretation is reasonable." But, anyway, all three said that it was unambiguous, and we totally disagree in what it means. Is that an anomaly? How frequently does that kind of thing occur?

Respondent 1: Part of one's view on *Chevron* can be divorced from views about how you interpret statutes. One of the reasons why Scalia was so comfortable with *Chevron* deference to agencies was because he believed that you had to aggressively mine the statutory language before concluding that it was ambiguous. The Supreme Court has never really given a good sense of how you operate at Step One--whether it's sort of this cursory glance where I look at the language and determine that just easily susceptible to more than one meaning, therefore you call it ambiguous, or do you really aggressively use all the canons and statute interpretation, and then ambiguity is what's left over? There's a case called *Zuni Public Schools* where you end up, among the nine justices, with four different decisions about what it means to engage in statutory interpretation, and what even the goal is. Four decisions among nine justices shows there's not really a huge consensus on how you operate at Step One.

Respondent 2: I would just jump in and say that, previously, when Speaker 3 was explaining about Scalia and Gorsuch being quite different when it comes to *Chevron*, I think that in some ways they were, but in other ways they weren't at all, in the sense that they both believe in a Step One that's very rigorous. You saw that Gorsuch, in two opinions that he wrote this last term, in both cases, I thought the statutes were clearly ambiguous. I mean, it says X, and that's basically not defined. What is a notice? It doesn't say what the notice is. But he uses the words "clear enough." Like, "it was clear enough, so we're done." And that reminds me a little bit of Justice Kavanaugh, who has a *Harvard Law Review* book review and then a Heritage speech where he's like, "I'm basically a 65 percent guy. As long as I'm 65 percent sure the statute is unambiguous, I'm done. But a lot of my colleagues, they're 90 percent judges. They want it to be 90 percent certain that it's unambiguous. And if not, they're

going to defer to the agency." And I think Scalia was probably a 51 percent, or maybe at a 43 percent, certain guy. And so, I think that one of the issues you have here is that judges have different levels. Adrian Vermeule and Eric Posner wrote what I'll call a cute article, because I don't like it. But they wrote an article where they basically said, if any judge disagrees on whether it's ambiguous, then it's ambiguous. And it just drove me crazy. No, that's not true, because the 99 percent judge should have no say. The standard should be around 60 percent. But, in any event, going forward, if Justice Gorsuch is in control, which I think he is on this issue, a lot of the fight is going to be in the context of a textualist constraining Step One.

Question 3: I want to get back to this political theme. So, the latest FERC commissioner was just approved by the Senate in a 50 to 49 vote. So, we're in serious partisan territory now, in terms of who's sitting on the FERC. It most likely ties back to climate change. I think a similar thing is happening at the FCC, with net neutrality. So, these decisions, more of them now are quintessentially political and partisan. That was not the way FERC was, historically. But how does that effect the way the courts will view, and should view, *Chevron* deference?

Respondent 1: That's a very good question. In an important judicial review case, Justice Rehnquist (I think he was not Chief Justice at the time) wrote a dissent for four justices saying that it is perfectly appropriate for an agency to change its views based on a change in administration. That was the case coming out of the National Highway Transportation Safety Administration as to whether cars should mandatorily have passive restraints. And an incoming Republican head of the agency had rescinded a requirement that was supposed to go into effect, and apparently he didn't feel that he could say, "Well, we're Republicans and we have a different understanding of the tradeoff between safety, cost, and individual freedom than the previous Democratic administration." And so, instead, his staff had prepared a technocratic explanation of why the passive restraint rule was not a good idea. But it just wasn't supported by the data, and so it got struck down, and the agency might have done better in the courts if it has more forthrightly said, "We just place more value on individual freedom, and we think the marketplace should handle this, rather than mandating it by regulation."

So, how do politics play into *Chevron*? If agencies are forthright in acknowledging that Republicans and Democrats have different tradeoffs on certain things, and that affects their understanding of what they should do to carry out their mandate, I don't see why that shouldn't be respected. Now, that is sometimes appropriate and sometimes not. If Congress has specifically said, "Do this," then you're supposed to do it regardless of which administration you're in. But if, as it is so frequently the case, Congress has said, "Come up with a rule that promotes safety, but that isn't too expensive," then I think it's perfectly appropriate for the agency to consider its philosophy about tradeoffs between safety and cost and how much individuals should make that decision and how much that decision should be made by government for individuals. I think that's appropriate, if the statute allows it.

Respondent 2: Reversing your question a little bit, I think there's a story you can tell in which the *Chevron* doctrine is partially responsible for the increasing politicization at the FCC and at FERC, right? Because, for example, at the FCC, where the Communications Act has not been revisited since 1996, back in the day when those who had internet access were doing it by dial-up. And so, the statute doesn't really give us any direction from Congress about how the FCC should regulate internet access, or net neutrality. Similarly, the Federal Power Act hasn't been revisited since, I guess, a little bit in the EPAct of 2005, but, before that, 1992. Congress hasn't felt any need to do that, because the agencies have been working within the framework of the statute and making the nimble corrections that they need in response to how markets are changing.

Chevron is allowing them to do that, which is why Congress is, I think, abdicating some of that power about important questions to agencies, which is why the agencies are in turn becoming more politicized than they were historically.

Respondent 3: I do love the question. In part, this is not the same Congress as 10 years ago, either. If we go back to Senator Reid's elimination of the filibuster for administrative appointments, you do end up taking away that check in favor of kind of less extreme heads of agencies, and so I think it's hard to parse out. If I were a judge, I'd be a little nervous saying that the guy that got only 50 votes is really extreme. But the flip side is that the filibuster's not there as a front end constraint, in terms of trying to force some more mainstream folks into the positions. So, I think it's a complicated issue. I don't think the Court's going to want to go anywhere near that, though, just because figuring out whether someone's extreme or not is a tough one.

Respondent 2: I think the questioner is focusing on the right debate about what it is that's really at play. I think the undercurrent behind a lot of the discussions we're having is this almost religious war level fight going on in our society right now about climate change. I think that's the most neutral way to describe it. I have strong views on the subject, myself. That is going to end up finding its way into FERC litigation.

So, the way we're going to see this unfold in the FERC future is going to be on the question of whether or not it is proper for FERC to be considering climate change matters as part of its "just and reasonable" matrix. I think it's kind of hard to put it in the "undue and discriminatory" preferential mode, unless you're talking about differences in treatment of particular kinds of generators because you're trying to favor them, if that's the reason. But that's the biggest fight that we can easily foresee is going to be coming to a theatre near us soon.

I would like to believe that that issue was actually addressed ages ago, when NAACP brought a case that went all the way up to the Supreme Court that tried to argue that the "just and reasonable" and "undue discriminatory preferential rates" tests should include some measure of racial justice. And the Supreme Court went, "We don't see that here. This appears to be an economic regulatory thing, and that's just a step too far." That then moves us back into the "major questions" doctrine, and that argument is going to be along the lines that if regulating emissions and being other than fuel neutral was something that Congress wanted FERC to do, that's probably the sort of major issue, major clarity point, that they would have stuck into this statute, if they wanted us to do that.

And so, we turn then to the ultimate values in question. You've heard what *Chevron* says. I want to read to you what I think best states the kind of opposite view. You've seen it a lot of different ways. This is Judge Sentelle's opinion in *Atlantic City*. It's the case that said that FERC's not allowed to take away your 205 rights because you join an RTO. You can't be put into RTO jail permanently. I quoted this a lot in my briefs, and you've seen it in a lot of FERC orders recently. As federal agency, FERC is a creature of statute, having no constitutional common law existence or authority, but only those authorities conferred on it by Congress. That's the counter value to the *Chevron* piece, and when you talk about whether someone's on a 45% or a 99% scale, the question is whether our default question is, "Unless power is clearly given, we say it has not been given." The other side says, "Unless power has been clearly withheld, then it exists." That's really the ultimate fight, and we're going to see it play out, I think, most likely in climate change related things. But I don't think that should be a FERC case. I think the case that will end up deciding this is going to be the Clean Power Act case.

So, the EPA has got two parallel things they've got to figure out. One is, have they adequately

justified their desire to pull back the Clean Power Plan? And then they're going to have to make the offensive case for their new replacement rule. Is that going to be something that's going to survive? But then again, the differences between the Clean Air Act and the Federal Power Act are so enormous. The Federal Power Act, to use Speaker 3's term, is not ambiguous; it's instead clearly broad. The Clean Air Act is, I think, an order of magnitude more deep than the Federal Power Act and has all kinds of very special little definitions, all of which are subject to some form of serious dispute.

I wanted to pull together one more thread and then I will shut up on the question of ambiguity. This came up in a FERC case about NEPA (the National Environmental Policy Act). After FERC lost, on this question of whether or not it had given sufficient consideration to environmental concerns about a set of pipelines that were going to Florida (two judges voted one way and another judge, Judge Brown, thought that FERC was correct), the environmentalists who brought the case went to the DC Circuit and asked them, under the Equal Access to Justice Act, for all their litigation costs. And the Court gave it to them.

Now, why does this matter? Because the standard for whether or not you're going to give a litigant money back is whether or not the government's position was substantially unjustified. And, along the lines of the question, how much ambiguity is ambiguity? How much clarity is clarity? It seemed peculiar, given that Judge Brown, who's just retired from the DC Circuit, had written a very thorough dissent in that case, that the two remaining judges who are still there on the court would decide that the government's position was substantially unjustified if one of the three people in black robes actually thought FERC was exactly correct. It's hard to see how you get to it, but I think it also tells you something about politics. Judge Brown was an extremely conservative judge. The other two judges weren't. I don't think they lamented her departure, but it was a very unseemly knife in the back as she was walking out the door to say, "Hey, we don't care about your dissent."

But, yeah, I think things are much more roughly political than they used to be. Certainly, in my life as an appellate litigator, I've not seen things as bad in the whole time I was practicing. When we find out what the composition of our panel is going to be, that's kind when we know whether or not we're going to settle. Because if we see one set of judges we're like, ugh. We see another one, it's the other way.

Question 4: Segue to my question and I personally want to say thank you to this panel. This has been educational and interesting to me. But I was thinking about the Clean Power Plan. Just to set the context, I'm ideologically disposed towards dealing with climate change and I think we've got to do something, and all that sort of stuff. So, I'm not trying to stop us from dealing with the CO2 problems. But my standard for what I like about what the courts do and so forth is probably any opinion written by Judge Posner. [LAUGHTER] So, I like him, and those are terrific, and I enjoy reading them, and I understand what he's talking about, and it seems to me that he speaks straight. And he doesn't always make decisions that I agree with, but nonetheless…

And so, let me get to the Clean Power Plan. When I read it, I was offended, as a citizen, because I just thought it was clear dissembling, and that the language that was put in for the justification of what they were doing was gobbledygook doubletalk. The best example of that, if you know about the Clean Power Plan, is the Tailoring Rule, which is when you say, "We're doing this under the Clean Air Act, and if it's clearly impossible to do, we're excluding that from conversation, so it must be we're only talking about these things." So, that seemed to me a *prima facie* argument against what they were doing. And, as I say, as a citizen, I was offended. And I didn't like this as a matter of public policy, even though I'm worried about climate.

So, my view on *Chevron* and deference would be influenced very heavily by the question, which direction does that push us towards? Does that push us towards the Clean Power Plan, where we say things that are clearly nonsense, and then we can defer to the agencies and accept their nonsense, and then we go forward? Or, does it push us to Judge Posner, where he says, this is clearly what we're supposed to be doing, and this is what the law says, and here's what we are, da, da, da, da…a straightforward interpretation, which doesn't necessarily produce the outcome that I want, but at least it has the process advantage of passing the laugh test. And Posner always passes the laugh test, and I would say the Clean Power Plan put forward by the Obama administration does not. And which way does this debate on *Chevron* cut? Nothing's perfect. I understand, but how does it cut in terms of things which don't pass the laugh test which are put into legal briefs because they're going to get deference?

Respondent 1: Well, I don't know the particulars of the Clean Power Plan issues, so I can't speak to that. I guess what you're getting at is that *Chevron* makes it more likely that an agency will try to get by with something that doesn't past the laugh test. I think many agencies face the situation that some important problem arises that they really ought to address, but it's not sufficiently contemplated by their statute, and so what can they do? Here I'll get to the one interaction I had with energy laws. This was back when I was a law clerk, back in the very early 90s, in the early days of Order 436. Maybe I'll just embarrass myself here, but it seemed to me that what was happening was that, you know, gas regulation was set up essentially as monopoly rate regulation, because in the old days, if you had a pipeline, you had an effective monopoly on the provision of gas. But then FERC said, "Well, there's been so much development. There's so much interconnectivity in the gas grid that it would be appropriate to have more competitive markets, but we're faced with this statute that's an old statue." So, what did they do? They looked carefully in the interstices of their statute, and they figured out a way to say, "Well, we're supposed to approve each gas certificate sale. If we say a gas certificate could be a more general one that allows the certificate holder to change its rate over time, maybe we can squeeze this into the statute," and that's what Order 436 was about. So, it seems to me that that's comparable to what you're suggesting. The Agency's faced with the need to do something, and that's given rise to the Clean Power Plan. They just said, "This is so important we need to do it, even though the statute doesn't contemplate it." So, I guess my answer would be yes, because of *Chevron* it's more likely that agencies will try to, and perhaps even succeed in, forcing something into their jurisdiction that doesn't really belong there. And, yes, that's a problem, but you also have to recognize that the alternative is to wait for Congress to take action and give them the needed power, which seems very difficult these days.

Respondent 2: I'll just add, though, on the flipside of that, *Chevron* also allows you to deregulate more easily, right? In the Clean Power Plan context, it's not a heavy lift to make the argument that there's flexibility in the statute to not regulate in the way that the prior administration had. And so, I think that's getting back to kind of Speaker 1's theme of how it's not necessarily an ideological tool. It does allow for deregulation.

Respondent 3: I think you're right that *Chevron* creates incentives for agencies to kind of push the envelope. We saw that with the Clean Power Plan, we saw it with the transgender interpretive rule, but even going back 20 years, 30 years to wheeling authority, when Congress didn't pass explicit wheeling authority, FERC went in and reinterpreted the Federal Power Act to allow it to do it under its original authorization.

One interesting thing that comes out of all this is that it is not just *Chevron* that creates those incentives. The fact that the litigation cycle takes a while can give agencies some willingness to

push the envelope. *Michigan v. EPA* is a great example, where the EPA adopted these smoke stack control limits and ultimately an Order of Compliance. The case went on for two or three years and ended up in the Supreme Court. And the Supreme Court invalidated the rule, and then there's a staff member over at EPA that posted a blog to the effect that we kind of don't care that we lost, because all of the affected smoke stacks had to comply anyway. So, during the time the litigation was pending, they all installed the smoke stacks that now it turns out we didn't have authority to tell them to install, but we got it done, so it doesn't matter, which is one of the reasons I think that, when the Clean Power Plan was challenged, the challengers immediately sought the Supreme Court to stay implementation of the Clean Power Plan pending the litigation. I think it was the only time I've ever seen the Supreme Court reach down and issue a stay in a case that was still in the DC Circuit, and I think that blog post had something to do with it.

Respondent 4: Yeah, that is the only time that they've done it, and they did it because it's one of the few cases where you could really show irreparable harm up front. I mean, you can't just undo one of those power plans.

I don't know the answer to your question, because I think that it totally turns on what the specific statutory scheme is. Again, because the FPA and the NGA both tend to be not ambiguous so much as they are clearly broad. I'm not sure that in the statutes we deal with on a more regular basis, we're going to see as much of a clear change one way or the other. It's in the lengthier statutes that have many, many more terms of art where I think you're going to see more action.
But there's a two layer thing. I don't want to lose this nuance about the way it affects agency decision making, because the place that the agency's get their biggest win on deference is at the second level, if it's ambiguous.

Maybe this goes without saying, but I just want to say clearly that one of the curious things that *Chevron* does is that it not only encourages them to be more aggressive, it encourages them to argue that their own statutes are ambiguous, in order to be able to achieve the special deference for the reasonable interpretation of some clearly not forbidden kind of thing. And that I don't think is ever good. And if I could evangelize anything, it's the idea that FERC always is doing better if it is clearly defining in black and white and giving people more certainties so they can manage their commercial affairs better. So, I just don't think it's ever, as a default rule, a good thing to be ambiguous, but people who are with agencies for a real long time, they want above all things to preserve agility. That's the term that one will hear constantly. "Well, if we are too clear about this, this is really going to remove our agility to do something different down the road." And my answer is, typically, "I don't want you to be agile. I want you to make a decision and I want it to be done." But other people who are perhaps wiser and are more concerned about looking into the future and having more moveability, they're going to push for the agility.

Comment 1: Climate change is one of the issues of the day. We all agree on that. But Congress hasn't done anything. And so, the decisional responsibility gets pushed down to the agencies which reflect the political views of the administration at the time. And what this is all about is whether that's where these decisions ought to be made, or whether, because these are really legislative decisions, they should get forced back up to the legislature that either can't, or won't, act. And so, what you had here was an Environmental Protection Agency that felt very strongly on one side of this issue, and that didn't have any legislative command really, although the Supreme Court suggested maybe they did, and so they felt they were going to act. And they took very broad action to address something that the legislature hadn't. And this debate over *Chevron* really gets to whether or not that's the right place for decisions like that to --

Moderator: I think that may be a bit simplistic. Because I think what could easily say what the Supreme Court said was that carbon dioxide was in fact covered by the Environmental Protection Act. So, it wouldn't be a stretch for the agency to argue it had statutory --

Comment 1 (cont.): I think I made that point, but I think that's right. But I think, looking at it from a broad public policy perspective, decisions about what we ought to do in response to one of the most important issues affecting our country and our society are supposed to be made by our Congress. And when you push those down to the agencies, I really think that you start to meddle with the way our Constitution sets up the decision making process, and that's what leads people to worry about giving *Chevron* deference.

Moderator: You mean, worry more about that than about what happens if Congress actually makes a decision? [LAUGHTER]

Questioner: But that's what worries me about this. So, there's the argument that was just made that Congress must make an affirmative decision that we're not going to regulate CO2, and must bar any agency from regulating CO2, for the policy to be that Congress hasn't decided to regulate CO2.

Comment 1 (cont.): It was worse than that. Congress tried to pass a statute to regulate CO2, and wasn't able to do it. So, given that situation, where does the responsibility and authority lie in our constitutional rubric to make that decision?

Respondent 3: It is so perilous to try to argue about what Congress intended to do because of legislative efforts that failed. Because you can't ever know why they failed. I think it's informative, but it's a deeply dangerous thing to do to say, "Well, we know that Congress must have meant to do X, because Y was before them, and they rejected Y." I think a lot of bad judicial decisions have been made trying to rest on that logic. I agree with your point more broadly. I just want you to pull back on that one item. We can't infer something legally relevant or legally useful from the failure to pass --

Comment 1 (cont.): I think what I meant to say is that this got pushed down to the agency because Congress was unable to unwilling to act. That's all.

Respondent 4: So, there's this idea that, "Well, action is required. Congress is not real good about acting; therefore, let's loosen up the ropes on agencies to do something, because something is really required." I think it comes down to a really important value judgement. For some people, you have to really, truly believe that our future survival, starting real soon, is at stake, in order to throw out something as important to them as the structural protections and the way that we organize our separation of powers.

My answer, generally, on all things related to objections along the lines of "Congress hasn't gotten its act together," is, so what? We then now have to stop and wait for Congress to get its act together. Because throwing out the structural components…We have to wait for Congress to do it, because the most important thing to do is to protect the rules. And the rules are the structure. And once we lose the rules, we unravel all the rule of law. So, while it sucks to have to wait for them to get their act together on this subject, I think that that's what we're really supposed to do. And not doing gymnastics…

Respondent 1: I agree with that. I think it is clearly correct that difficulties in getting anything through Congress, the fact that Congress is paralyzed, that does not by itself give the agencies any power they wouldn't otherwise have. So, when I was referring to Congress being paralyzed, that's my explanation of the motives of the agency for trying to do something. It is not a civics or constitutional explanation for why the agency has more power. But it would explain why the agency would say, "Well, let's carefully go back through the existing statutes and see

whether there's anything in them that might give us the power we need. Maybe we should take a more aggressive approach to interpreting the existing statute." But it's quite right to say that the fact that Congress is paralyzed does not in itself give the agency more power.

Moderator: That's true, but I do think the Clean Power Plan is not the case to use to make that argument, because the Court had already held that the Agency had the authority. You can argue about the wisdom of what they did. That's a different question. But it's not like they had to wait for Congress to offer them something more specific.

Questioner: No, if that were true, then there would be no Tailoring Rule. The Agency would say, "Congress says that we have to regulate. We have to use the Clean Air Act. The Clean Air Act describes quite specifically how to do it, and you have to regulate every Dunkin' Donuts, because the amount of CO2 coming out of the Dunkin' Donut meets the threshold that's in the law." And it would have been ridiculous.

Instead, they adopted the Tailoring Rule, and said, "We don't have to regulate Dunkin' Donuts, we only have to regulate a coal power plant."

Respondent 2: Can I comment on that? I think that was unwise on the part of the EPA. What they should have done is say, "We do recognize and respect the thresholds that are in the Clean Air Act, but we're going to phase in towards those limits. We're going to start off at the higher level, and, as we gain more experience, we will respect the thresholds and the Clean Air Act." I agree that just simply saying, "This is impossible, so we're just going to ignore those numbers" was…I think that was a poor tactic.

Respondent 1: That's an Order 888 tactic, right? [LAUGHTER] "We're going to go after bundled or unbundled. Well, we're only going to go this far for now…" And that was upheld. Conservatives didn't like it. That's why you've got the separate opinions in…

Moderator: You can make the same argument about what FERC did when it took from the 1992 Act, which gave a case by case ability to work through open access and turn it into something broad. It's exactly the same issue. Yeah, you can argue that EPA didn't handle it well. You can make that argument, but saying they didn't have some legal authority to do it, it's just not true.

Respondent 1: That goes to the earlier comment about how in 1992, Congress didn't give FERC the authority to order open access, but the 1992 wheeling provisions were like a sign from Congress, that "We're sort of comfortable with this policy." So, FERC discovered that ever since 1935 it had that authority, like the French Lieutenant in Casablanca, who discovered he had the authority and then he used it.

Moderator: And was shot. [LAUGHTER]

Comment: Well, actually, that's not how I read it. I think that Congress gave them the OK sign. The industry changed in response to that, and FERC said, "We're going to interpret the Federal Power Act, taking into account what's actually going on in the industry and in light of that, and Congress's OK, we have this authority." They never would have, 20 years earlier, gone in and been able to say what they said then.

So, I know we're off point a little bit now, but I just have a little bit different take. I guess my view on EPA, if they had said the, "With and without this Clean Power Plan, the results for climate change don't change," and had been honest about it, and then we'd have moved forward from there, we probably would have gotten a more honest debate about all of this.

Question 5: I've got a comment and a question. The comment is on the point that was raised earlier about why conservatives now aren't embracing *Chevron* deference. To me, that's not

surprising. With today's conservatives, there's more of a kind of both antagonism and indifference towards the regulatory state. More so than in the past. So, I think they don't necessarily trust the regulatory state. They don't trust agencies and don't like them very much. So, even though they're in charge of them now, they don't really want to rely on them. I can't remember who on the panel said that the Trump administration has not argued for *Chevron* deference. That would seem to be somewhat consistent.

Michael Lewis's new book, *The Fifth Risk* (I highly recommend it) is all about administrative agencies, and it focuses in on the transition. The Obama people, they were all set. They had their briefing papers. They were ready to do the transition when the Trump people came in, and nobody showed up. So, I think that is maybe a partial explanation, at least the way that I see it. So, that's a comment.

The question is, is the Federal Power Act a superstatute? Some legal academics talk about "superstatutes," these statutes that establish a new institutional framework for policy that sticks around for a long time. There are not a lot of amendments to them, and they have a very broad effect. Scholars have written about the Endangered Species Act as potentially a superstatute, as well as the Sherman Act and the Civil Rights Act of 1964. These statutes, over time, almost have a quasi-constitutional impact or import. I don't know if there's any writing on whether the Federal Power Act is a superstatute. It would seem to meet those criteria, to me. What impact does that have on *Chevron* deference, or even deference in general? So, thoughts from the panel.

Respondent 1: I generally dislike the superstatute/not superstatute, superprecedent/not superprecedent kind of distinctions. I don't find them particularly persuasive, and I think you can make the argument that any agency organic statute is a superstatute. And it makes me uncomfortable, but I think if you do buy into the superstatute theory then those are areas…again, it comes back to what you think is the grounding for *Chevron* deference. I think Eskridge and Ferejohn, kind of the inventors of the superstatute, would argue that *Chevron* deference is stronger with a superstatute, because Congress has put it in place, so they're not playing with it, and they've clearly delegated that to an agency to kind of flesh out and control. But I don't know. I'm just not a huge fan of that.

One other note on your comment. With respect to the *Pereira* decision, last term, where Justice Kennedy, in his concurrence, explains constitutional concerns about *Chevron* deference, in Alito's dissent, he actually is like, "Wait a minute. Did we just overrule *Chevron* deference?" And I think you see a more traditional judicial conservative, like Alito, saying, "Wait. I actually like the idea of deference." And so, I do think there are still a few supporters of *Chevron* around that are still judicially conservative.

But on the idea of a superstatute, it just makes me nervous. But I think if you buy into the superstatute theory, then that is an area where, at least under some of the theoretical foundations for *Chevron*, you'd argue that the deference should be greater.

Respondent 2: My sense is that, descriptively, it's certainly true that statutes tend to stick around. It's much easier to create a statute than to repeal one. And, from a political science perspective, the idea of agencies interpreting the statute, and courts weighing in on that decision, and then Congress having the option to go back and amend the statute if it doesn't like the conclusion that the agency and the courts have come to…it becomes an ongoing dialogue. The fact that Congress hasn't stepped in to correct what it might see as a judicial error, just means, descriptively, that the statute has some lasting power. Do I think that means it gets greater deference? Does it change the way courts should think about the statute? I think probably not. But I think, if you're looking

at it from a political science perspective, that makes sense.

And I think it's actually what's going on with the greenhouse gas case. You can see, in the *Mass v. EPA*, and then the *Utility Air Regulatory Group v. EPA* cases, this ongoing dialogue among these three parties, where the Agency's saying, "Congress, you need to get your act together," and the Court first said, "Yeah, you do", but then the Agency continued to press, and the Court said, "That's going too far." Both of these are sort of shots across the bow to Congress to say, "You need to step in and do something here."

Respondent 3: I don't know enough about the Federal Power Act to say whether it is a superstatute, but on the question about whether, if you conclude that a statute is a superstatute, whatever you think that means, the agency interpreting that statute gets more or less deference, I would think it doesn't really matter, because the determination that a statute is a superstatute would play into the question of interpreting the statute. And, as was mentioned earlier, *Chevron* does not tell you how to interpret statutes. *Chevron* just says, "Use the traditional tools, whatever those are." So, I would say, if you conclude that the statute is a superstatute, that might have an impact on how you interpret it. You would give more weight to that statute, perhaps, when it comes into conflict with some other statute, so that's how it might have an impact. But I don't think it would impact the question, does the agency get more or less deference? I think it would go to a different question, what does the court think the statute means?

Respondent 4: Katy Kovacs has argued that the Administrative Procedure Act is a superstatute, and she actually comes out the other way that I think Eskridge and Ferejohn do, at least the way I read them. She would say you really are textualist. She doesn't want the court to add anything onto the statute, under this theory. So, I think if you extend that, you also might make the argument that agencies shouldn't be able to add anything on to it, too--that that statute should stay in its kind of its pure, crisp form. So, again, I don't buy into the superstatute stuff, but I think you could make arguments both ways about whether we've got to stick with the text, or whether we allow it to develop through administrative common law.

Question 6: With respect to whether or not the Federal Power Act is a superstatute (and maybe there's disagreement as to whether or not, if it is, there should be greater deference) it seems clear from your data that there isn't greater deference. Maybe I'm reading that wrong, but they're winning in only 60 percent of the cases. Anything behind that? FERC seems, in a sense, to be worse off with the very clear, broad delegation of authority to it with respect to rates.

Respondent 1: I don't know. And I hesitate to try to draw too many conclusions. I have to go back and reread the cases. There are only 38 of them. It wouldn't be too hard to do. But one thing is, our dataset only looked at agencies' statutory interpretations, and I just don't know enough about FERC. I mean, for the FCC, in this context, their win rate is super high, which would shock a lot of us, if you follow the FCC, because they lose a lot. But they don't lose on their interpretations. They lose on "arbitrary and capricious" grounds.

Questioner: Or First Amendment.

Respondent 1: Or First Amendment grounds, yeah. And so, it's interesting. My dataset doesn't capture the other losses. It only captures the wins and losses on the legal interpretations. And so, at FERC, there might be something going on in the background there, such that, for example, they're winning more on "arbitrary and capricious." I just don't know.

Respondent 2: FERC does best on rejecting the "arbitrary and capricious" piece. I mean, there's substantial evidence. Even when I was clerking, when a FERC case would come along, the clerks

would, like, run for the hills. I would volunteer for those cases, but other people really run away from them, because their eyes glaze over when they see some of the technical jargon come by. And I think there is still a very strong tendency, in all the courts of appeals that hear FERC cases, if it looks complicated, they're just like, "Oh, these are close enough, so that's enough. I don't want to deal with this. I don't want to get into a fight about Schedule 3 charges and the difference between those and Schedule 4 charges." For example, when there was a battle between FERC and PSE&G about labor costs, that was a quintessential example where the Court was just like, "Really? What are the differences between union labor costs in New Jersey or nonunion labor costs in some other part of PJM in terms of how we're going to address CONE (Cost of New Entry)?" That's the kind of stuff where they are, like, not going to mess with it.

But on the question of why FERC has not done super well in some of its statutory interpretation cases, I think it's just that the previous administration was very aggressive in its interpretation of what the statute allowed FERC to do. And so, we're still seeing some decisions rolling out from the courts of appeals about things that were issued just before the interregnum period, and things that also when through when FERC had no quorum. So, there's a lot of cleaning up going on still in some of these statutory interpretation things. And the reason why FERC is losing a lot lately is because it had some pretty aggressive positions, I think, in the previous administration.

Question 7: One of the things I find myself wondering about a lot with this *Chevron* stuff, and I think it's been highlighted in some of the discussion, is that it's ambiguous to me what *Chevron* means for legislative power. I think, in a world which is difficult to pass any legislation, the ability to pass ambiguous legislation and have the executive branch implement it to the best of its ability, may be a positive power for the legislature. I mean, in some ways, if you think about the Tailoring Rule, if you didn't have that, it would almost be like a work-to-rule kind of policy. And you don't say, "Oh, work-to-rule empowers management." It makes it harder to get things done. So, in a way, I think being against *Chevron* is a consistent position for a conservative, small government point of view, because it may push towards less ability to implement federal policies. And I just wonder if people think it might be significant that way.

Respondent 1: I think that's right, and I think one of the critiques of *Chevron* has always been that it allows Congress to take credit for doing something: "I passed a statute, and I highlighted this as an important issue, and I gave it to an agency." But then they did not reap the cost of making the hard decisions, which happen at the agency level, about what actually happens to answer that particular problem. And so, to the extent that *Chevron* is premised on political accountability, it kind of falls apart if the major decisions are being made by the agency, because voting for a President is kind of a noisy signal, versus discussing whether I disagree with a particular court decision of the EPA or FERC or something like that.

Respondent 2: I would just add that there's a whole literature in political science on these issues of delegation and Neomi Rao, the current regulatory czar, or whatever you call it for Trump, is going to be on the DC Circuit in a matter of months. She's written about how there's also an administrative collusion problem--that Congress people do have a lot of incentives to pass really broad, open-ended statutes, because they don't have the time--they need to get reelected, and they need to focus on other things. They also have abilities, *post hoc*, to control agencies through oversight, through constituency mail, and through the appropriation process. And so, they have ways to distort the process. One individual member of Congress, or a committee, not the collective Congress, can do things. And she's written on this a lot, and I think, when she gets on the DC Circuit, you're going to see that

developed even more as additional grounds to get rid of *Chevron* deference, as it would eliminate at least some of that which she calls "administrative collusion" between members of Congress and agency heads.

Respondent 1: So, Respondent 2, you're saying what about her chances of getting affirmed? Because, for all the reasons you're describing about Neomi's writing, I thought that she might be in more danger, but you think that she's OK?

Respondent 2: She got four Dems in the last Senate, and this Senate's two Republicans stronger.

Respondent 1: So, it's not that you're saying it's not going to be contentious, you're just saying that realistically speaking --

Respondent 2: I don't see any Republican not voting for her. She's supremely qualified.

Respondent 1: But you're not saying she's not going to face a bunch of people saying horrible things about her, perhaps.

Respondent 2: Oh, yeah. She already has. Yeah. It's going to get ugly.

Respondent 1: Full disclosure, she's a classmate of mine. We've been friends for many, many decades. She's awesome, and I wish her nothing but the best. She is super, hyper principled. And she'd be a great judge.

Question 8: As more of the FERC litigation begins to morph from traditional *Chevron* to more *Auer* based deference, dealing with the complexities of market rules, and as the percentage of FERC litigation centering around the nuts and bolts and details of market rules, and the organized markets has predominated (I don't even thing we've had a significant cost of service case in a decade, but it's really technical issues on market rules), can the courts really get into the nuts and bolts, where the market rules themselves defer to the market organizers, who have their own internal rules that are not even on file? And a larger and larger percentage of the dicta and the operation of the industry today is governed by self-governing, self-regulating entities, under a broad umbrella of FERC regulation.

Respondent 1: I'm really happy you asked that question, and yes, I think you're quite right. As long as we get involved in a statute that's very broad, and we have tariffs that are very dense, and (for all the same reasons we talked about in terms of agencies having reasons to want to be ambiguous, or want things to appear more ambiguous, in order to have this agility to do things) the RTOs have the exact same motivations to keep the rules as loose as possible, so they can react as they might wish. And that's not a good thing. But there is a Supreme Court decision (it was issued in a completely different context) that I think is probably going to sew this question up. There are lots of cases about Grand Gulf, (the nuclear generating station) down in Louisiana. So, we got *Mississippi Power and Light* out of that, and several other decisions. The latest and most recent spinoff was the 2003 decision in *Entergy Louisiana v. Louisiana Public Service Commission*, and in the decision there, after all these earlier decisions saying that states aren't allowed to second guess FERC prudence calls or FERC cost allocations, Louisiana decided to say, "Yeah, but what if all that FERC's tariff does is it gives Entergy the discretion to decide what goes into an emergency reserve shutdown mode?" The important point was that the state was saying, "Unless you specify exactly who it is, exactly what it is you want to do, we can question their prudence." And the Supreme Court said, in that case, that it doesn't really matter whether or not FERC sets the line, if its tariff clearly decides who makes the decision, in that case, Entergy, then they can do that. So, in a completely non-RTO, like, the most quintessential non-RTO setting, an energy system agreement, we've already had the Supreme Court answer that question. That would be very difficult to get around. I hope that was helpful.

Respondent 2: I think the broader question about how much decision making can be delegated, even beyond the agency, is one the Supreme Court has shown some interest in. There was an Amtrak case a couple of years ago, raising the question about whether, when the Department of Transportation gave authority to Amtrak, was Amtrak a private actor, and therefore not allowed to exercise government authority? And the Court ultimately resolved it by saying that Amtrak was a governmental authority. But I think you can raise similar questions about RTOs, and folks are delegating authority to the Universal Service Joint Board, on the FCC side, which, because it has state participants, can raise issues about federalism and appointments clause stuff, too. So, I think there's a cluster of issues that have not yet been litigated that the Court has shown some interest in looking at. We may see some development down the line.

Question 9: I was just wondering if there's been any research done on what courts generally did before *Chevron*. I'm wondering if courts generally deferred to agencies, but just used different justifications.

Respondent 1: Yeah, there's a lot on this right now, as I kind of hinted at the outset of my remarks about the return to interpreting the Administrative Procedure Act and whether *Chevron* existed or not. There's a great article by Aditya Bamzai in the *Yale Law Journal* that came out maybe two or three years ago where he traces back deference to kind of the 1800s, because one of the reasons Scalia thought *Chevron* was OK is because he thought it had a historical pedigree and Aditya Bamzai says, "Well, kind of." Courts deferred to agency interpretations that were contemporaneous and consistent because they deferred to any interpretations that were contemporaneous and consistent, and not because they were agencies. And so, his kind of big takeaway is that we had deference doctrines long before we had *Chevron* or even the Administrative Procedure Act, but they weren't the type of deference that *Chevron* is.

Of course, there's been a lot written on the 1940s cases that came out right before and right after the Administrative Procedure Act that also affords some type of deference. I view that more as a standard, not a rule. I think *Chevron*'s a much more of a rule-based kind of crystal-clear deference, and the prior deference standards were much more kind of like a reasonableness kind of "totality of the circumstances"-type, *Skidmore* deference. So, there's definitely a lot that's been written on the pre-*Chevron* deference regimes.

Respondent 2: In the pre-*Chevron* period, going back to the founding of the country, the courts said a lot of things, not all of which are easily reconciled. But on the core question, if the agency says the statute means one thing, and a court thinks the best reading of the statute is something else, I think it's clear, in the pre-*Chevron* period, the court would ultimately say, "If we think the best reading of the statute is something else, that's what we go with. Notwithstanding that we understand that a reasonable person could take the agency's view. If we think our reading is best, that is the meaning of the statute."

Respondent 1: Are you sure about that?

Respondent 2: Well, we can debate that further after. [LAUGHTER] But, as Speaker 2 says, there are certainly many statements, even in pre-*Chevron* opinions, where the courts say, "Yes, we looked to the contemporaneous construction and that informs our interpretation."

Question 10: Just an observation, and then a question. It seemed to me that, without an explicit CO2 limitation regulation, the electricity sector has made significant strides, just based on the markets themselves, in contrast with other sectors that are potentially way more important to CO2 emissions, like transportation. And it seemed to me that that's a function of a lot of regulations and direction coming from the individual states.

And the challenge there is that different states have different ways of approaching this, and, therefore, the CO2 value in different states is calculated differently, so that there are disconnects from state to state, or from region to region, in terms of what a pound or a kilogram of CO2 is worth. And I guess what that leads to is a suggestion that if there were some kind of federal-level regulation, a principle benefit might be to have a uniform value or calculation of value on CO2 reductions, which would make it easier, across the board, for generators, utilities, et cetera, to be able to look at decisions as to what kind of generation to put in place. I think that's all true right now, except for, and it's a big except, the penetration of natural gas-fired generation, which is the baseload generation of choice right now.

Respondent 1: I don't disagree with that. I guess that the question for federal action will be whether it's a floor or a ceiling. And that's the same issue with the debate about Federal RPS standards, things like that. If you're setting a federal minimum that maybe states could go above, then you still get some of the benefits of experimentation that we see in federalism literature. If FERC is preempting states that may want to go above the federal limit, you get the benefit of uniformity, but you get the argument from those states that maybe that's not high enough, not enough protection.