ENERGY BAR ASSOCIATION PANEL DISCUSSING THE SMART GRID

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S P E A K E R S

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P R O C E E D I N G S

MR. DENNIS:

Good morning everyone and welcome to our plenary panel. I'm Jeff Dennis, from the Edison Electric Institute here in Washington. This panel is entitled, "What is the Smart Grid Anyway? How could it Change the Electric Industry and Our Client's Business?"

We designed this panel, and the planners really put together the entire day, to try to give you a broad overview of Smart Grid. Why are policymakers so focused on it? Why is the electric industry pursuing it? What does it mean for the utility business and utility consumers? And why are your clients already asking you about it, or will be?

At the EBA mid-year meeting yesterday, Joe Rigby, the CEO of Pepco Holdings, gave a great overview of his company's Smart Grid strategy. I was

particularly struck by his description of the Smart Grid "Thomas Edison meets Bill Gates". I hope he doesn't mind that I'm stealing that from him this morning. We'll call it borrowing. I borrow it because I really think it makes a great point about the Smart Grid: it's really about adding game changing technologies—many of those information generating technologies—to our existing electric grid. In our conversations at Edison Electric Institute, we often call these technologies "game changing" because we think they have the potential to fundamentally change how the electric industry does business and how customers receive energy services.

If these technologies do "change the game," they're going to have significant implications for all of us humble energy lawyers. They'll have significant implications for the regulatory system we navigate our clients through. They could present new and novel jurisdictional issues. And they could present a variety of complex legal issues, ranging anywhere from the First Amendment and protection of the privacy of customer data to software licensing issues. So we can't cover all of these topics today but we can scratch the surface and explore a few of them. And this panel is intended to start us off with a broad prospective of the Smart Grid, from government, the electric utility industry, and electricity consumers.

We have an excellent panel here to help us do that. I'm going to introduce them and then I'm going to get out of their way.

First we're joined by Joe Miller. Joe is Senior Vice President of Horizon Energy Group. He provides expert insights to the electric industry in the areas of grid modernization and process technology and optimization. He also has the important role of serving as a leader of the DOE Smart Grid Implementation Strategy Team, and he will give us his insights into the Smart Grid from that vantage point. The DOE Smart Grid Implementation Strategy Team that he leads has developed a vision and other key concepts for the Smart Grid and is now focusing on supporting its implementation from a strategic perspective. Prior to joining Horizon, Joe was at Illinois Power for twenty-eight years where he held various positions in the nuclear power, transmission and distribution business units.

Second, we'll be joined by Kevin Kelly. Kevin is the Director of the Division of Policy Development, Office of Energy Policy and Innovation at the Federal Energy Regulatory Commission (FERC). There he is responsible for analysis of major electric, gas and oil policy issues and advising the commission regarding these policies. Since he joined the Commission in 1994, he's helped develop Commission staff analysis of all major electrical policy issues including Smart Grid, demand response, competition analysis, transmission planning, reliability, generator interconnection, wholesale market design, and transmission pricing policy. Kevin is going to provide a FERC and governmental prospective on the Smart Grid.

Third, we'll hear from Paul Demartini, who will provide the utility prospective. Paul is Vice President of Advanced Technology in the Transmission and Distribution Business Unit at Southern California Edison (SCE). Advanced Technology is Southern California research and development (R&D) organization that's responsible for Smart Grid development, including advanced grid technologies, electric transportation, smart metering, and integration of energy smart consumer products. Prior to joining SCE in 2002,

Paul held senior management positions with ICF Consulting, Sempra Energy, Coastal Corporation, and Pacific Gas & Electric (PG&E). Paul is a member of the California Energy Commission's Peer Advisory Board and the Electric Power Research Institute's (EPRI) Smart Grid Advisory Committee. He is also a Fellow at the Wharton School at the University of Pennsylvania.

And last but certainly not least is Barbara Alexander, who will bring us the important perspective of electricity consumers. Barbara is a Consumer Affairs Consultant who comes to us today from her home base in Maine. Her clients include national and local consumer organizations, state public utility commissions, and state utility consumer advocates. She has appeared as an expert witness in regulatory proceedings, submitted comments in rulemaking proceedings, assisted in the drafting of legislation, and worked as a consultant to state regulatory commissions on several issues, including consumer protections to accompany the move to more competition in retail electric, natural gas, and telephone service, service quality standards for electric, gas and local telephone, and low income program designs and proposals for pilot and system-wide installations of advanced metering. Before opening her own consulting practice in 1996, Barbara was the Director, Consumer Assistance Division at the Maine Public Utilities Commission.

So with that I'm going to turn us over to Joe Miller to get us started from the DOE perspective.

MR. MILLER:

Thank you Jeffery. Good morning everybody. I think this is probably the first chance I've ever had to speak to a group of attorneys on the subject of Smart Grid. I'm just an old utility guy, but I do have a son that's an attorney. I hope that helps. He has certainly challenged me over the last couple of years with some pretty tough questions on what the Smart Grid's all about.

What I'm going to do this morning is two things. One is I'm going to give you the short course on what the Smart Grid is from the perspective of DOE's Smart Grid Implementation Strategy Team. I'm going to give it to you from the "blocking and tackling level" – the very fundamentals of what we're doing to the grid to make all these things we talk about – these neat whiz-bang gadgets – work. And the second thing I'm going to do is, from my own perspective, talk a little bit about what I think is one of the biggest challenges we face in making this vision a reality. It is an issue that's not getting the attention that I think it deserves.

So with that, with a group of attorneys I have to give you a disclaimer. My comments are mine alone, and not necessarily those of the Department of Energy or the National Energy Technology Laboratory. But I doubt that anything I say will be objectionable to either party.

Before I get into it, I want to note for those of you who may have followed the work of the DOE Modern Grid Strategy Team, that name is now gone. We are now calling ourselves the Smart Grid Implementation Strategy Team.

I want to give you an update of what we were all about then. We began our work in January 2005, so I think that was about five years ago when there wasn't a lot of things going on around Smart Grid. Our role was to respond to the mission that the DOE handed down to the National Energy Technology Lab,

which was to go forth and figure out how to accelerate grid modernization in the United States. So we put together a group of folks and we started to develop concepts and definitions of what this thing was, what the barriers were for getting there, and what the benefits and value proposition were.

As we look around now, if you haven't noticed, we are now at the end of the beginning, or getting close to it. What I mean by that is any significant transformation begins with understanding, cussing and discussing, alignment, and that sort of thing. We're not there with all stakeholders, but the work we've done has now become somewhat foundational in the industry, and I'll show you some of that here in a minute.

Now, we're shifting our work. We're going to continue to help educate some stakeholders that maybe are still not there yet, but we're also going to start moving down the path with DOE toward more directly helping with implementation. We're trying to become more of the integrated gear, one of the gears in the DOE machine to help with implementation. We're not going to get in the way of anybody; we're out there looking at things no one else is doing. If we find something and you think you're doing it, we'll give it to you. In short, we're just trying to clear the path for implementation.

So what is a Smart Grid really? Now we talk about all these gadgets – those really aren't the Smart Grid. The danger here is getting all excited about being able to connect these gadgets and gizmos to something that can't accommodate them. That's what the Smart Grid is about – a grid that can accommodate the gadgets and gizmos.

So what I want to do is talk about the fundamental differences between a Smart Grid and today's grid. It's really pretty simple. There are three things to remember. First is a move to a decentralized supply and control model. When we grew up we had these big power plants out in the country – all centralized. Power went from them to the load. The Smart Grid idea is to move from thousands of these big power plants to millions of power plants that are of small sizes, connected throughout the grid. That's a paradigm shift. That's a fundamental blocking and tackling change we have to deal with.

The second thing to remember is two-way power flow. Remember that one. Two-way power flow. We say it like it's easy. The grid wasn't designed to move power in two directions. It was designed to go from the big power house to our house. That's the way it was designed to work for seventy-five years. Making it capable of going two ways to accommodate some of these things that we've talked about, that we heard about this morning, is a major shift in paradigm.

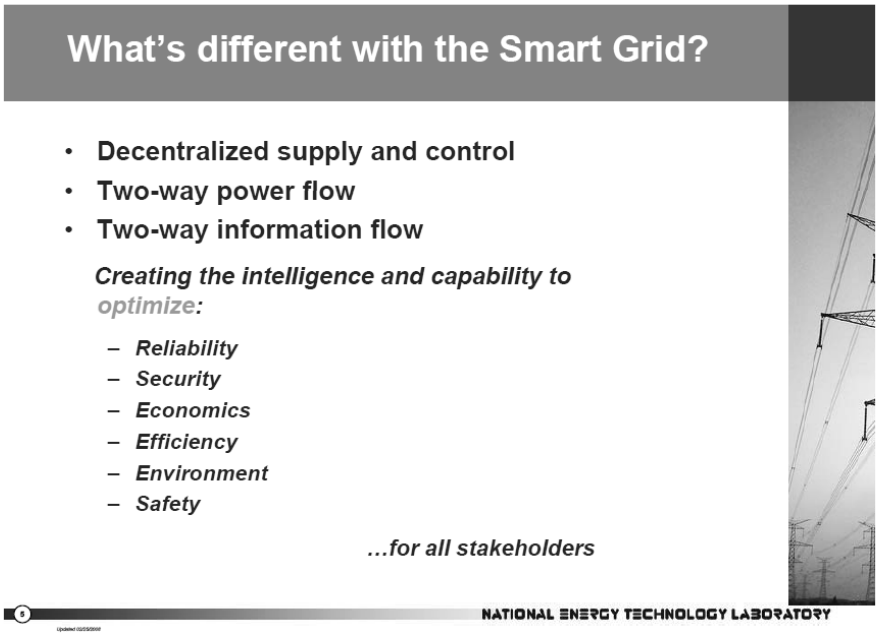
The third thing to remember is two-way information flow. From the transmission perspective, we have some two-way information flow, and a lot of one-way information flow between the grid assets and the grid operators. But in the distribution system, we have much less. And if you really think about it, the consumers who now are part of this overall equation have no information flow. So to go from what we have today to two-way information flow among assets, operators and consumers is a huge paradigm shift.

So those are the three fundamentals: decentralized supply, two-way power, and two-way information.

Why in the world do we want to do that? Well if we do that, now we have everything—because now you put all these smart people in a room that can write

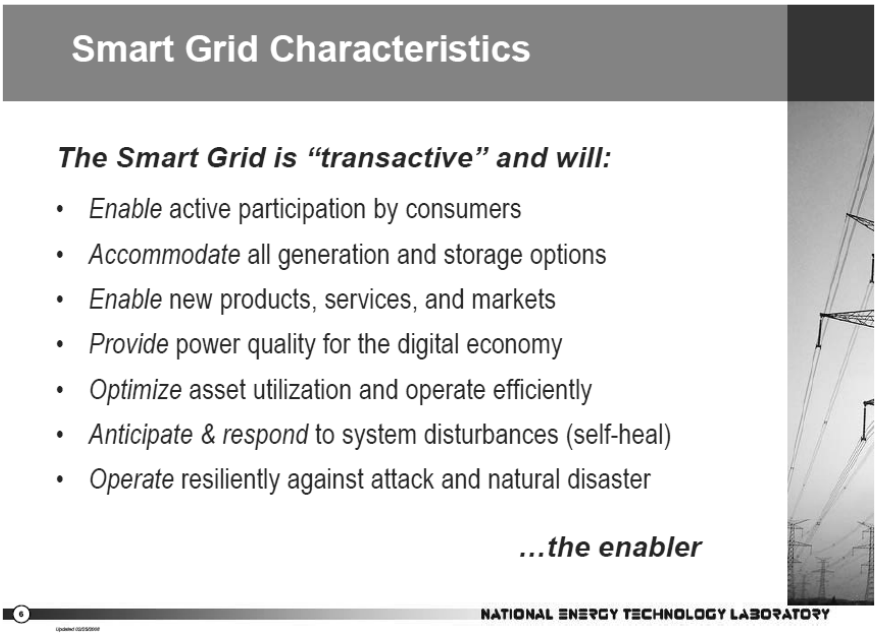
algorithms and software to make this work. We can create the intelligence and capability to optimize assets.

Figure 1.



What are we wanting to optimize? There are six value areas where the Smart Grid can enable all these gadgets and gizmos to give us increased value and electricity that's more reliable, more secure, and more economic (see Figure 1). This will put downward pressure on prices. Prices aren't going to go down, but we can keep downward pressure on them with a Smart Grid. More efficient operation, environmental improvements, and safer grid operations are all value areas. And now it's not just for the CEO at the utility that we're talking about these values, it's for all of us as stakeholders—you, me, and us.

Figure 2.



Now, if you remember those three fundamentals—decentralized supply, two-way power, two-way information flow. If you think about it, how do you put those in practice? Well, to make the Smart Grid work as a transactive agent, there's seven, we think, complete characteristics that define it (see Figure 2).

You have to have consumers involved, don't you? So that's the first characteristic – enable their active participation.

You also have to accommodate all of these new generation devices that are going to help us get to a decentralized supply model, and that isn't easy. Seventy-five years of process, procedures and hardware – it's costly and hard and onerous to change that.

Third, if we have two-way information flow, two-way power flow and so forth, we can create a market. The Smart Grid has to accommodate that exchange of information from a market perspective.

Fourth, power quality – if we do this right, all these new devices and those three fundamentals allow us to make sure that power quality is better than it is today in those places where it needs to be better.

This is where the efficiency characteristic of the Smart Grid – the fifth characteristic - comes into play. We will take those three fundamental paradigm shifts and improve the operation of utilities. I'm using utilities with kind of a general label, here, and speaking in terms of reducing their own end costs and reducing their capital costs, which helps us as consumers.

The sixth characteristic is self-healing. With all those three fundamentals, think about how much smarter the grid could be in terms of finding degrading conditions before they become issues, outages or blackouts, and fixing them

before they occur. And, if they do occur, isolating the problem and restoring power quickly.

The final characteristic is the touchy one. This is the one about becoming a more resilient grid. Clearly those three fundamental changes will make the grid much more resilient. The trick and challenge for us that we've got to be honest about is whether we will introduce new vulnerabilities at the same time, primarily in the area of cyber-security. A lot is being done there, but we've got to be careful because it could get us in trouble if we aren't careful. Imagine no power for three months across the country – what that would do to our nation?

So a Smart Grid is an enabler. But I ask you not to get confused. PHEV's aren't a Smart Grid. Fancy phones that can do things – that's not a Smart Grid. The Smart Grid is what allows these things to happen and makes their value real.

So there you have in five minutes or so what the Smart Grid is. Going back to the old college days, if you always remembered how you derived the equation, you could always answer the question on the test. If you remember those three Smart Grid fundamentals, you'll never get confused.

Okay, so is it worth it? There are a lot of challenges out there. Technology is a challenge, we heard about regulatory policy challenges this morning at breakfast. A lot of those challenges are being worked on by these mini-stakeholder groups.

There's one challenge that, in my opinion, we aren't putting attention on, and that's the notion of this as a change management effort. We go from understanding to alignment, motivation, coaching – those are the steps you know if you've been through change management. Is there something motivating us all to move forward? Have any of you called your regulator recently and said where's my Smart Grid? I don't think very many of us have yet, but some day we will.

So let's talk about who stands to benefit from a Smart Grid. Well there are three sets of beneficiaries: utilities, consumers – and I'm going to say selfish consumers, you and me as individuals – and society at large. Some of these folks would say "yeah, I think a Smart Grid is the thing to do," while others would say "I'm not sure yet."

So let's walk through these quickly and ask ourselves – what would a utility get out of a Smart Grid? Of course, it's pretty obvious that their shareholders earn a rate of return on their investments. So when they spend money they make money. And if they spend it in Smart Grid, we can see operational improvements, we can see asset management improvements. Which do what? Reduce O&M costs and reduce capital costs. Actually, on the O&M side, those costs go to the utility's bottom line until the next rate case. So there's a benefit there for the utility. It's a good deal for them if it's done correctly and their PUC approves the investments. But the idea here is that this also keeps downward pressure on prices charged to us as individual consumers, there's a piece of the utility benefit that applies to us as individuals.

On the consumer side – now this is you and me as individuals – what are the benefits? Well we know about more reliable service, we know about the notion of demand response and how, if it's properly done, we have a chance to save money on our bill. That's all good. Some people are talking about savings on fuel cost for driving your vehicles, because it's cheaper to burn kilowatt hours than it is to burn gasoline or diesel fuel. So there's another potential benefit.

And we heard this morning that someday we'll be able to offer our resources to the market, whether it's demand response or generation resources or regulation services to the grid, which can become a revenue stream to us.

Those are the possible benefits to consumers, but I think if you talk to your wife or your grandmother or your friends, they're not either going to understand that or they are going to say: "Hey, what's going on here?" However, they do know this – that the costs are passed on to consumers. We pay for it ultimately. So the question is what is in it for me? Is it worth it? Are we at a tipping point?

Let's take two quick examples. We have some mathematicians in here, I know, but let's do some quick math. Let's look at the potential bill savings. The average residential bill is $100 a month, or $1200 a year. Some studies say that if you really go after this and try to use Smart Grid technologies to help you save money, you can save ten to fifteen percent.

You do the math – that's $60 to $120 a year that you can save. But now we've got to pay for these investments, so much a month, and if it's $5 or $10 a month on your bill, you do the math. It looks like we're not going to get hurt but we aren't going to see a huge opportunity here on an average basis. So it's positive value but it's not something that's going to get you and me to call our PUC and say, "Where's our Smart Grid?"

So maybe that doesn't get us to a tipping point. If you look at the fuel cost idea—I took some really rough numbers, if you drive a car that gets twenty-five miles a gallon, and assume $2.50 a gallon, that's about $.10 a mile. Gasoline is probably going to go up, so if you figure $.10 to $.15 a mile to drive your vehicle 10,000 miles a year. There's a study or two out there that says the cost to drive an electric vehicle is going to be $.03 to $.05. So if you do the math – that's $500 to $1200 a year that you can save. Now that's getting where it's a little more exciting, isn't it? But we've got to go buy this car first, and you have to pay a premium to get this electric vehicle. At least for now, maybe ultimately it will be cheaper than a regular car, who knows.

Now this is more compelling, but is this a tipping point? Again, I don't know that we're there yet and there's a lot of reasons why we haven't gotten to a tipping point. One of those I think is this notion that societal benefits come along with the Smart Grid. We're going to benefit as individuals as I just showed you—maybe not a lot, but some. It's not a losing proposition, at least in theory. Societal benefits—I know you say there's no free lunch, but societal benefits really do come along free, don't they? Because we've already paid for it as individual consumers.

How big are some of these societal benefits? We've been talking about energy independence for how long? For quite a while, right? PNNL, the Pacific Northwest National Lab says, "Hey, if we do this right with the Smart Grid, these electrical vehicles can help us reduce our dependence on foreign oil by fifty-two percent. Now that's not a marginal improvement. That's a substantial improvement. EPRI says that with Smart Grid we can also reduce our consumption of energy by up to four percent. That's what 203 billion kilowatt hours saved represents in 2030. I don't have any numbers on national security, but if we get the cyber-security issue whipped—and I'm confident that we will – the Smart Grid is going to provide that resiliency that's going to make us not only immune from our own little bad guys in the United States, but from an attack from overseas.

So there are some significant comfort value propositions here as well from a societal perspective. And there's downward pressure on prices. It's hard to say I want to go invest in this because it's going to keep downward pressure on prices, though, because that's kind of invisible, but if you look back to where we were with gas and oil – if we would have done something ten

or fifteen years ago, what would we be paying right now? Maybe we wouldn't even be using gasoline and diesel fuel. So there's downward pressure on prices. Smart Grid gives us a chance there.

There are a couple of other value propositions too. Improving the environment – we talk about that a lot and how the Smart Grid can help. The use of electric vehicles again can help on the environmental side. There is another number that says that quite a few million metric tons of CO2 can be saved by 2030. But the Smart Grid, with the motivation behind it to promote storage devices – in fact, millions of electric vehicles could solve the energy storage issue and by doing that it allows us to integrate more of these intermittent wind devices and solar devices out there, which is more environmentally friendly.

So there are some significant opportunities that go well beyond smart meters and the things that people talk about today. Growing the economy is another opportunity. KEMA said last year that 280,000 new jobs can be expected to be needed to support the roll out of the Smart Grid, and half of those will be needed long-term from an operations and maintenance stand point.

And finally, this number's been debated a lot, but the cost to commercial and industrial customers for outages is significant. It's $135 billion by some accounts each year. So if we can cut that in half just by improving the reliability and reducing the probability of a blackout to near zero, that's worth a lot.

So let me wrap up and just say – we aren't at a tipping point yet with our consumers. And I maintain that until each of us in this room get excited about the Smart Grid and feel like we ought to call our regulator and say, "Hey, where's my Smart Grid," we're going to be held back from where we want to go. So we need to help get the consumer on board, not give them a sales job. Talk to them, give them the numbers, but also address their concerns and their questions. Some of their concerns and questions aren't financially motivated at all. Some are very much from the heart, like: what about my privacy, what about obsolescence and gizmos I've got to buy for my house, and so forth? We're not addressing their questions, I don't think, as well as we should.

So if we do this right, we can all be winners. Let me leave it there. I just want to plug again the transformation to the Smart Grid Implementation Team, and coming soon will be the smartgrid.gov website. It's up now, it's still kind of under construction, but I encourage you to go there if you still want to learn more about the Smart Grid.

So with that, I'll close. Thank you.

MR. DENNIS:

Thank you very much Joe. Let me invite Kevin Kelly to the podium.

MR. KELLY:

Thank you Jeff and good morning everyone. I want to thank Jeff Dennis and the Energy Bar Association for inviting me to talk to you today about the Smart Grid and the Federal Energy Regulatory Commission's role in implementing it for the electric power industry. Any views I express during the talk or during the discussion later do not necessarily represent those of the Commission.

I want to talk to you about four topics. I want to do it briefly because we want to allow adequate time for discussion later. First, I want to let you know that the government is interested in a Smart Grid. Second, Title 13 of the Energy Independence and Security Act (EISA), a 2007 law, has Smart Grid provisions, including a role for FERC. Third, FERC has a Smart Grid policy. And fourth, I want to talk about why it is important to develop good Smart Grid standards.

What I won't talk about is what is the Smart Grid. I think Joe did a terrific job of that, and since I previewed Paul's and Barbara's slides, I know you're going to hear more about that from them. But I will point out for those of you that like words – particularly words in statutes – more than in pictures, you could look at EISA Title 13. You won't find there a Daniel Webster style definition of Smart Grid. What you will find in Section 1301 is ten things that "the Smart Grid is designed to achieve." And in Section 1304, there are nine areas where DOE is directed to fund research, demonstration, and development of Smart Grid. In Section 1306 you'll find nine types of investments that qualify for DOE Smart Grid grants, and also in Section 1306 you will find a dictionary style definition of "Smart Grid functions," which effectively define the Smart Grid in terms of the ability to carry out nine functions. So together, these forty-six elements of EISA provide a pretty good description, if not a dictionary style definition, of what Congress thinks the Smart Grid is.

So first, if you didn't already know, government is interested in the Smart Grid, as well as are various industries, equipment manufacturers, consumers, and the press. President Obama, particularly in his speeches, has energized several industries to develop and deploy Smart Grid technologies quickly, and has also energized government agencies to develop the Smart Grid framework quickly. The Recovery Act reinforces this interest and the urgency by providing stimulus dollars for a Smart Grid, a subject of one of the breakout sessions after this. State governments are also interested for many reasons, but especially because the Smart Grid enables a number of new retail functions such as load management and demand response, among other functions.

As mentioned, EISA is the Energy Independence and Security Act of 2007. It begins by declaring that it is the policy of the United States to support the Smart Grid, and it gives a lot of assignments to the Department of Energy. Assignments to do research, to do demonstration projects, to fund studies, to give grants, and to create a Smart Grid advisory committee and a Smart Grid task force. All of which DOE has done or is doing.

EISA also gives an assignment to NIST, which is the National Institute of Standards and Technology – part of the Department of Commerce – to coordinate the development of an interoperability framework for a Smart Grid. And this framework consists of standards and protocols for so called interoperability, which means roughly that all the pieces – all the devices in the Smart Grid – are able to communicate with one another in two-way

communications. NIST is not to develop standards and protocols itself, but it is to work through various standards development organizations. George Arnold, who is leading the effort for NIST, told me last April that he once had to bring four different standards development organizations together to develop a common set of standards and it was one of the hardest things he ever did. It was like herding cats. Then, he said that we had thirteen standards development organizations that were then trying to herd together. I believe the number has grown now to over twenty. It is a very difficult and challenging assignment. George and NIST, in my opinion, are doing a terrific job.

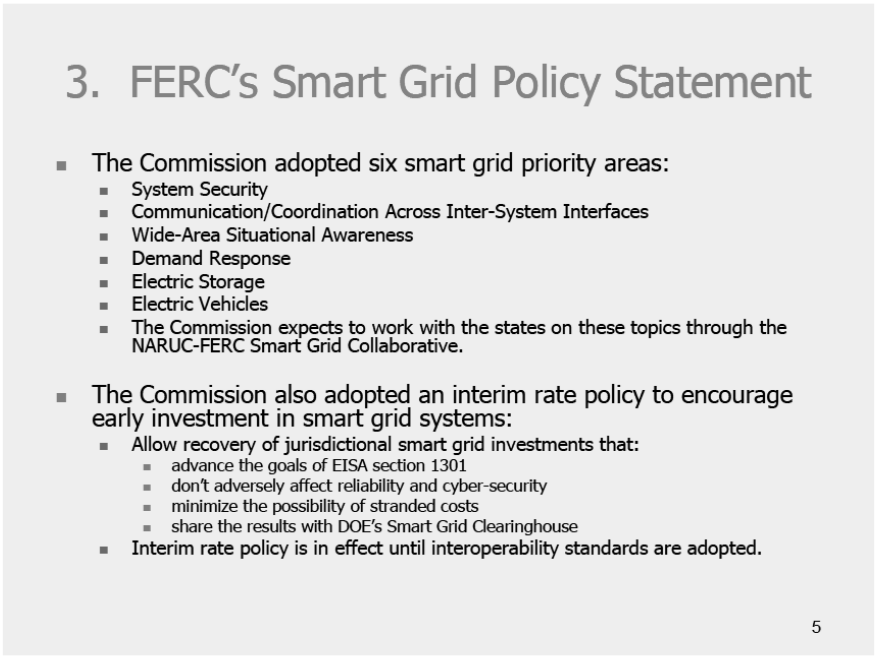
EISA requires FERC to adopt standards developed through the NIST process by rulemaking when FERC finds there is sufficient consensus on a standard. As most of you should know, FERC already has in place a process for approving standards, including reliability standards for the North American Electric Reliability Corporation (NERC) and business practice standards for the North American Energy Standards Board (NAESB). FERC is working closely with NIST to coordinate the efforts of our two agencies.

I should mention that EISA also establishes two new Public Utility Regulatory Policies Act (PURPA) standards under PURPA Title I for states to consider. If you remember PURPA Title I, it requires state regulatory agencies to consider standards, but does not mandate that they adopt these standards. The first new PURPA standard from EISA, if adopted by the states, would require utilities who are thinking of adopting a non-Smart Grid technology to consider adopting a Smart Grid technology in its place, taking into account various factors such as cost-effectiveness and cyber-security, among others. The standard also calls on states to develop protocols for Smart Grid cost recovery and to consider developing protocols for obsolete investments that are replaced by Smart Grid investments but have not yet been fully depreciated, so as to avoid stranded costs. That's all one PURPA standard.

The second PURPA standard provides for states to consider requiring utilities to provide retail customers with access to Smart Grid information, such as prices and customer usage.

I might also mention that a different law – the Energy Policy Act of 2005, in Section 1223 – while it doesn't mention Smart Grid explicitly, says that FERC, "shall encourage, as appropriate, the deployment of advanced transmission technologies," which FERC may interpret to provide incentives to technologies such as Smart Grid technologies.

FERC has a policy statement on the Smart Grid which was issued in July of this year, following the issuance of a draft policy statement and the receipt of comments. FERC adopted six Smart Grid priority areas, which we divide into the first two and the next four.



The first two priorities we call cross-cutting priorities. One is system security, especially cyber-security, and the other is communication and coordination across inter-system interfaces. That is, it refers to interoperability among the parts of the power system. The other four priority areas are wide-area situational awareness covering technologies such as those that could have prevented the 2003 blackout, demand response, electric storage, and electric vehicles.

The first two are called cross-cutting because, for example, each of the four that I just mentioned should have both cyber-security and the ability to communicate with other parts of the system. NIST and its stakeholders, through a process, accepted and adopted FERC's priority areas and added two of their own – advanced metering infrastructure (which I think some of us at FERC considered part of demand response) and technologies for the distribution grid, particularly for the integration of distributed energy resources.

FERC in its policy statement also adopted an interim rate policy to encourage early investment in Smart Grid systems. We would allow jurisdictional utilities that invest in Smart Grid to recover early investments without the risk that we would later say, "Well, it's not used and useful because that technology didn't pan out," provided that the early adopter makes four demonstrations to us. One is that the investments advance the goals of EISA as stated in Section 1301. Second, that the investments do not adversely affect reliability or cyber-security. Third, to minimize the possibility of stranded costs, and the way to do that is to have technology with components that can be upgradeable as the technology improves, rather than technology that has to be entirely replaced. And fourth, the utility must agree to share the results of its early adoption experiments with the DOE's Smart Grid Clearinghouse. The

interim rate policy is in effect only until all the relevant interoperability standards are adopted, after which the risk should be reduced because there is a known set of standards.

My final topic is to stress the importance of developing good Smart Grid standards for the electric power industry. I want to talk to you about this because so many of you work for companies or have clients in the electric industry. It's important to understand that these standards will affect a huge section of the economy and could bring large gains and costs to electricity consumers. So it's important to get these standards right. The companies that you represent should help shape these standards.

Now some electric power companies have been very involved in the development of these standards, but many more have not been. And I personally am somewhat concerned about that. I would urge you to urge your companies and your clients to be more involved in the NIST process and the standard development organization processes. Tell your clients not to hold back, saying "these processes are dominated by IT companies and telecom companies, so I won't participate; instead, I'll just object when the standards get to FERC." As we've said to people in the development of reliability standards and business practice standards – participate in the development of these standards, don't hold back and try to litigate technical issues at the Commission. That's not the optimal way. They should get involved now. The development of these standards is moving very quickly.

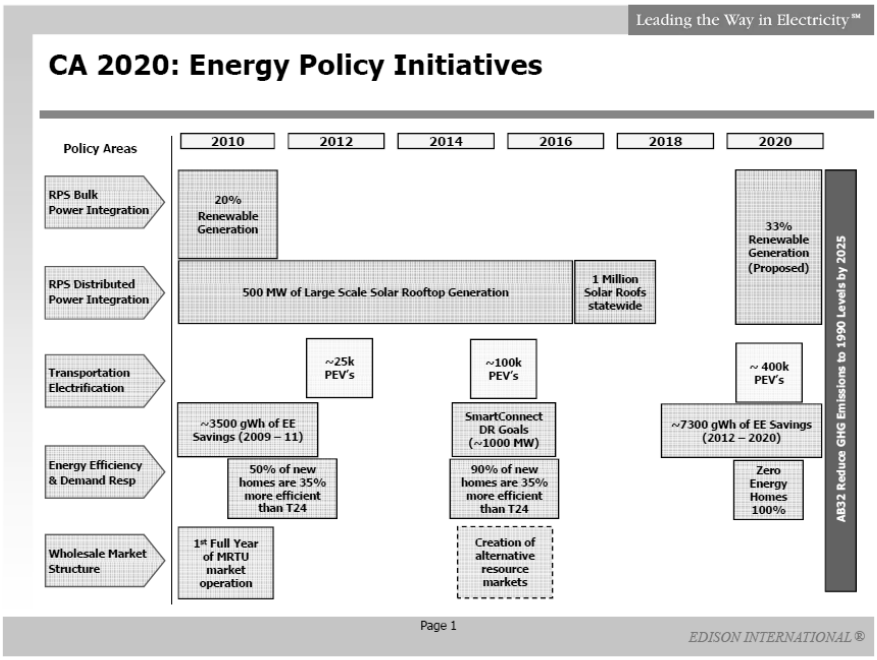
I recognize that the process can be hard. I know many of my electric utility friends are used to going to meetings where they constitute a large majority of the people in the room, with a few regulators and consumer groups also attending, but that's not the case when they go to a Smart Grid meeting. You have the IT industry, the telecom industry, the internet industry, the cyber-security industry, the appliance manufacturing industry, the meter manufacturing industry, and many more industries who are trying to collaborate in a difficult exercise. But while it's hard to participate, participation is crucial and I'd urge you to urge your clients to get involved. And I thank you for your attention.

MR. DENNIS:

All right. Paul Demartini, you're up.

MR. DEMARTINI:

Well, thank you for the opportunity to share with you what's going on in California and more specifically at Southern California Edison with respect to how we see the Smart Grid evolving. Building on what you heard earlier this morning, I think you'll see there's a lot of parallels to what's being discussed, but there are some nuances specific to what we're trying to accomplish in California to meet state policy on both climate and energy.



This first slide really tries to set out a little bit of the policies that have already been set forward in California. And maybe starting from the right-hand side there is the overarching climate change bill that was passed in California a couple of years ago, Assembly Bill 32, which essentially adopted the Kyoto Protocol to meet greenhouse gas reduction goals. As a result of that and some other activities that have been going on for quite some time around energy efficiency, renewable portfolio standards, demand response and the like, we have had an increase in the number of objectives in the state in terms of targets to hit and programs that have been put forward.

I think you're probably very well aware that there is an effort within the state, including the Governor's executive order, to move from a twenty percent renewable portfolio standard to thirty-three percent by the year 2020. That's still being discussed in the state and while that is the Governor's executive order, I think there's a lot of people really looking at what that is really going to mean in terms of practical implementation, and that it might be more practical by perhaps 2025, according to a lot of folks in the state.

But that's not just central solar and wind development, although there's a lot of that to be expected including in the Tehachapi area in our service territory, where there's 4500 megawatts of wind development anticipated and transmission facilities that we're just completing now to be able to connect that. But we're also recognizing, as was talked about earlier by Joe, that we need to look at how distributed renewable resources can create opportunities to meet this larger target. So we are not just relying on large central transmission-

interconnected renewables, but also how we can integrate renewables at the distribution level.

This has really taken on two elements here in the last six months. One is that we've had in California something called the California Solar Initiative. This was an outcome building on the Governor's million solar homes concept from a couple years ago. But in addition, what was approved just a couple months ago for Southern California Edison – and there are similar proposals from the other utilities in the state – was a large rooftop solar program where we're looking at 500 megawatts of rooftop solar installations. This is on commercial building rooftops on the scale of one to two megawatts apiece, so approximately about 350 projects that would go on the top of very large distribution warehouses. To give a sense of this, one megawatt takes up about 86,000 square feet of rooftop, so this is directly connected to the grid. It's taking advantage of these large distribution warehouses in the Ontario area that we have in our service territory. This creates very much this dynamic that Joe's talking about when we talk about bi-directional flow. Because these buildings are only in a few places on our system – in fact there is about three places where these type of buildings are located and they tend to be clustered – the developments on these projects will be on a relatively few distribution circuits. So we are seeing, for example, on a 12,000 volt / 16,000 volt distribution circuit that's normally rated at about ten megawatts, we are seeing anywhere from four to potentially fourteen megawatts being proposed to be connected. As was mentioned earlier, distribution circuits were not designed to do that. These are not transmission lines that are designed for bi-directional flow. These are distribution circuits that as mentioned are designed for one-way flow from central power plants out to the load.

So this isn't what are we going to do in five years or ten years. This is what we're doing right now, working to develop the designs to be able to accommodate some manner of this. It's not just circuit design and arrangements but also protection schemes that we need to look at because the existing protection schemes are not designed for two-way flow at distribution. And we're also looking at how we take advantage of energy storage technology to be able to mitigate some of the intermittency, which I'll show you in a second.

I think folks are aware of the significant energy efficiency efforts in California and that has been underway for several decades. But we are pushing to do more in the state. In fact in the last year, there was authorization by the state PUC for the three investor-owned utilities combined to invest an additional billion dollars a year in energy efficiency efforts for the next three years. This builds on the billion dollars a year for 2009 and also for the previous two years, so you're talking about a significant investment in energy efficiency facilitation in the state in terms of rebates and other programs.

And then, of course, there is demand response. Southern California Edison's smart metering program is targeted at to be able to achieve 1,000 megawatts in incremental demand response. That's on top of the just under 2,000 megawatts of demand response that we currently have. And this would come in the form of both time of use rates and dynamic pricing – that is, critical peak pricing type programs – for our residential and small commercial customers. Additionally, this also includes enabling technology like smart communicating thermostats.

The other thing that folks talk about and many of you who have been looking at in the Waxman-Markey bill will have noted is this idea of the net zero energy building, whether commercial or residential, as a future concept. Well in California, that's actually happening. By 2020 all new residential buildings have to be zero net energy. By 2025 all new commercial buildings. And there are steps along the way as I've shown here for new construction that has to start meeting this target.

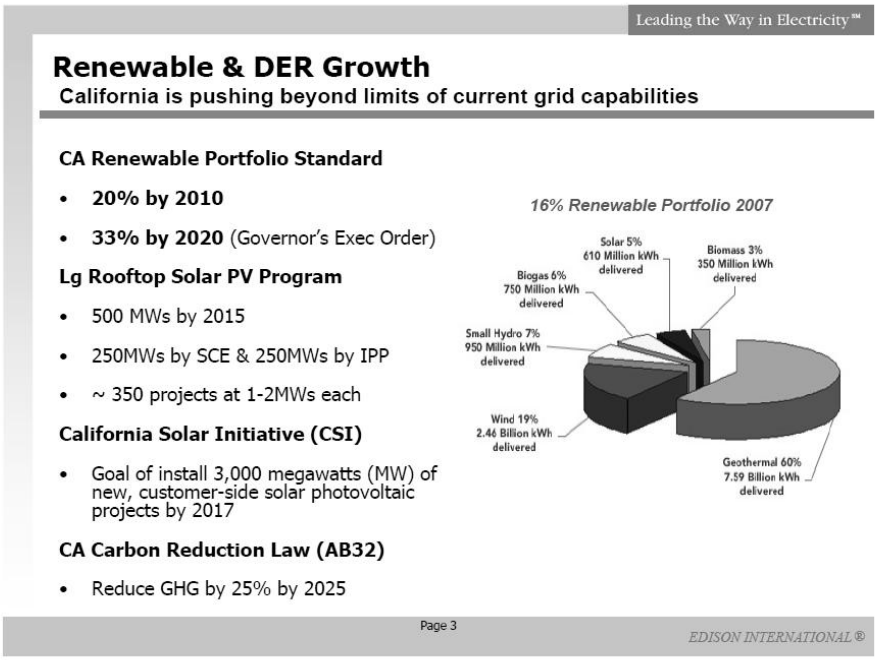
The big deal, which I'll highlight later, is how do we effectively create a residential or commercial ecosystem so that we don't cause issues or problems on grid operations and for other customers – where, for example you oversize the solar panel or the renewable resource at the premise to net out at the end of the year, but that resource is over-producing in one period, under-producing in another period, in a way that is totally out of sequence for what makes the most sense in terms of the overall societal benefits that Joe was talking about. How do we make sure that these good intentions all line up so that we do get the societal benefits that are shooting for, including trying to achieve the climate objectives?

As you can see and as you heard today from Chairman Wellinghoff, in California there is an effort to extend the market structure forward to accommodate demand response, storage and the like, building on the locational marginal pricing scheme that's been put in as part of the market re-design effort last year. To give you some context of this, for those of you that haven't been following, in California we previously had three pricing points within the state for the investor-owned utilities and those that are participating in the California Independent System Operator's market. And now we've moved to 3,000 pricing nodes. Within Southern California Edison, that's about 800 different pricing points for supply.

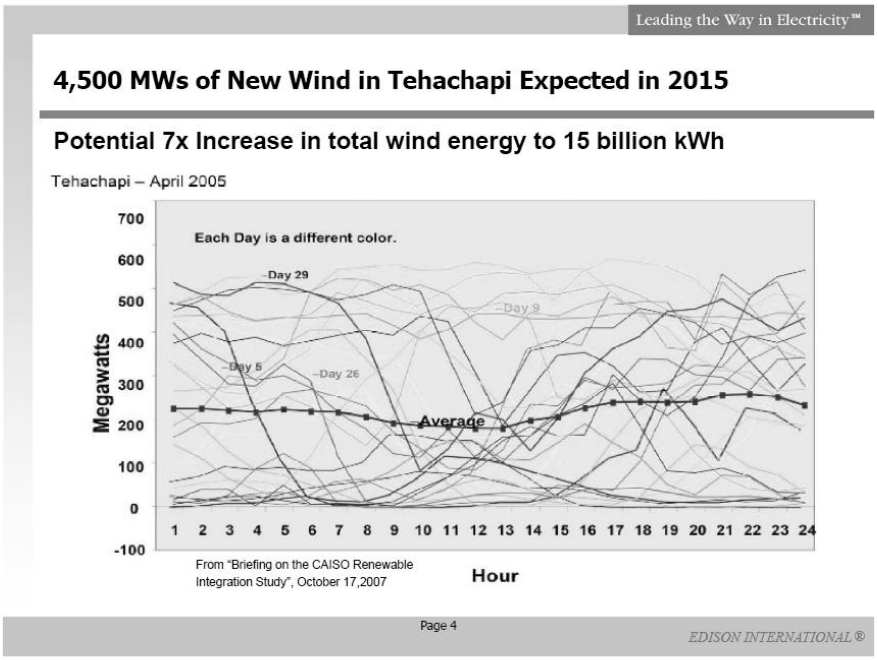
At some point in the next decade, we can anticipate that this probably needs to line up with the load if we're really going to have some effective constraint, which means that we then have to think about how we translate what's going on in the distribution system to the transmission system. One of the things that I'll point out for you is from an operational standpoint is that the distribution system and the transmission system are essentially operated separately. Because of the way that the power flows from source to load, they historically don't operate the same and are isolated in a sense by substations. Over the past one hundred years there wasn't this contemplation that power would flow from the customer back up through distribution through the substation, backwards through the transformer up into transmission. And so as we start to look forward over the next decade or two, these are pretty significant issues to be looked at from an engineering perspective. And there are also going to be policy and regulatory jurisdictional issues that are already starting to emerge.

Suffice it to say we think that we need to understand how all these relate. This is a very large systems issue. So looking at any one of them you can get a really nice answer but the reality is that we need to look at this from an entirety, both from an electrical flow, an information flow, and all the related policies that go along with this to make sure that this all works.

These are little background slides with what's happening with renewables.



We do have one of the largest, if not the largest renewable portfolios in terms of purchase power in the country currently. We're just under seventeen percent today, sixteen percent in 2007, and we have under contract twenty percent, and when the transmission project is done we will have achieved twenty percent. But going to thirty-three percent is obviously going to be a big challenge. One of the things to point out on that graph if you can make it out is that large blue wedge is geothermal. The opportunities for further development on geothermal are limited. So most of the development is going to come from wind and solar, and you can see solar is a very small wedge at five percent. That five percent in 2007 represented about eighty percent of the solar purchased in the U.S. in 2007. So to be able to start seeing much larger numbers in terms of achieving thirty-three percent of the energy delivered on our system, and we have a system peak of about 24,000 megawatts, you're talking about a pretty significant increase in the amount of solar and wind development in our system. And by the way, the Southern California Edison service territory happens to be home to the better development sites within the state of California so we're not only having to support the development of wind and solar to meet our needs for our customers, but also those of PG&E and San Diego Gas and Electric and other utilities within the state. So that's why, for example, when we looked at the original proposed legislation on a thirty-three percent renewable portfolio standard and there was a requirement to have, I believe, eighty percent of the development within the state of California, it seemed to us that this wasn't necessarily the most cost effective solution for our customers because there were other development areas outside that could be lower cost and avoid potential market power issues that we should consider.



Often one of the things people talk about with solar and wind sometimes is you get these nice smooth output curves that shows overnight it's producing very nicely, and during the day it drops off but then it picks up again in the evening, and you get this very nice smooth bathtub curve. However, as illustrated on this slide, the output of these units is anything but smooth. And nothing's changed since 2005 when this was taken in terms of a monthly snapshot, each of these lines represents one day in the month of the Tehachapi area. The wind in this area tends to blow in the spring and in the fall, so this is during the peak production period in this area and this represents one day out of the month for a twenty-four hour period. So when we talk about intermittent resources and what we need to do in terms of how storage can play and these other issues in terms of resiliency, these are the sorts of things we're trying to tackle.

Solar – when we think about solar and it sounds really good – it ramps up very nicely in the morning, pretty steady during the day when the sun's shining, and then drops off. Well the reality is when clouds come over you get very steep and dramatic drop-offs in output and then it comes back again. This is a problem on transmission, but we haven't really gotten to high levels of solar on the system so we haven't really had to deal with this. On distribution systems, going back to what I was talking about earlier, these large projects that are going to happen may play havoc with power quality. The voltage level on a system may be bouncing around. So the technologies that we use today like capacitor banks aren't really designed to be able to deal with really fast response. So this is where we're looking at new technologies to be able to accommodate it. Again, we need to think about the whole system.

We are fortunate that we were awarded one of the demonstration projects from DOE to look at how we can take lithium ion technology that has evolved

for auto manufacturing for electric vehicles into grid applications, and so we'll be looking at that and how that technology can mitigate some of the wind dynamics in the Tehachapi area.

Certainly advanced distribution is something we're looking at as a result of the activities I talked about earlier. The Edison Smart Connect program is our smart metering program. We are deploying five million Smart Meters across our residential and small commercial customers, but we have had going on seven years experience with smart metering for our largest commercial and industrial customers. One of the things that's not well understood is that in California, for the investor-owned utilities, we all deployed smart metering in 2003 for our largest commercial and industrial customers, which for Southern California Edison represents about sixty percent of the energy delivered. So we did get the low hanging fruit to start with and now we're working to enable the remainder of our customers. Sometimes that's lost but it's important to understand what are the most cost-effective projects in terms of the diminishing returns curve.

Electric vehicles – we do expect in Southern California to see a fair amount of uptake.

Nobody is quite sure what the adoption rate will be, but it could be 200,000 by 2020, or as high as over a million, almost to 1.1 million vehicles adopted. Pretty significant, and there are a lot of issues there in terms of getting it right, in terms of charging patterns and consumption.

And then, of course, all of the elements that come into the home that all have to work together. We are investing pretty significantly in evaluating and testing products today. So it's not something that we're looking at in the future. This is something that we've been continuing to do for several years and right now we have a $1.5 billion capital investment program going on for smart metering and other elements of the Smart Grid as well.

So what is really needed to realize the Smart Grid? We talked about this. Certainly having the plug-in electric vehicles integrate gracefully. Cost effective energy storage is key to many of the things that we're trying to accomplish. Commercial products based on open and proprietary standards that are secure. We've heard this a couple of times today. It's very important, and why we've been spending a lot of time in the standards arena. And like Kevin said, we encourage others to participate. It's critically important. And obviously with the communications network we have to solve some of those challenges as well. And sometimes it's overlooked, but there is a work force issue as we look at this industry over this new decade. I think the current numbers, and these change from time to time, but something like fifty percent of the work force in the utility industry will be retiring over the next six to ten years and that's a significant issue that we should be looking at as we bring in new folks, and what skills are going to be required for the next generation of electric system.

Finally, a couple of observations. Sometimes we think that this is all going to happen really quick and we tend to forget that things we take for granted today – the iPhone and the like – are a result of many decades of development. Personal computing – what it is today wasn't where it was in 1981 when we all started seeing them. Certainly cell phones have evolved in the last twenty-five years. The public internet has evolved, certainly from the ARPAnet of forty years ago. So we do need to consider technology adoption and the pace and what does that mean in terms of policy and our customers.

We cannot forget that our customers at the end of the day are paying for this. And so what's the right balance in terms of thinking about policy, value and technology. But we do need to recognize that we are talking about enabling our customers to be part of this overall solution, in a way that has never been done before. We need to be thoughtful about that.

Thank you.

MR. DENNIS:

Thank you Paul. And let me dial up Barbara Alexander now.

MS. ALEXANDER:

Thank you very much and thanks to the Energy Bar Association for the opportunity to speak with you on these issues from a perspective that is frankly all too wanting in many of the discussions that I have seen being held at national meetings about Smart Grid, smart metering and about the vision that you have heard many of these speakers speak to you about. Many of you probably remember the mantra that accompanied the introduction of nuclear power. If we would just do this, power would be too cheap to meter. Many of you might be familiar with some of the promises politicians and policymakers made to the public about the adoption of retail electric competition. If we could just break up those big bad old utilities, customers would have myriads of choices and power costs would be lower. Neither of those visions have occurred in the way that the public was led to expect.

Please forgive me if some of my colleagues and myself are somewhat skeptical and a bit leery about some of the wonderful visions and benefits that we are told if we only pay for now, we will see for ourselves later. Please don't interpret my remarks as an indictment of the notion that we need to modernize the transmission and distribution grids in this country. Clearly they need substantial investment and modernization to meet many of the objectives that you have heard the speakers identify. Please do not interpret my remarks as suggesting that we do not need, and residential customers should not participate in, demand response programs. We definitely need those programs. We definitely need residential customer participation in those programs. But as you will hear from me in my remarks, we have concerns and questions about the way those objectives, which I think we all share, are coming to us in the form of actual requests for us to pay higher rates now for certain benefits.

I do not need to define a Smart Grid, and my list is not functionalities, but rather from a consumer prospective, what we're being asked to pay for. So they fall into three categories of investments. One is metering and communication systems, the new advanced metering systems. These include the communication systems, the billing and collection changes at the utility, the meter data management systems to capture the hoard of data that is flowing out of these meters and into the utility's computers and then has to be managed by the utility in a way to make sense of it and turn it into a bill or load information of whatever kind.

Second is a whole set of investments in transmission and distribution systems to modernize them – new sensors, more communications, more ability to have two-way information flowing around the grid. More information to detect, man, and manage outages. More ability to integrate intermittent resources and storage of energy where that might be possible. So that's another set of investments that are being called upon here.

The third set is on the customers' side of the meter. We have to buy the electric vehicles, we have to buy the new smart appliances, and we'll probably have to buy the devices that would be located in our homes that actually talk or link to the meter on the outside of the home. The meter will still be owned by the utility. The meter doesn't tell the customer anything unless the utility enables the customer to communicate with that meter.

The jurisdiction of this last set of investments is primarily at the retail level. I'm kind of astonished at the vision that some of the FERC speakers have promoted that suggest that their policies will drive the development of the Smart Grid. I personally beg to differ. While FERC has roles that it has that are very important, and I don't mean to denigrate their role with respect to tariffs and rates for the bulk transmission system and the supervision of the Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) in the country, the fact is the investments that utilities are required to make to implement any of this vision are subject to the retail state jurisdictions. And the retail consumer ratepayer is obligated to pay increased rates for the metering, the distribution system, and all of the accoutrement that you have heard described here.

The purpose of my talk is to focus a bit about some of our concerns as to how this is coming down to us. And the way that it's coming down to us is not really, "Here's the bill for this vision. How are we going to pay for it?" It's, "Here's this piece. Here's that piece." And the piece that we're hearing all about in most states in terms of absolute requirements for rate recovery is advanced metering. They aren't starting with the distribution system, with the modernization of the grid. We don't know what that's going to cost us. In almost every state it's advanced metering as a sole standing proposal to the utility commission. They are proposed as enabling the entire Smart Grid but they do not come with an investment description or proposal to actually implement any modernization of the grid other than this metering and communication system. So we look at this as, "Okay, this is a couple billion. What more are you going to need from us to actually make it all work?" And we don't know the answer to that question.

We have a lot of concerns about these issues in the context of the specific advanced metering proposals that have come before many of the commissions, and that are frankly pending in many states in the nearby area here right now. We have concerns about the costs that we are being told about and we have concerns about the benefits. And I'm just going to give you a flavor for some of the issues that I have raised, and other advocates have raised, in the context of these proposals.

They want a separate guaranteed cost recovery tracker for their smart metering costs. They don't want to wait and come to a base rate case in most cases and take the wheat with the chaff and look at the operational benefits and offset them from the costs of the metering system. They want guaranteed

separate tracker cost recovery in many states – not every, but in many states, for this new metering system outside of a base rate case. So consumers will pay for the costs under their scenario. This is an investment on rate base that they will make money on as normal utility capital cost investments do. I mean that's the way this system works. This approach is going to increase bills for everyone, because the costs are flowing through and they have particularly more adverse impact on the low use customer and the low income customers. Perhaps I don't need to say why that's the case.

We're being asked to pay for a technology, the status of which in terms of final compliance with NIST standards and their development in the whole field is certainly at the cutting edge, not proven. PG&E in California spent hundreds of millions of dollars installing a meter they later discovered was not the one that should be installed, and they had to go back to the commission and get approval for another multiple hundreds of millions of dollars in additional costs for their metering program. They took out the old smart meters and put in the new smart meters. And as I say, it's a down payment on what it is we ultimately have to pay for to make this vision a reality.

The benefits – we have a lot of concerns about the benefits. A lot of these benefits cannot be justified on operational cost savings to the utility. In many states, particularly in these restructured states around here in Maryland and D.C. and Delaware, the benefits must come from a projected impact of demand response programs. The basic benefits are firing the meter workers and losing jobs – that's the benefit of smart metering is you get rid of the meter workers and the field operations people that visit the meter at your home. That's the big source of the benefits in every business case that's been proposed.

But that isn't enough in most cases. They have to come up with projected reduction in calls to the call center, improved billing accuracy and demand response programs. Well, how do they do demand response? They have to project a number of people participating in a new tariff program. Maybe it's a new pricing program. A critical peak rebate program, a peak time rebate program, or a critical peak, pay a $1.50 a kilowatt hour on a hot summer afternoon program. Then they project how many people will take what kinds of actions and how that action will be valued in the current wholesale market, and how it will be returned to customers of a distribution utility who owns no generation.

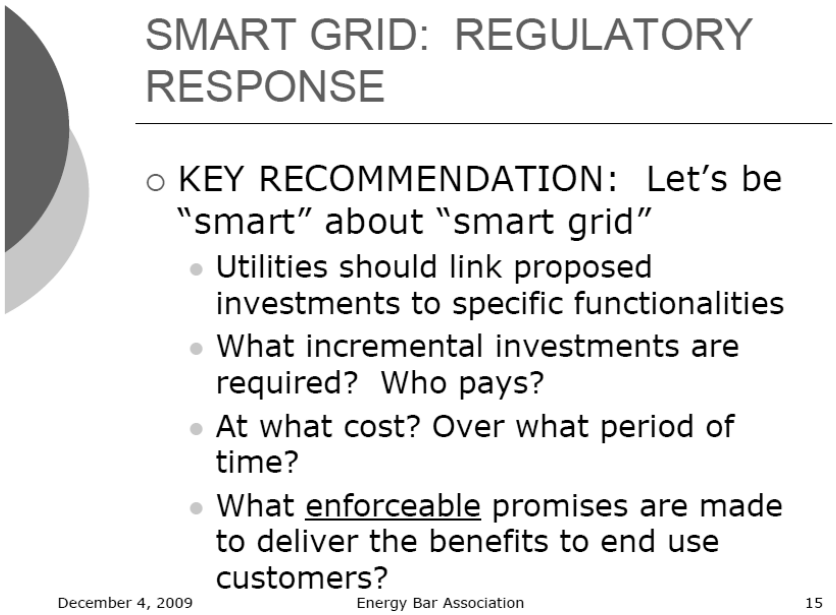
So we have some hurdles here and some concerns about how this happens. And there are risks under every one of these proposals – risks that these benefits will not occur as projected over a fifteen year period. Those risks lie with the rate payers who are guaranteed to pay for the costs and not guaranteed to receive the benefits that are being projected. The costs do not include in-home devices. The costs don't include anything on the customer side of the meter in any of these business case analyses. The costs assume that the only way to get demand response is through critical peak pricing or dynamic pricing programs, when in fact direct load control programs that interrupt or control a residential customers thermostat have been in effect for years in New England and throughout the Mid-Atlantic states at a very low cost, at a proven product result, and are capable of being bid into the wholesale market right now and are being so bid and returning value to rate payers.

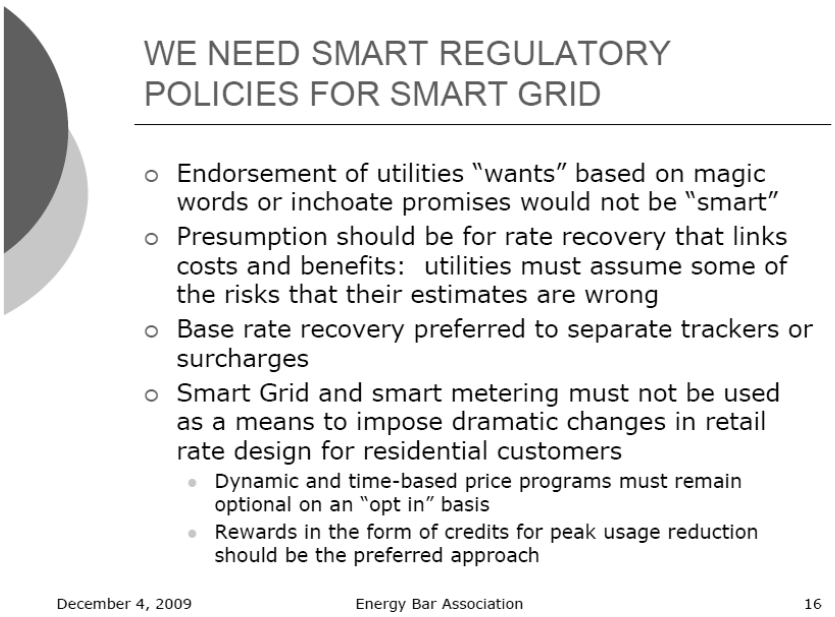
So you can imagine why we are concerned that perhaps what's going on here is an attempt to transform the way that residential customers pay for a central utility service, and here is where the rubber is meeting the road. Here is what our ultimate real nervousness is – residential customers don't care what meter is outside of their home. They care about these programs that look from many policymakers to be designed to change the way we pay for electricity. To see the real price of electricity in our retail rates. To make time of use or critical peak pricing the default rate structure for residential customers. There's a reason why time of use rates, who've been around for twenty years, are routinely not viewed as popular by residential customers. Every utility that serves most of the people in this room has a time of use rate option already on the books and time of use meters that will be installed if you want that kind of service. And very few people want it. It's a minority of customers who want that rate structure. There is a tremendous concern about this rate structure for low use customers who clearly do not have as much room to shift usage and reduce bills as others. Elderly customers, people who are vulnerable to excessive heat, folks who are disabled, families home with young children. These are folks who must use power in those critical peak hours and cannot, without suffering dire and significant health consequences, pay $1.50 a kilowatt hour for their summertime use of electricity.

We're also concerned about some important consumer protections. With the meter comes the right to wirelessly disconnect it without a premises visit to your home. Now obviously wirelessly reconnected power to our home is a benefit and I understand that and it does reduce costs. But to wirelessly disconnect service when customers are behind on their bills without a premise visit raises significant consumer protection concerns. The lack of that premise visit, and in many states a requirement to knock on the door and attempt to avoid disconnection of service with personal contact with the customer, is a significant loss and raises important health and safety implications. In fact there's preliminary evidence from California where PG&E is very far along on its smart meter deployment program and its disconnection rate for low income customers rose seventy-five percent compared to the prior year. Now part of that is the economy. All of the utilities in California are disconnecting more frequently than they have in the past. But none of them have that dramatic increase in disconnection. When a utility has no incentive to target disconnection to the largest amount overdue or to target disconnection based on the availability of the truck, or roll cost to the company, it can flip the switch on anybody once they've sent the notice and made a phone call. That's it.

Privacy concerns have been mentioned by many other speakers. I suspect this will dominate the debate as we get closer to the implementation of these metering and in-home device systems. These meters will tell the utility who's home, if anybody's home, and what you are doing. You will have a very intimate profile of your household usage as a result of these new meters.

Now as I said, dynamic pricing is what I think our biggest concern is with all of this, and let me just say that there are direct load control and peak time rebate approaches in which customers' rates are not changed at all, but they are offered a benefit of reducing usage during peak hours, critical peak hours. That is something that we are very much in favor of exploring and very much in favor of trying to find a cost-effective way to implement.





Smart regulatory responses to the Smart Grid is what I've entitled my presentation. Here's our perspective. Utilities need to be made to link their proposed investments to actual promised benefits. Whose going to pay for these incremental benefits, over what period of time, and what kind of promise is

enforceable with respect to the benefits that are being promised to us? How can we link their cost recovery to the enforcement of these promises? The presumption must be that customers do not bear all the risk. That the promises may not come forward as we want. And dynamic pricing in our view must be optional and not mandatory.

Thank you very much. Appreciate the opportunity.

MR. DENNIS:

Thank you very much to everyone. I'm sorry Paul and Barbara, I've got my crude little sign here giving you time. I apologize, but I wanted to save a couple minutes for questions.

I have one that I thought I would kick off for some discussion and then hopefully we'll get a question or two from the audience. It seemed like a big theme coming through all of your presentations were things that we talk about a lot in this industry, and anyone that's done utility rate cases or other things talks about these a lot, and that is cost and benefits. Joe talked a lot about societal benefits. Paul talked about those as well, and Barbara talked a lot about the cost to consumers. So my question is – and I hope it's not too theoretical – how do we incorporate some of these kinds of societal values that we'll get from a new energy system into a regulatory structure that is really focused on an individual utility and individual customers? What does the utility earn and what do individual customers pay? That's really what our regulatory system focuses on now. I'm wondering if each of you just wanted to talk for a second about how some of these other kind of benefits could flow in.

MS. ALEXANDER:

One of the points that I wanted to make is that the societal benefits of totally revolutionizing the transmission and distribution system to accomplish the vision that Mr. Miller laid out for all of us may not be properly laid at the feet of ratepayers through traditional rate recovery. If there is a national purpose to get this system set up so that we charge our cars with electricity rather than gasoline – a purpose I can completely understand – then maybe society in the form of taxpayers have to start footing part of this bill.

MR. DENNIS:

Paul you're reaching for your microphone.

MR. DEMARTINI:

Well, I do think that we do need to have a framework and a construct for how we value societal benefits, and then how that fits into the regulatory process. And that was one of the discussions that we had in California at one of the workshops the Public Utilities Commission had on Smart Grid as part of the Order Instituting Rulemaking process this past year. This is an important

element, as Barbara mentioned, in the smart metering proposals in California, in the applications that were made. Societal benefits in our case – which weren't counted – reflected that the value there was almost $300 million. Now what societal benefit is in one jurisdiction, as Barbara touched on, may not be societal benefit in another jurisdiction. Because we are decoupled in California, things like theft reduction – non-technical losses as it's sometimes called – and things like meter accuracy. That is improved accuracy so you don't have losses, these don't count. And they're considered societal. So what do you do about $297 million that is actually going to flow through more efficient operation of the overall system? There are these broader greenhouse gas reduction numbers and things like that that were not considered in California.

But certainly as we look at these other technologies beyond metering and for the grid, one of the points that we put forward was maybe we aren't looking at cost-benefit. Maybe the right framework for thinking about investment is as alternatives to either the status quo, or other ways of approaching it so it's a "best fit, least cost" approach to technology instead. You know for energy storage, for wind integration, it may not be as cost effective. It may be what are the other alternatives to be able to accommodate it. So there's multiple ways but we do need to come up with some constructs, and waiting until these proceedings happen is really not the right time to be trying to figure out how you're going to evaluate it.

MR. DENNIS:

Go ahead quickly and then we just have a couple questions.

MR. KELLY:

I'd just like to say I largely agree with Barbara's remarks and it's important to look at the costs and benefits to consumers. I just jotted down four things that could motivate Smart Grid in very general categories. One is if an investment lowers costs to consumers, everything else being equal, that's good. If it provides enhanced services, so you may pay more but you get more, that's generally good. A third category is improving reliability for customers. I think that's generally good. It has its own cost-benefit analysis. And there's a fourth category that's probably not exactly characterized as cost-benefit to consumers, but most electricity consumers are also citizens. But if you think of them as separate categories, Congress or the states may decide that there are important policy goals – probably environmental goals like climate change – that could be implemented through industries like the utility industry. And that might require, for example, wind integration, which might then require Smart Grid-like functions in order to enable it. And while you might argue taxpayers should pay for all of that, Congress is likely to decide, "No, consumers of the electricity products should pay for it." And that'd be a fourth category.

MR. DENNIS:

Go ahead.

MR. MILLER:

Obviously I'm an advocate for the Smart Grid. But that's because I've had five years of being able to study this darn thing, so I have a pretty good understanding of the big picture. But I'm not a salesman and everything that Barbara said was on my list too in terms of what we've got to address with the consumer. And one of things that we've been trying to preach at the Department of Energy and the National Energy Technology Lab is, like I said earlier, blocking and tackling. Remember those three fundamental things I mentioned earlier. The fourth thing that you'd want to walk away from here with is keep the end in mind. So we can't go out on the cost side and say, "Well, the savings is from the operational benefit for the utility." That's just a piece of the cost. And the benefits aren't just the benefits that the utilities see either. It's the silent benefits. We're preaching smart meters and the costs and benefits of those. When we go out and lay out what we trying to do with the Smart Grid to the consumers, we have to tell them the whole picture. Or else we end up where Barbara was, "You know, fetch me a rock today, and I'll pay for another rock tomorrow." Keep the end in mind I guess is the slogan I'd encourage you to keep in mind.

MR. DENNIS:

Sir, please go ahead.

MR. DIAZ:

Yes, Romulo Diaz for Exelon and PECO Energy. The question that I'd like to raise is an attempt to relate the consumer issues and the federal Smart Grid policies. And I'm asking in light of the FERC Smart Grid policy, for example, which I think acknowledges that there is a potential overlap relative to federal and state jurisdiction. I'm wondering what FERC or others might believe to be the appropriate federal role in connection with consumer education. I mean, rather than letting these dynamic pricing impacts occur and then people scramble to try to justify or demonstrate benefits, I'm wondering where people may believe the federal responsibility is with respect to consumer education, in coordination with state regulatory commissions. Thank you.

MR. KELLY:

Let me take a crack at that. The responsibility for consumer education, in my opinion, is fairly diverse. You have everyone from the President touting the Smart Grid through many federal agencies, including DOE, the Environmental Protection Agency, the Department of Commerce, FERC, and others, as well as state commissions, as well as consumer advocates. And I think that they all have a role. I don't think that you'd say that the responsibility for consumer education

falls on any one person. So I could say more but I'll stop there in the interest of time.

MS. ALEXANDER:

Let me just say, the practical answer to your question is FERC doesn't have any money in its budget for consumer education. It has no jurisdiction over retail customer rates, and no jurisdiction over the states who are deciding about these investments and who pays for them. So it's really unfair to think that FERC could have that responsibility.

Now obviously the consumer education that needs to happen in individual states with individual utilities is what is happening with your rates. Why is it happening? What new rate structures are being offered to you and what are the bill impacts that you are likely to see? That education can't happen at the federal level.

MR. MILLER:

In addition to who's responsible, we have to make sure we understand the content. So it's who's doing the communication and what are they communicating so we get back to this notion of telling the whole story, the big picture. And not in a tell mode, but in a listen mode as well.

MR. DENNIS:

Let's try to take one more before we get the big giant hook here. Go ahead, sir.

MR. BRUNE:

Hi, I'm Brett Brune from Smart Grid Today. I have two questions, principally for Ms. Alexander. One is: other than linking proposed investments to specific functionalities, exactly what solutions do you propose to the hurdles and the challenges that you brought up today?

MS. ALEXANDER:

Thank you. I actually have a proposal. And the proposal is to actually start with what it is we need to do to transform the transmission and distribution grids to make them capable of handling high-bandwidth two-way communications, the sensors, the increased capacities to handle the loads that these electric vehicles are going to impose on the system. I had one utility executive in Maryland tell the commission that if one of those things pops up on his screen, and they're clustered in a high-income neighborhood, they're going to blow out the transformers. They will increase the load instantaneously on the system compared to your home. You're doubling a home's normal load drain. So what happens if these things come along and people plug them in at two o'clock in the afternoon? The whole thing needs some work and some attention. I would do

metering last for the residential customers, and I'd focus more on demand response with smart thermostats and communication to these thermostats on air conditioning and water heaters. That's what I would do first.

MR. BRUNE:

My other question, if you don't mind, is really who or what should devise these solutions? It's really the same question.

MR. DENNIS:

Paul.

MR. DEMARTINI:

Well, I think the process we saw in California over the last five years looking at smart metering, and now more recently looking at a broader range of Smart Grid technologies for the transmission and distribution system, has been a fairly collaborative process. At least that's what we've been trying to do at Southern California Edison. And talking to various stakeholders – and when I say stakeholders, it's not just the consumer advocacy groups like the Division of Ratepayer Advocates and The Utility Reform Network and others, but also the stakeholders we talked about earlier in very broad Terms as the IT organizations. The Googles, the Ciscos, the IBMs, Microsofts, and others. The GEs and what they are looking to do with Whirlpool and the like. So you have a very broad set of constituents these days looking at opportunities to provide customer value at the end of the day. So we're keeping the end in mind if you will, as was mentioned. In that context, we're really trying to understand what everybody is trying to do and trying to come up with a set of solutions that really does meet and balance those objectives that I talked about earlier.

MR. DENNIS:

Any other final words from the left side over here?

MR. KELLY:

Just maybe echoing Paul. It ought to be developed by the private sector. I think the role of government, as Chairman Wellinghoff said this morning, is to get rid of any regulatory barriers that may stand in the way, but otherwise let the private sector flourish.

MR. DENNIS:

I'm sorry I can't take another question. Please join me in thanking the panel.