JOINT COMMITTEE WORKSHOP

BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the Matter of:	)	
	)	Docket No. 09-IEP-1G
Preparation of the 2009 Integrated Energy Policy Report	)	

ORIGINAL

SMART GRID TECHNOLOGIES TO SUPPORT CALIFORNIA'S POLICY GOALS

EAST END COMPLEX

1500 CAPITOL AVENUE

FIRST FLOOR, AUDITORIUM

SACRAMENTO, CALIFORNIA

WEDNESDAY, MAY 13, 2009
Day I

10:00 A.M.

Reported by:
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COMMISSIONERS PRESENT:

Jeffrey Byron

Arthur Rosenfeld

PANEL MEMBERS:

Rachelle Chong, Commissioner, PUC

Kellie Smith, Senator Alex Padilla’s Office

Jim Detmers, California Independent System Operator

Michael Gravely, Energy Commission

Terry Mohn, SDGE

Paul De Martini, SCE

Kevin Dasso, PG&E

Jim Parks, SMUD

Richard Schomberg, Electicite de France

Fred Fletcher

Peter Karpoff, DOE

Mike Brown, GE Communications

Eric Hsieh, NEMA

Eric Dresselhuys, Silver Spring Networks

David Kreiss, The Current Group

Tim Simon, U-SNAP Alliance

David McCalpin, GE Appliances

ALSO PRESENT:

Ron Hoffman

Stacey Reineccius, Powergetics, Inc.

Merwin Brown, CIEE

David M. Tralli, Jet Propulsion Laboratory, Pasadena

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P R O C E E D I N G S

9:00 a.m.

MR. GRAVELY: Good morning, everyone. Please take your seats, we'll be starting in a few moments. Those of you who are online with the WebEx, you will find that your systems have been muted because of the noise here. There will be times throughout the day that we will allow you to make comments. You can also type in your comments to the moderator, from that perspective.

For the attendees today, this is an Integrated Energy Policy Report Workshop, and there is opportunity for comments during the day and at the end of the day.

We request anybody who wants to make comments to please pick up one of the blue cards Jim is showing you back in the back. Just pick up a blue card and then turn it into the – down here at the front office here and we'll get it into Commissioner Byron for comments at the right time.

So anytime you want to speak, fill in your name and information.

The proceedings today are being recorded and there will be a transcript, for those of you online and those of you who might want it later for information.

Just one quick administrative thing, for those in the room here, we're obviously in a large conference room. The facilities are outside. We request you do not

bring any kind of food or drink into the room.

If we have any kind of emergency, the two exits in the back are the best way out and straight out to the street and go from there.

And with that, I'll turn it over to Commissioner Byron and allow him to open up the Workshop.

COMMISSIONER BYRON: Thank you, Mr. Gravely. And welcome everyone to our new digs here, at the Energy Commission. What building are we in, please?

MR. GRAVELY: The building name?

COMMISSIONER BYRON: Yes. The Department of Health Services. Yes, it's a very nice facility, we're very grateful to be here. I think we had so many other conflicting meetings going on at the Energy Commission.

We'd like to thank all of you for being able to find us here. I'll remind the Panel that there's no on/off switches on the microphones.

And I do have an illustrious group joining me here today and I'm going to allow them to all introduce themselves.

We're here for a joint – no, I don't think it's a joint. Yes, it is, it's a joint committee meeting of our Integrated Energy Policy Report and I believe the Electricity and Natural Gas Committee, on Smart Grid Technologies to support California's policy goals.

That's the principal interest that I have in this meeting.

But we're also joined by – at the dais, this morning, from a member of the Public Utilities Commission, and our Independent System Operator, and from the Legislature. So we've got a good, diverse Panel up here.

We're very interested in this subject for a number of different reasons. And, of course, there's a great deal of interest around the Smart Grid, recently, as regards to stimulus funding, or the American Reinvestment and Recovery Act funds.

Commissioner Chong has had workshops at the Public Utilities Commission on this subject. And we have, as well, at the Energy Commission.

So we're going to spend a couple of days on this subject. Maybe we'll come up with a definition or two of the Smart Grid that everyone likes.

But I'm really interested in the policy aspects of how the Smart Grid can be used for grid management, technology, and communication, as it affects efficiency and integrating renewables, as we move to the high renewables in California.

But also having come from the customer side of the meeting, I'm interested in, you know, getting more

information and control into the hands of customers, and that's another aspect of Smart Grid that we want to deal with here, over the next couple of days.

I'll make my comments brief. And I think we'll just go down the line and I will ask my fellow panelists if they would like to say anything.

Commissioner Rosenfeld? Please introduce yourself, also.

COMMISSIONER ROSENFELD: Good morning. I'm Art Rosenfeld. I'm the Chair of the Energy Efficiency Committee, which is concerned with building standards. And I'm also involved in demand response.

And I'll make some remarks on the Panel. But Commissioner Byron said he hopes to come up with a definition or so of Smart Grid. There are five of us here, I'm sure that makes at least five definitions.

And I want to talk for a few minutes about my view, which is sort of the dinosaur's view of Smart Grid. Smart Grid appears to be sexy and evoke ideas of fast switching, and broadband communication, and grid stability.

And for me, that's all well and good, and I'm all in favor of it, but there's an awful lot that can contribute to good stability by demand response.

I'll remind us all that this is a State which goes

from 40 gigawatts typical peak load when we're not in the summer, to 60 gigawatts or so when hot weather appears. We have 20 gigawatt air conditioning systems in this State, which is really responsive and all of which can be reconstituted and emergency dependent, and give us huge reserve margins for relatively short amount of time, like an hour.

And we are involved in getting there with everything that's going into – for every customer in California. And that seems to me to be a very important component of the Smart Grid.

So it's not very sexy, it doesn't involve instant response, it sometimes involves just warning people 24 hours ahead that the price is going to go up on a hot day, one percent of the time. But I think it's very useful. And I will make more remarks about that, I'm sure, as the day goes on.

Commissioner Chong.

COMMISSIONER CHONG: I wanted to thank you for inviting me to participate on today's Workshop.

Over at the California PUC we've been very interested and excited about the potential of the Smart Grid. We see that incorporating information and control technologies into the electric grid can support State energy goals, which include the important expansion into

renewable energy, empower consumers as to their energy management, and improving reliability of the system.

The PUC has initiated a Smart Grid ruling, starting in December of 2008. I am the assigned Commissioner on that Smart Grid OIR.

The PUC's goal in this proceeding is to set very broad Smart Grid policy and to establish an affirmative regulatory framework for the investor-owned utilities, because we do with to encourage and guide a Smart Grid in California.

I wanted to make the audience aware of five workshops that we've scheduled in the Smart Grid proceeding, and invite you, cordially, to any of them.

First, on May 27th, we will be focusing on the point of contact between the Smart Grid and consumers.

Our second workshop is June 5th. This one will focus on aspects of the Smart Grid relating to the distribution system, including automation and the integration of distributed generation and storage.

On June 26th, at our third session, we will be looking at Smart Grid and the transmission system.

Our fourth workshop will examine how Smart Grid will interact with plug-in, hybrid, and electric vehicles. And I notice I don't have a date here, but I do know by heart that it's July 15th.

And, finally, on July 31st, we are focusing on developing an appropriate regulatory approach for encouraging Smart Grid developments in California. So the focus will be regulation.

For several years, now, the PUC has been working very closely with our colleagues here, at the Energy Commission, and at the California ISO and, of course, in the Legislature to implement important policies, including the loading order.

Our recent efforts on Smart Grid will continue the tradition of working collaboratively with all of them. Most recently, Commissioner Byron and I spent very intense 24 hours together, preparing comments at the Department of Energy, working on some of the proposed guidelines for awarding grants to Smart Grid.

We were in Washington, together, discussing Smart Grid developments in California with DOE, the FERC, Congress, and others.

So we have delivered the message that California does want to move forward with Smart Grid, and we hope to build on our existing foundation of many developments in California.

I am very pleased by the attention the Energy Commission's giving to Smart Grid, especially through the Public Interest Energy Research Program.

Smart Grid is still a nascent emerging area and there are many areas that require further research efforts.

I would also like to add that I'm very pleased about the Federal focus on Smart Grid. There is leadership meetings going on in Washington, this coming Monday, to get the CEOs of the energy utilities on board on Smart Grid.

Also, there is a series of workshops being run by NIST, with the able assistance of EPRI, on the important interoperability standards issue. And I'm very pleased to see that moving along swiftly and I would strongly encourage that. Thank you.

MS. SMITH: Good morning, my name's Kellie Smith. I'm a consultant to the Senate Energy Committee, actually, Energy, Utilities and Communications Committee.

I'm here on behalf of Senator Alex Padilla. I'm sorry he couldn't be with you today.

He is the Chair of our Committee this year, and there's probably no greater champion of Smart Grid in the Legislature, than Senator Padilla.

I think his background as an engineer has allowed him to really appreciate how important the Smart Grid is to electricity delivery in California.

It is frustrating, though, for us, because we are

not technical people, and so I'm going to really address things more from the 10,000-foot level, which it probably comes down to three areas of focus for us.

One is renewables, second is efficiency, and third and foremost, ratepayer impact.

We all know the importance of efficiency and so I don't need to say too much about that, demand response, et cetera. But when we talk about those things, we do have to keep in mind, and probably one of our greatest concerns is how we engage consumers and make them understand that this is a useful tool.

Not to go down a rather frustrating path for the Energy Commission, but we might all recall sometime back, with a release of some information regarding smart thermostats and how that backfired in the community because the public didn't understand exactly what was being proposed, and how it would help them.

They saw it as a threat; they saw it as a big brother control mechanism.

And that is a good lesson for us, as we roll out Smart Grid, to remember that people are not as technically savvy as we are.

The energy world is one of the most complicated policy worlds I think there is, and so we have to approach it very delicately as far as our consumers and

ratepayers are concerned.

On the renewable side, what we see repeatedly is a tremendous push for different types of renewable integration, especially at the local level with distributed generation, that our grid just isn't ready for.

I may be a Lone Ranger, so excuse me, but I think that some people, with the limitations of our grid, currently, have over-valued rooftop solar.

We have to remember we have a dumb grid. And, unfortunately, the utilities frequently don't even know that the lights go out. Well, then how do they know how much electricity is being put back on the system from a solar – from a rooftop solar application?

We have great pressure in the legislature to do more of this. But Senator Padilla has particularly resisted it because he doesn't think that the grid can manage it appropriately, yet, nor does he think that it is of great value to ratepayers.

And, again, I'll come back to the ratepayer issue. A lot of times we'll look at these issues from the standpoint of an individual ratepayer.

The CSI and that metering program, we had a lot of folks that come in and tell us how wonderful it is for them, in their application, at their home and their

business, that we try to step back and say, well, how valuable, though, is it for all ratepayers.

And that's something that we have to keep in mind here. Because while one small group of ratepayers, in some setting, may find the Smart Grid to be of great value to them, or an element of it, is it really effective for all ratepayers? Is it going to help us keep costs down?

And over the next few years, as we do start to see more renewables roll out under the grid, and it will happen, it's been slow, but we've really laid a lot of good foundation, and they're going to start coming in and costs are going to go up.

The meter applications and other technologies, are costs going to go up?

8032 is going to implement and costs are going to go up.

And the utilities are going to be on the front line, and so are the Legislators, when people's utility bills come in and they're starting to scream.

They may poll well right now, and people say, yes, we like it, but let's really see how much they like it when their bill shows up.

And so that's something that we're really trying to keep in mind and be considerate of as these negotiations

and discussions move forward.

MR. DETMERS: Good morning, my name is Jim Detmers. I'm the Vice President of Operations for the California Independent System Operator.

I feel honored to be here amongst the people that are going to make the changes, and I'm not only talking about the Panel up here, but also of you, to be engaged in such a transformation of this system that we now have that is a very old system, and in a lot of ways it is a very dumb system.

And it needs to move on and we need to work on this transformation, together, to make sure we do the right things.

Again, I'm honored to be up here to talk about Smart Grid. And what we make it is what Smart Grid will be.

I really feel that the Smart Grid aspect of what we're doing is the enabler to be able to accomplish the transformation of our supply system, transforming it into 20, 33, or even 50 percent renewables on the California system will require, definitely, changes on the distribution side, changes by our customers, changes on the transmission side, as well. All of that has to move forward and it has to advance.

And we need – every comment, that I've just heard

by all the Commissioners here, they are on the right track, but we really have to position ourselves and really see what this future needs to be so we can take ourselves there.

So I think this is one of the opportunities of really forming what that vision looks like as we start to transform what this grid is on the transmission side, the distribution side, the customer side, and all of our resources.

So I'm very happy to be here and happy to answer any questions, as well, that I think we're going into here.

COMMISSIONER BYRON: Good. Mr. Detmers, as always, we'll save the difficult questions for you.

I would – I failed to mention that, unfortunately, my Associate Member on the Integrated Energy Policy Report could not be with us here, today, and that is Commissioner Jim Boyd. And I'm sure that he's sorry that he cannot join us.

The next item on the agenda is a panel discussion. However, I'd like to check with my peers, and see if you would be agreeable, I think it would be good to have Mr. Gravely give his short presentation prior to that panel discussion.

Let me make sure that we aren't going to lose any

of you. You won't get up and leave, Mr. Detmers?

MR. DETMERS: No.

COMMISSIONER BYRON: Okay. So let's go ahead and do that, if that's not going to cause you any difficulty. I think it would be good to get a little overview of Smart Grid, and then we'll get into the policy discussion. Thank you.

MR. GRAVELY: And the lead into here, what I'll discuss here is a brief overview of the Smart Grid and how some of the policies that have already been established in California are impacting that Smart Grid.

And again, I'll remind you that after this session and during the panel there will be an opportunity for questions. So feel free, if you want to, in the audience, have questions, be sure and fill out one of the blue cards.

If you want to on the WebEx, type it in and identify you want to speak, and we'll do our best prior to the breaking of lunch to cover as many questions as possible.

When we look at today's discussion, I just want to cover a little bit about what we think Smart Grid is and how Smart Grid in California may differ from Smart Grid in other areas of the country. Smart Grid, my office is heavily involved in the research and development efforts

around Smart Grid. I'll cover, briefly, that.

Tomorrow, we'll discuss in much more detail the different projects and the status of them. Today, I'll just give a brief overview to show how it fits into what we're doing and help in some of the policy discussions.

Because, clearly, in some of the research we're doing, we're doing research to help formulate policy and help provide answers, so policymakers can understand the value and impacts of different decisions.

I think today's discussion, where we don't have a -- we weren't able to get a specific speaker from DOE today because they're so busy with the Stimulus Package, but we will talk throughout today and at different times about the opportunity it brings, and particularly the Smart Grid opportunity. So I'll give a brief overview of those opportunities and what we're doing to pursue those.

And closing comments, before we go to the panel discussion, will be just some general synopsis of how we, from the research side, see Smart Grid impacting California in the future.

Well, most people, when you look at the utility system, it's classically a hardware system. And when we talk about the information technology system it's wireless, it's software, it's communications.

And what the Smart Grid is going to do for us in

the future is bring those two networks together into one intercommunicating, interoperable network.

And so we see things that –- the ability to -– and we'll talk a little later about, for example, from the capability that the ISO has now, that they're expanding their capability to look deeper into the grid to see what's happening with.

With the advent of new meters, the ability of the grid to tell the grid operators what's going on and to tell the customer what opportunities there exist, and help them understand better how their energy's used.

And, ultimately, our ability to use this data to integrate more renewables, to integrate more distributor resources, and to make the grid more reliable, more cost effective, and more supportive of our future needs.

There are many, many definitions. I use this one, just for today's purposes, to point out there are a couple of commonalities that come up a lot in the definition of Smart Grid.

It is the emergence of digital technology into the grid. I think in most cases we're looking for saving energy, reducing cost and increasing reliability. So we really are looking at doing more with less in the future.

And also, I think in many cases a lot of both the policies, as well as the world, itself, is looking, to

look for us to be able to address global warming in a more cost effective and a better way, and be able to meet some of those needs.

And also, energy independence, to allow us to reduce our dependence on one source of energy and look at alternative sources of energy.

So there are many different definitions. And I think -– I will point out, again, for those that are attending, that this is a two-day workshop to help us, and our staff, to gather information, and so we can provide recommendations to this panel, and others, in the 2009 IPER. And what will come out of this workshop will be prepared in draft comments; it will be prepared for review in the fall.

So we are looking to provide policy recommendations to our 2009 Integrated Energy Policy Report.

So I'll remind everybody that there is an opportunity, if you're not able to speak today, if you have specific comments to provide those to the docket. It's on the information that you have. And you can provide those at any time. I think there's a deadline for the initial comments that we're looking for and that deadline is on the announcement.

COMMISSIONER BYRON: Mike? Mike? Mr. Gravely, if I may interrupt for just a moment?

Unfortunately, it sounds as though these devices may be interfering with the PA system. So I think we should turn them all off --

MR. GRAVELY: Okay.

COMMISSIONER BYRON: So we can make sure that we can -- everyone that's on the phone can hear us.

MR. GRAVELY: We have a background noise that seems to be real bad.

COMMISSIONER BYRON: Some of the devices do seem to interfere with some PA systems. Go ahead.

MR. GRAVELY: So I'll just – I'll just leave this right here and go back to the other chart here.

You want to go ahead and go onto the questions, you say? I'm sorry, your mike is not quite as loud as the other ones.

COMMISSIONER BYRON: There it is. I'm a little closer. No, you continue with your presentation, please. It was the interference that we were getting from the Blackberrys.

MR. GRAVELY: Okay, thank you. I thought you'd mentioned someone had a schedule change. I'm sorry. So we'll do this.

COMMISSIONER ROSENFELD: Mike, you should get a little closer to the mike, also.

MR. GRAVELY: This seems to be the worst area here.

This area here has the worst acoustics, I guess, of all the rooms.

COMMISSIONER BYRON: We need you closer to the mike, too.

MR. GRAVELY: That's what they're saying here, so I'll do that.

So in general, why Smart Grid? This is a quick summary of the things we'll hear throughout the next two days. Most of this is pretty straight forward.

The execution of these are some of the questions. In other words, how do we obtain these benefits, how do we measure these benefits?

We believe that the Smart Grid will provide us technical opportunities to improve the environment, to reduce emissions, to provide more efficiency options on the grid, and to truly make the grid more green than it is today, and in the future.

Lower costs, more efficient operations to be able to use our current systems, that we're going to be in more efficiently, to last longer if they're operating properly, to look at new, low-cost options in the future, and new technologies that will make the system operate better.

But one of the challenges, always, is to operate the system better, to reduce the losses that we have on

the current line and things like that.

This type of technology we have will give us insights that we don't currently have, and to being able to measure those. And then once you understand those, then you can find ways to make them better.

Reliability is very important. For those of you who remember the 2000-2001 time frame, with rolling blackouts, and the impact it had on individuals and businesses, and how important it is for viability for us. And so the ability to shorten or to make the number of outages less, and when we have an outage to be able to make that outage shorter. And also, in some cases to be able to predict or even make some decisions where those outages go for the least amount of impact.

Those are types of technology we'll hear about today and tomorrow, as we go through these discussions.

Ultimately, we've heard from the Panel, and particularly from Kellie there, that the consumer is our ultimate focus.

So we want the grid to not just be something for the system, but for the users of the system. So we want to find ways to allow consumers to meet their energy needs and low cost, we want to give them options that they can understand and use, and we want them to have the ability to participate. For example, in dynamic rates,

and things like that, if they choose, so a lot of people who desire to be part of the solution and, therefore, they're willing to do a little extra, and we want to give them the choices, but we don't want to make that so complicated and difficult that they're not able to use it effectively.

In California we have already made some decisions that will impact our Smart Grid in the future pretty substantially. And those were additional discussions we have today.

These are the policies and have specific dates that we look at. We'll talk a little later. We've been looking, in our research area, at the Smart Grid 2020 because a lot of our policies will culminate or be implemented by that time. So we want to see how we can use the Smart Grid to help us meet some of those goals.

The greenhouse gas reduction goals, the efficiency, the net zero energy homes and businesses. The expanded use of demand response.

I'll talk briefly, a little later, about California's energy profile and why demand response and energy efficiency are so effective for us.

And also, the goal to go into renewables. As Mr. Detmers mentioned earlier, for the ISO, 33 percent, and they're obviously desirous to go even more, if possible.

That becomes a challenge when it comes to keeping that grid reliable and operating properly with some of the renewables, because not all renewables are as reliable as the current generation system is.

So in addition to these clear policies that have been established, we also have made some decisions in the area of moving forward with infrastructure.

The utilities, the three large utilities in California, the independent operator utilities, have all received permission from the PUC. They're in the process of installing new Smart Meters, both for electric and natural gas, and we expect some 12,000 electric meters, to a cost of roughly $4 billion over the next four to five years.

COMMISSIONER ROSENFELD: You mean 12 million.

MR. GRAVELY: The decision has been made that implementation is in. So as we look at our Smart Grid, we need to be sure that the Smart Grid of the future, this is an integral part of the system that we use, that we capsulize the features of those things.

There are capability, as we go on the road to upgrade those, and some cases very simply. In other cases, we may find that we make a decision based on the capability of what we've installed, as opposed to some meter that come out two years from now that's, you know,

faster, cheaper, but maybe not in the big picture of things when you look at a long system of 12,000 meters.

COMMISSIONER ROSENFELD: Mr. Gravely? You said 12,000, you mean 12 million?

MR. GRAVELY: Twelve million, you're correct. I'm sorry 12 million -- 12 million meters, that's correct, 12 million meters.

And so that once we start that infrastructure, and so as we look at our definition of Smart Grid, the capabilities we want to implement, the infrastructure we want to put in place, both these policies and both these infrastructure decisions will impact what California has.

And it could be different for a state that hasn't made its decision to, what we'll call an industrial term, a green field environment, where they have not made decisions and they can do them later.

But, also, we can anticipate reaping the benefits from these decisions much sooner by virtue of being on the leading edge.

And also, some of these last two statements provides us, we believe, a head-up on the DOE approach, and some of the stimulus funding because we are, we believe, ahead of most of the nation and we have the ability to show the nation how to implement a Smart Grid.

In addition to those things, we have future energy

growth. Even though we're in tough economic times, it's reasonable to assume California will continue through the growth. We've had tough times in the past and we continue to grow in California.

The energy use profile in California, in the summer we have very high peaks and in the evening it goes away. And so we don't have, like they have in Florida or Texas, where you have high humidity and lots of places where, at nighttime, it's still very hot.

So we have the ability to manage our energy, and use things like demand response and energy storage. We have the ability to implement things like renewables and distributed generation much more effectively. And so when we use this advanced communications and advanced knowledge, we have a profile to allow us to use our system, and so the managers of our system will be able to get, maybe, a better utilization out of the energy we have and make it more cost effective by virtue of doing things that make sense for the California need of it.

Also, as we'll talk briefly today, and throughout the Workshop, there is a huge amount of money being inserted into the Smart Grid and to the whole grid system, and that will have an impact.

What we decide to do, the demonstrations that are done, the decisions that are made throughout the nation,

what we might have done in ten years will probably be done in two or three years.

And so in addition to what's been happening with our own State of California, the country is going to be in accelerated mode of going into Smart Grid implementation.

Just a quick review for those who aren't familiar with some of the technology we're talking about, this will just give you a quick overview.

That we do, in our office, look at the whole system, from the transmission generation side, to the distribution side, to the consumer, and we look at all those elements, whether they be rooftop, PV, plug-in hybrids. You'll hear a lot throughout the conference about synchrophasers. This is a PMU, a phaser measurement unit that's measuring the data. We'll talk a little bit about that later today.

But it's easier to say that there is a lot of opportunity, but sometimes too much opportunity is also a challenge, so we have to prioritize what we do to the best of the State.

If you're not familiar, I'm going to discuss just briefly here, because there will be presentations tomorrow on this, one of the areas in particular, one of the areas in the DOE dissertations is synchrophasers.

Synchrophasers are simply a device that measures electricity, that measures the current voltage 30 times a second.

And we can we can have Jim Detmers give us this a little later.

But basically ISO, today, they take all their readings and they bounce off the grid. With this type of technology they can do this in less than a second and, in some cases, 20, 30 times a second, and that gives them insight that they don't currently have.

So one, if there's a problem occurring they can see it, and make response, and the problem can be resolved without impact.

And two, later they can learn how things happened, they can go back and understand how the system resolved and they can do that.

The key element for us that's different in the technology side, from this area, is the GPS timestamp. When they had previous outages and previous blackouts, when they went to measure things people were on different clocks. So you didn't know what New York was doing, and Texas was doing, and California was doing because the clocks were a little bit off.

With these synchrophasers, they're all on the same time. So when you look at how things happen and how

things cascade, this technology provides us the ability to really understand how the grid operates, and that's one of the technologies that will let us manage the grid much more effectively in the future and do more with less.

Energy storage, you'll hear about tomorrow and a little bit this afternoon. Get this thing working right.

Okay. This is just a collage of the different types of energy storage opportunities. We have storage at the home level, the business level, at the grid level. Our office has been doing quite a bit of research in this area and the utility-connected grid is one of the major areas that the DOE is looking to demonstrating as part of the Smart Grid, so we'll see more about that.

These just gives you a collage of everything from compressed air, on the upper right, and pumped hydro, to flywheels, to batteries, to different -- this is an area, there's a lot of emerging technologies, there's a lot of opportunity and cost effectivity.

These systems are drastically improving over the last decade, and so we envision energy storage in the next decade being a major player.

And here, in California, when we can actually store it with wind at night and use it during the day, there's a huge opportunity for us to use this type of technology

to help us in the future.

Demand response is another area we talked about that we're spending a considerable amount of time at the Commission, in the research area, because in California there's such a huge opportunity and such a huge value.

Our current –- we mentioned before about the customer and working things. We see the value of automating these systems; we see the value of communications. We also see the value of customer choice. And so on some of the previous communications the customer choice piece and the customer control piece wasn't really defined, when it was always there.

And so as we go forward the testing that we do on these type of systems, we find that we can get five or ten percent better response by automated demand response than you do with manual, classical manual responses.

And so we see this as the wave of the future to allow us to do it. The customers are very happy with it when they do it. They have the ability to predetermine what they want to do. They have the ability to go away and let it happen or they have the ability to stop it at the moment that it happens. So this is the wave of the future.

And in California, we think we are actually leading the country. As a matter of fact we've developed a

standard, an open standard for this area, and that standard has been accepted by DOE as part of their national standard that they're doing under the Smart Grid Initiative.

Just a kind of summary chart to show you here. This is, again, just a – all the utilities have similar opportunity, but I wanted to show you we're all thinking the same. And that is there is opportunity in the home for renewables, there's opportunity for plug-in hybrids, there's opportunity for Smart Systems, and the same thing for businesses and buildings. So that we see lots of opportunity.

It is a high-tech environment, so we do have to take the time to be sure the customers and consumers know what they're doing. But I think if you look at the world today, and the group that's growing up in the internet world, and the communications world of cell phones, and things, I mean, and I hate to say it, in my generation, those people have home phones that are landlines. I suspect there will be a time, in the future, where the cell phone is the mode of operating and people will have multiple cell phones and no landline. And that's not too far away.

And I've been in travel overseas and some of the emerging countries are already there to do that, because

the capabilities are so good and the service is much cheaper. So we have these capabilities to do that.

Just a quick summary here on some of the other activity we're doing as part of the supporting of the Integrated Energy Policy Report.

We do have a station that we've closed and we're going to evaluation now, and that will help us to find the Smart Grid of 2020. Our goal is to have that research in parallel with the workshops and the results that are happening with the PUC, so we can provide some of the information to them.

We're also doing some ongoing research in the area of Smart Grid demonstrations, under what we call a micro-grid, where we can look at it from a small section of the grid and demonstrate different technologies.

We're also looking at some white papers that will be provided as part of the Integrated Energy Policy Report. We envision these white papers, or they may be called staff papers a little later. Anyway, we envision them to be publicly posted and available on the website for the IPER, and we envision the results of those being part of the 2009 IPER.

We're looking at things like California's needs for codes, and standards, and protocols. The integration of renewables, what technologies can we work in the next ten

years to help us meet those aggressive renewable goals.

And also, energy storage, and trying to figure out how best we can integrate energy storage in the future to help us meet those.

And then, ultimately, as the PUC continues the rulemaking that Commissioner Chong talked about, a lot of this research, other research we have, we hope to feed into that effort and future efforts so that they have, at their fingertips, and at their knowledge, information that's available. And then if questions come up, we may be able to go out and resolve those.

But, ultimately, we want to be sure when they make their decisions that they have the most current information and the most accurate information available to make those decisions.

The Economic Stimulus Package, just briefly, if you're not familiar, there are two large areas for Smart Grid. One is in the area of demonstrations. There are 615 million currently identified.

And the other one is in the area of Smart Grid investment grants, there's 3.37 billion.

I'll share with you, we've made a couple of comments to DOE and they're assessing those comments. One is the current plan only allows a single project to be in the range of 20 to 30 million dollars, depending on

the particular technology, and the mixture is a little bit off.

So we've requested DOE maybe balance the mixture out in these two areas to about 2 million each -- two billion each, and they allow single projects to go, maybe, up to 100, 200 million, so that we can have multiple utilities do multiple projects together.

One of the key elements of Smart Grid is the interoperability. So we're hoping that this fund is to be able to demonstrate projects that will go across utility lines and across customer lines, and build something that's truly a grid of the future.

So the other two projects down here are basically a grid infrastructure for both Bonneville and Western Area. But we've seen, with six and a half billion dollars, we anticipate some substantial growth in our transmission capacity and our generation capacity, and so we envision the grid of the future, in the shorter term, having much more capability than it would have had without this insertion of funds.

And last, and just a summary before we get into the panel discussions, is how can Smart Grid help California? This is also a question I will be posing to the panel in general. What we talked about is the green grid efficient, less emissions, and lower cost, higher

reliability.

The grid becomes a vehicle to put in new technologies and new policies as we go forward.

Managing the data. One of the things we learn in all of these systems is you have more information, more information, and faster, and so sometimes that's a good thing and sometimes it's a bad thing, because you have so much data you don't know how to read through it. So some of the efforts is how to use that data.

And, ultimately, we want better service for the consumers; we want them to be happy with the system, the reliability. Ultimately, if it works right they don't think about it and they worry about trying to find ways to save money.

And with that, I'll turn it over to the panel. And are there any comments before we start, sir?

COMMISSIONER BYRON: Okay, thank you, Mr. Gravely. Why don't you go ahead and moderate this panel.

MR. GRAVELY: Okay.

COMMISSIONER BYRON: We've got a lot of expertise up here and a lot of notions about the direction we need to take policy.

I think you have some questions you want to ask us?

MR. GRAVELY: Right.

COMMISSIONER BYRON: So Mike, if you don't mind

being in that capacity and take us through this, we've got a little over an hour and be tough, ask the panel some good, tough questions.

MR. GRAVELY: I'll be glad to. So I'll start off with we have a couple of questions we want to ask and then if we have some blue cards, we'll do that, and we'll give an opportunity for the people in the room to ask some questions, also, of the panel.

And the first question that we have today is to go with the policy goals and energy goals. And that would be, for the panel members, you all have different roles in the policy of the State, and that would be how would you envision or how do you envision Smart Grid helping us enable the future policies we need in the State, or how would you envision the policy goals that you see is important for the State being enable by Smart Grid.

Anybody who wants to participate and answer?

COMMISSIONER BYRON: Well, I'll start and keep it brief. I actually said this in my introduction, but I'll repeat it, I feel very strongly that there are primarily three policy goals that we're after, improved efficiency, renewable integration, and the information to the customer, but mainly giving control to the customer, and allowing them to have the information they need for control.

So those are the three principal policies that I'm interested in.

MR. GRAVELY: Okay, Commissioner Chong?

COMMISSIONER CHONG: Yeah, I'll take a cut at it. You know, we're operating under a lot of mandates over at the PUC. We are working on climate change, under AB 32. We're working on renewable portfolio standard. Currently, the law's 20 percent and it looks like it's going to 33 very soon. And we've got the California Solar Initiative. We've got the Loading Order.

And I actually see Smart Grid being something that can help us achieve all of these goals.

So, for example, the electric grid was built originally to deliver power really one way, from the power plants to the customers. And the power plants tended to be, although not always, pretty far from the customer.

So we are looking today at this new push towards distributed energy, including renewables, and that will move a lot of the generation either into the premises or closer, into the load center.

So one area of interest to me is how do we appropriately integrate all that new distributed energy. It strikes me that that's going to cause the type of upgrade that is really critical, but we've got to bring

that distributed energy in and help the operators understand where those distributed resources are and how it fits into the system.

The other area that I'm very interested in is how we engage consumers into this problem of greenhouse gas and how they react with energy.

And so one area that I've very interested in is to send appropriate price signals to consumers, for their energy. And so to that end, the PUC has been working on establishing dynamic rate policies, and we're quite ahead of the other states on this issue.

We've decoupled selling more energy with profits of the utilities, so that they're fully engaged in energy efficiency.

So we want to ultimately send a price signal to consumers and then have the consumers respond to it.

Now, how does that make sense? If you look at, for example, the concept of plug-in electric cars, if the consumer comes home from work, plugs their car in at home, I'm told by the utilities that this looks like a small house on the grid when you plug that car in, and so we would be creating essentially a new peak, maybe about between 5:00 and 7:00 p.m. Right, Jim?

And I don't think my friend over at the ISO will be very happy with me by creating a new peak between 5:00

and 7:00 p.m.

So the solution is that you need to send a price signal to the car owner to say, when you plug it in, tell it when you need the car to be charged, it might be 8:00 a.m. the next morning, and please charge my car when it's cheapest, which will hopefully be after 9:00 p.m., the middle of the night, when Jim's got more energy to juice up the car.

So these are the types of things that we can conceive in the future. I mean, that's not an immediate thing, but gosh, darn it, those EVs are coming right on the market starting the end of this year and next year, and we really need to focus on what we need to do, in terms of the utility side, to be ready to deal with those plug-in cars.

So I was very pleased, I was at a conference with your colleague, Commissioner Boyd, and we are looking at getting money for charging infrastructure in places other than the home.

And we're also looking, at the PUC this summer, at how we prepare the grid for EVs. And we're going to look at rates, tariffs, for example, that we have for EVs. And we're going to be looking at, with advice from our experts at the California ISO, how we manage that load, hopefully, towards the middle of the night or anytime

when there isn't peak.

So those are just a couple of examples of the ways that we see Smart Grid helping on our big goals, which are pretty much the ones that Commissioner Byron enumerated. Thanks.

COMMISSIONER ROSENFELD: All right, I'd like to elaborate on what Commissioner Chong said a little bit.

Price. Commissioner Chong didn't say it, but the pricing scheme which the PUC and the CEC have been favoring is called critical peak pricing. And the idea is that there will be about three prices.

Price one will be off-peak 90 percent of the time, and that would be considerably less than the average price; we think in terms of 10 cents a kilowatt hour, or less. And that's when you would charge your hybrid, or whatever storage you happen to have.

On summer afternoons we expect to be congested, particularly on weekdays, and critical peak pricing envisions that on summer afternoons, summer weekday afternoons, all summer, there would be regular time-of-use pricing, and I think something like 30 cents, whatever the actual real price averages out.

And then, during the ten hottest days of the summer, when this idea of a heat wave, or whatever, you expect to have a real peak and you want to avoid that

peak, and you can usually tell they're coming ahead of time and you can warn your customer that tomorrow's going to be a critical peak day, and you really need to get quite a few gigawatts of the system at that time, so think like a dollar. That will get the customer's attention.

And the customer, I want to mention two sets of customers. There's the immediate customer who, presumably, will set their thermostat, preprogram their thermostat to response to these prices, use every weekday afternoon. And that can be done in the home by people preprogramming their thermostat to set itself up two or four degrees.

The commercial building, they're a more successful system in getting its program to –- it's interested and decides, on the basis of price, to preprogram their lights to be, thermostats to set up air havers to slow them.

I say we need to lean the curve with advanced –- but, of course, there are emergencies. And in an emergency, really, there should be a fourth price, which is really very high. A bunch of things are going to happen once they become –- but, nevertheless, it sounds fine to be able to control thermostats and lighting, once every ten years, as a sort of softening into emergency,

instead of having what I consider a very brittle system of a rotate blackout.

There's the indirect customer, and that's the architect/engineer, who designs a building. And they advance the image of what the price is going to be five or ten years ahead of time is extremely valuable.

Right now, if architects knew that there was going to be a term-of-use pricing every summer afternoon, they would design buildings quite differently. They would design buildings with thermal storage, chemical thermal storage, with millions of gallons of chilled water or ice. And immediate thermal storage where you have more contact between the thermal and the building, and the occupant.

Not only do you have a huge use of thermal storage built into buildings, but they're isolated from the living spaces or the occupied spaces by carpets, and tiles on the roof, and also some things which are good acoustically, and there's a tradeoff and we don't design buildings to take advantage of that. But we will as soon as prices become certain.

We're always preaching about prices. To distinguish between prices and what we call programs, there are an awful lot of utility people who actually think in terms of a program. Meaning, we will pay you

$80 per month and in return for that, we will take over control of your air conditioner, or your heat pump and manage it for you.

Well, that's fine; I have absolutely no objection to doing this. Every time I make a telephone call, I know I have some sort of contract with the telephone company and it's a do-know.

But in terms of managing my life I, personally, would like to be able just to know what the price is, preprogram my thermostat, not get involved in special deals. I think these two things may be related, but undoubtedly to think in terms of just programs, I do think it's important that we have some stability that the price be published, that they change every five years, or every rate case, and it has to go through the system and can work on our thermostats in our homes, and our controls in our commercial buildings.

That's my embellishment. I hope, Commissioner Chong, I think we agree on this.

MS. SMITH: I guess I'll add, just to expand maybe on where I started. And a couple of examples of problems that we have been facing continually in the energy world, the Energy Committee, in the Legislature, do revolve around renewables.

And so by example, where we all agree with this

broader goals of efficiency, renewables, and ratepayer impacts, I mentioned the issue of net metering.

And following up on Commissioner Chong's comment about this use of distributed generation, we are under great pressure by mostly participants in net metering, and advocates of solar, to pay people for the value of the power they are putting out on the grid at two o'clock in the afternoon.

Not only do they want us to pay them for excess over a time frame, but they want us to pay them on time-of-use rates. And our ability to try to address this without getting immersed in the technicalities of the difference between a bill you receive in the mail and the amount and the cost that the utility pays for the power, that the utility doesn't know the power's there, what value does it really have? I mean, this is an issue that's coming up to us day after day, after day.

And the amount of time we've spent on that, you would probably be greatly frustrated by.

Clearly, Smart Grid, at the DG level, at the distribution level would help us.

One of the other great problems that we're seeing is the issue of large utility scale renewable generation and how to manage that load, and where to locate that load.

Currently, if generation is out of state, it cannot be scheduled by the ISO from a renewable generator.

So when the wind is blowing in Wyoming, many people feel that we should buy that wind and bring it to California because it's cheap.

I won't get into the other policy issues about California jobs, and California emissions et cetera, but just strictly looking at that little issue, we don't have the ability to bring that wind in on a real-time basis.

So practically speaking what is happening is the wind is switched out. Somebody else gets the green electron at the moment, and then a third party intervenes and schedules firmed and shaped power, which is generally system power if it's coming in from the east, or probably hydro if it's coming in from the north, to be delivered to California.

In practical terms, I realize technically an electron is an electron, and those engineering issues, but from a ratepayer, consumer stand point, there are people out there that think if they are paying for green power, they want it to come in the time that it's being generated and in the form it's being generated. And the current grid does not allow us to do that, so another issue.

Something that hasn't come up, and this will be my naiveté, and maybe Jim can follow up, is one of our greatest frustration in dealing with renewables has been the relationship of the ISO-controlled territory and the muni-controlled territory.

We don't, in the Legislature, know for a fact, but we suspect, that there's a great amount of unused capacity on some muni lines. And we suspect that ratepayers are not being efficiently served by a transmission grid in this State. We suspect duplication.

For those of you in Northern California, we've seen a lot of press recently about a tank line going through the Central Valley, and from the Lassen area and others to go down to the Bay Area.

Well, I've also understood that PG&E wants to build a line probably pretty much along the same general area, going all the way up to British Columbia.

And we wonder, you know, we also understand the politics of ISO versus muni and local control, and when you have a Legislature whose leaders in both Houses represent municipal utilities, and whose policy committee chairs in both houses represent municipal utilities, we are probably going to continue to pay a great deal of attention to the need for local control.

But my question is will a Smart Grid help us bridge

some of these issues, and while we're still maintaining local control that each party, if you will, will still be able to maintain their own transmission systems, but operate in a more cooperative, real-time fashion to make sure that on behalf of ratepayers that we're really using those transmission systems in the most efficient manner possible.

I still don't have an answer to the muni/ISO issue, so if anybody has a good one, we're always willing to listen.

MR. DETMERS: Well, we need to talk. All right, we'll try to get this done.

Wow. Wow, all the comments that I've heard all the way down the panel here, where do we start?

I want to take us back. I've heard about renewables, I'm going to pass on the transmission issue right off the back. But as far as –

COMMISSIONER BYRON: Jim, you need to get real close to the mike.

MR. DETMERS: I got to get even closer. Okay, how's that, can you guys hear me fine?

I think one of the things that we really have to get our hands around here, to start this conversation off right, is the fact that in order to integrate renewables, everyone must understand they are, for the most part,

generating at times, and producing at times, they're great energy sources, and they're coming from very clean, very reasonable places, but solar and wind, their variability is, for the most part, generation off-peak for a large portion solar.

And you're going to question, solar, isn't that on-peak? Well, solar actually comes on very early in the morning, depending on how east you are, how far east you are on our overall system.

If you're in Arizona, Arizona is about an hour ahead of us or even two hours ahead of us, as the sun comes up, and our load is not coming up at that very same time.

Wind is an inverted curve, actually, of its actual production. Its maximum production is this time of the year, in the springtime, and it's typically off-peak.

So when we talk about need for storage or we talk about the need for demand response, both of those two things are definitely needed in large quantities, as we've already undertaken initiatives to get us to 20 percent. Contracts are being initiated, and projects are being developed, and to bring on the renewables.

What we don't have yet specified is how much demand response is required to be able to effectively integrate all of the renewables that are coming online.

And when I talk about demand response, Commissioner Rosenfeld, you're absolutely right, I think critical peak pricing and real-time pricing, those types of things are definitely required. But we also need it, and we need large volumes of that, of customers to be responsive in that area.

We also need controllability 7 by 24, and I'm not talking about shutting customers off 7 by 24.

I'm talking about having a customer willing and able to offer its product of demand response to the market. But we're talking about gigawatts of demand response that's 7 by 24. Not just an additional one or two, or not just a kilowatt. We actually need probably things that I don't have the accurate figures for, just to write down that we're going to move to this.

But I think we really have to find out how much demand response is needed to effectively integrate the 33 percent. I mean, we really have to come down to some actual numbers on that. Might be something on the research side, might be something in the work that we're already doing at the ISO to be able to integrate the 20 percent that can help us out and determine how much that we need.

Because once we have those figures, or general figures that we're going to need, then things along the

lines of either a Legislature, or at the Commission, the PUC, or in other places, we need to move that forward. And these numbers are not going to be small numbers by any means.

Because as we bring on, say, 8,000 megawatts, or 8,000 gigawatts of additional wind onto the system here, in the next couple of years, we will probably need at least a gigawatt of demand response or a gigawatt of dispatchable generation, and/or something else to be able to effectively generate that wind onto the system.

And so that's a choice that needs to be made that is not yet specified. And it's not yet specified either by the ISO or the utilities, or those that need to determine how much of this other dispatchable resource needs to be tied to the system.

We also need a certain amount of storage capability for the off-peak conditions, for the early morning conditions and the off-peak conditions.

Early morning, everyone wakes up very slow, as it looks like it does on our demand curve that you can see on the ISO's website. In those off-peak or early morning hours, even if you take a look at our website today, and we're lucky today because we now have our new markets running, and you can see what those prices are.

You'll, on some occasions, see negative prices on

those off-peak hours. And those negative prices, we need to all understand, negative prices means that we're paying to have somebody eliminate the production of the resource.

So that, in my book, is typically referred to as a disposal cost of the power that's being generated at the time. That is the worst in efficiency you can possibly get to.

We need to know where those places are in the system. And today we know, with our new market design out there running, we know where those hot spots are for peak conditions. We also know where the excesses are in the off-peak conditions or no-demand conditions.

All of that information is now available. But we really need to move forward with specifying what is the additional capacity to respond needed, either via generation, or I would prefer, more likely, to go after demand response, fully capable demand response resources, and have that come into the system.

Because the demand response is also going to incent the storage capability as well.

So I can talk for days, but I'd rather not. And I'll turn it back to you, Mr. Gravely.

MR. GRAVELY: Okay, thank you very much.

I think we'll do one more question and then we'll

open it up. I've got a few questions here from the panel.

But you brought up the market redesigned technology upgrade, that's recently completed, Jim Detmers did. And about a month ago, over a month ago, we were able to transition to a capability that's been desired for a long time.

And so I guess for Jim Detmers, I'd ask the capability, and for the rest of the panel, what you're expecting?

So as you implement this new capability and Smart Grid comes on, what does the two, together, give us that we did not have before, or what opportunities do we have to use the new market capabilities with Smart Grid, to give California new capabilities in the future.

COMMISSIONER ROSENFELD: Could I make one comment about the previous question?

MR. GRAVELY: Yes, sir.

COMMISSIONER ROSENFELD: And it has a little bit to do with Detmers' comments.

In your story about storage, you showed, of course, parking hybrids and electric vehicles. And again, I just want to use Commissioner Chong's analogy, you can think of the cause being a small house. So it's interested in charging at a rate of like one kilowatt, or discharging

at the rate of one kilowatt in the afternoon, where it's needed.

We're pretty soon entering the demand response era, where we're going to have 12 million houses, real houses, which can adjust their thermostats, or in commercial buildings, under the 12 million equivalent, who can dim lights and whatever.

And thermostats, using typical houses, using three kilowatts, and that's disposable at the one kilowatt variation, easily. So that's equivalent to 12 million, rather than hundreds, or as if the whole California fleet where there as a plug-in.

So I assert that we ought to get started by using the huge variable of discretionary loads that are out there, a long time before we're going to have 12 million plug-in hybrids or 12 million electric vehicles.

In the case of commercial buildings, just a number for Jim, I think there are like, oh, three or four gigawatts of lighting in California. Now, lighting can go up, up or down plus or minus ten percent and you don't even notice. So that's a huge presumed responsive available to us if we're smart enough to get the architects and the equipment to do it.

But that was just a continuation of your last question. Now, back to you, Mike.

MR. GRAVELY: Okay. Well, I would agree. The research, we're showing, of course, the demand response in California is a huge opportunity. I think the plug-in hybrids is, and probably won't go as fast, but I think the attention to –- and with the Stimulus putting on another million vehicles on the road, we need to look at both. But I think the priority and the implementation schedules would be slightly different. But I think both of them are key factors.

But I think, as research indicates and what we're doing with the DOE, is that the demand response in California, we're probably more ready to implement demand response faster, than we are to start using hybrids as part of a grid asset, for example.

So, anyway, I'll back to give –

COMMISSIONER ROSENFELD: Excuse me, Mike.

MR. GRAVELY: Sure.

COMMISSIONER ROSENFELD: So will some – the Stimulus money help in bringing down the cost of communicating thermostats, or communicating pool pumps, or in communicating dryers, is something we should pay with right now, easily. And we can't pay for the hybrids, yet. I think they're, I don't know, about '10.

MR. GRAVELY: Yeah, I don't know that it's –- it's identified in the Smart Grid area. I'm not sure it's as

well identified in the efficiency area and other areas as opportunity.

So just to give you a chance to give us a quick -- your assessment of the market redesign, how it's going, and then opportunities. And I think, for the panel, given that new capability, what do we see that Smart Grid could bring to California, that we've been waiting for.

MR. DETMERS: Yeah, thank you, Mike. If you're not aware –

COMMISSIONER BYRON: Jim, you need to get the mike in front of you.

MR. DETMERS: Here we go. I don't know what you want me to do with this. I don't know, that's not comfortable down there.

If you're not familiar with the ISO and what it's done here in the last month, and it actually took us several years to actually accomplish it, but we actually implemented, April 1st, new markets which actually price 3,000 different points on the overall power system throughout California.

This was a modal pricing scheme that we put into place, as well as an energy market, and also other items replacing our technology at the ISO, which had originally been installed all the way back in 1997, that have been

in operation for quite some time.

Those original markets, if I take you back at that point, basically only price the use of the transmission grid in Northern California and Southern California, two basic prices.

And that was the granularity that we were able to see over about the past 11 years.

What has just occurred and it's available up on the ISO's website today, is real-time pricing, as well as day ahead pricing of the overall power system.

So this is very important information for us especially on the demand response side, to get customers active, to be able to understand what's happening on the power system price-wise, or what is available to them, and their ability to offer products back to the ISO, not programs, but products back to the ISO, is very much available today.

We have initiated steps to actually provide opportunities for what we refer to as proxy resources, today, for demand response capable aggregated providers that can come to the ISO, and they're not coming to the ISO in terms of kilowatts or watts. They're coming to the ISO in terms of megawatts per hour, that can be made available by hour, and can be offered into the ISO.

The ISO has set up the systems to be able to enable

this to occur. And I think MRTU has been referred in the past, or market redesign and technology upgrade.

What we refer to today is the new markets we have in place are very much available, not only to new resources of generators, as well as to be able to determine what the impact is of the renewable fleet that is currently under transformation, but also to get the other resources necessary so that we can balance the system.

The ISO is required, by North American Electric Reliability Council, to balance, at all demands, supply and demand on the system. We have to do that, given if it's a 30-thousand megawatt day, or a 30-gigawatt day, upwards of 40 or 50 thousand gigawatts. We have to balance that system and keep it reliable, and kept the flows on the system within the capabilities of the system every ten minutes, every 20 minutes, if something should happen. But we have to do that on a continuous basis.

We, in order to be effective at what we do, need the resources to be able to respond. Demand response has the capability of responding actually faster than most generating resources, if we set it up that way. And it's a more dependable supply, reliable supply, but we have to set that up and get that capability going now that we have the capability of actually pricing the whole system,

at every point on the system.

So I encourage all of you to take a few minutes. Don't do it all at once, but all of you can – you can, if you'd like, but take some time, when you get back to your offices, and pull up the information on what we call Oasis, which is one of the click points on the ISO, caiso.com website. Pull that up and you'll see at the bottom of the screen pricing information, that's pricing the real-time information of what's happening out on the system.

And you can also pull down the individual screen, so you can see individual points throughout California, both in Northern California, the San Francisco Bay Area, San Diego, L.A., and other places.

But it gives you the information that you can then see, that customers, if they had that, could be able to respond if something is happening. On a normal day, on normal things happening, you see average prices running to 20 to 30 dollars per megawatt hour. That's probably not what demand response customers are looking for.

What we need to start talking about is the ISO also has other resources that we hold online and remain online to be capable of responding, and that capacity to respond is an equivalent of what a generator costs.

And to go back to I think both Commissioners down

here, from the Energy Commission mentioned a few minutes ago, as we started, that capability to respond is quite expensive.

We also need, just for the summer peak conditions, about 20 gigawatts. And I don't know whether it's gigawatts or gigawatts, but I'll just go with the gigawatts.

COMMISSIONER ROSENFELD: I say gigawatts.

MR. DETMERS: Okay, you say gigawatts, I'll say gigawatts.

But that 20 gigawatts in capability that we currently have in generating resources, that I would love to have an opportunity for demand response to displace all of that, if they can. I think that could be done much cheaper than what the generating fleets to today, and what we pay in that forum.

But 96 percent of all the time out of the year most of that gigawatts, or 20,000 megawatts, sits idle until we get to the summer peaking conditions in Q-3. That is sort of an unbelievable picture when you look at it from any other stand point.

If I was a beach front property and I had to build my condos and my hotels to be able to handle just summer peaking conditions, when all the customers showed up, I wouldn't be in business for very long, but that is the

system we now have. That is what has to be transformed into something else, where customers have an opportunity, instead of paying for that capacity to be there all summer, we've got to come up for a new solution.

COMMISSIONER BYRON: Congratulations to the ISO for getting MRTU underway. It took a long time –

(Applause.)

COMMISSIONER BYRON: -- and I understand it's going very well, with maybe a few little glitches they're not talking about, but they'll get it figured out and we'll never know.

But, really, to me, the Market Redesign Technology Upgrade means pricing is now transparent. It's like the banking system is no longer invisible. We know where the congestion will be, and where there's more interest to see far. So I think we give it a little time.

But we will see signals, price signals that will influence where generation's going to be built, both large and small. Because it doesn't take much generation in some places to really reduce prices.

And we'll figure out the real costs of power in various parts of the State.

Now, it took a long time –- remember the meetings just held up every month, how much electrons you used, and we called those kilowatt hours and we got a bill. It

took us a long time to get to time-of-use pricing and understand all the electrons are not going local. But they didn't get to every place in the State equally, either.

And I think we're going to see locational pricing lead to changes in tariffs, potentially, as well.

So I'm very excited about this aspect of MRTU. I know it doesn't -- at least I heard it doesn't review, but those are the two things, for generation and to customers in prices I think are going to be very advantageous, and it's going to be up to the public – I'm sorry, yes, the Public Utility Commission to probably figure out how to use those prices to reduce costs to consumers.

COMMISSIONER ROSENFELD: Yeah.

MR. DETMERS: We'll be glad to help, Commissioner.

COMMISSIONER CHONG: Yes, I wanted to pick up where Jim left off which is, okay, now we've got this great pricing information for the first time, what do we do with it?

So one way to do it is we've put in these expensive automated metering infrastructure, $4 billion is what Gravely's Power Point said for AMI, which will be in by 2012. So how do we put those Smart Meters to use to help Jim with his problem?

So two things that we're working on at the PUC involves setting up dynamic pricing. One is the critical peak pricing scheme that we've already described. The second is just, generically, real-time pricing. In other words, let's have a rate that's linked to the actual wholesale price, which Jim can now tell me with great specificity, apparently very often, too. So thank you for that.

So what is the PUC going to do with it? Well, what we've been doing is we would like to push our utilities to offer dynamic pricing to their consumers.

The PUC is currently considering a proposal for PG&E to implement default critical peak pricing for their very large commercial and industrial consumers, and these are going to go into effect 2010, that's just next year.

And we also have, in front of us, rates from PG&E for their small and medium commercial and industrial consumers that will go into effect 2011.

And then, pretty soon, we will be looking at some optional real-time pricing rates for all customers, that we hope will be available in 2011.

So in other words, we're going to take those actual price signals and then start sending the signals to customers of PG&E, for example, and we will then be able to get some reduction in a peak use from large, medium,

and small consumers during peak hours.

And this should help Jim's problem of maintaining all those expensive resources, when we could step down the demand.

And I'm saying this with Kellie here, because there are some bills in front of the Legislature that would discourage dynamic pricing, and all the work that we've been doing at the PUC at dynamic pricing. And I want to point out that this would actually save consumers money by not having to have all these stand-by resources, when we could really step it down by sending some price signals.

MS. SMITH: Having not seen all of the several hundred bills that are going through the process, yet, I am going to surmise that one of the issues you mention is the -– whether it's an opt-in or opt-out pricing structure.

This goes back to my comment where I started and I mentioned the thermostat issue, the blow-back from the thermostats a year or two ago. We're going to experience the same thing on dynamic pricing.

Most Legislators love it in theory. In practice, it will be a different experience and we need to prepare for that.

And the other thing about the practice of it is,

it's going to have a –- if you –- dependant upon the degree to which it is implemented, it has a great societal impact.

The reason we have peak is because our workdays, our schooldays, our society runs on a certain schedule. And to the degree you push business and other practices off that peak in order to save money; you are also having a significant impact on society and the way it operates. The way we go to school, the way we visit our kids' schools, how we pick up our kids from school, whether we're home at night or whether we're working because electric rates are lower.

And so these are some of the things that the Legislature will probably get the blow-back on before others do. And I think that that's one of the reasons that you're starting to see elements of this in legislation is because they're starting to think about, wow, wait a minute, yeah, in practice it makes sense, or in theory it makes sense, but how do we really want our consumers to use it and how much control do our consumers get over when they use it?

And if you price something so high that a business has no choice but to move its operations to the middle of the night is that really what we want to see happen?

And I think, especially in this economy, we don't

know how long this is going to last and so anything that has that fiscal impact on rates is going to be viewed very cautiously.

COMMISSIONER ROSENFELD: Can I –

MR. GRAVELY: Sure.

COMMISSIONER ROSENFELD: Can I try to suggest a few buzz words, Kellie, which will make it a little more acceptable. No one, that I know of, is proposing mandatory time-of-use rates.

The buzz word, which Commissioner Chong and I have been using, is default opt-out. What that means is the furthest we will go is to say once you've got your new meter, and you are programmed within the standard, your auto-demand response system, in a small business, then you go on automatically to the rates -– the rates that we are talking about.

That all you have to do is pick up the phone and say I want out, and you will be out.

Moreover, we plan to give you lots of information about whether or not you're really out.

The thought that the PUC and the CEC have had about the rates, in the first place, should be that if you don't respond at all, you will be whole; your bill would be the same like if you didn't respond to time-of-use rates. If you do response, you would save money. There

is money to be saved.

But an individual customer, of course, doesn't know what he's doing compared with going back to flat rates.

So we're proposing that their bill –- that is, if you go into default at that rates, you get your bill at the end of the month, but you also get what your bill would be if you were on whatever you want, flat rates.

And you could look at those for a month or so and decide, gee, I'm responding, I'm well ahead, I want to stay where I am or, gee, flat rates will be better for me, I want to pick up the phone and go onto flat rates.

But I wanted to distinguish between those. So I'm repeating, in summary, there's a big difference between default opt-out and mandatory, for goodness sake.

I'm sorry, I'm looking at my colleagues and not speaking into the mike.

There's a big difference between –- just the thing is about mandatory, it would be terrible, nobody ever proposed it, even for the thermostats. I realize that there was a bogus view, a reaction, but it was not because we talked about mandatory rates. Thank you.

COMMISSIONER CHONG: I want to give a few examples, in response to Kellie.

So, for example, let's look at pumping of water in California, we use an exorbitant amount of electricity to

pump water. This is something that could easily be shifted to night.

You know, it doesn't matter if it's pumped in the day or pumped in the night; you just need it pumped, right?

So that's an area that we could shift, easily, a task that takes a lot of electricity to cheaper off-peak hours.

Okay, let's take a consumer. I can easily decide to do my wash at night or weekends, instead of during peak hours, if I know that it's going to save me a lot of money to do that.

So to me, I always think of cell phone usage in the early years, where there was peak and off-peak, and everybody learned that you call your mom, in Iowa, nights and weekends, when it was cheap, instead of during weekday work hours.

And consumers understand that, they get it. And so there are some things you can't shift, but there are some things you can.

And so all we're asking is that for the things that consumers can shift, please do, you'll save money. You're going to like that part.

But if you can't, say you have a medical condition and you need to have an oxygen tank on all the time, of

course you can't shift that off. I mean, hello, I know that. So those people will have the option to pick something that suits their lifestyle or their medical needs.

And so, you know, we are cognizant of what the consumers are saying. You know, we read the blogs, too, and we get it.

But there is so much we could do, with really not that much effort, to help Jim with his problem, that we really need to do, and I think people want to do it, given the greenhouse gas concerns, given the price of energy. You know, they want to try to help save money for themselves.

Well, in fact, if I can even add to that, I'm reminded that residential customers are only about a third of the users of electricity in this State. A lot of electricity is used by the commercial and industrial customers.

We got very excited back in 1996, when AB 1890 passed. There was a little thing that was in there, that a lot of folks forgot, and that is that the meter came under the control of customers.

If I could, just for a moment, sidebar, I went to work for a large software company in 1997, and looking into the customer side of the meter, realized how little

information I had and how little control I had.

So taking advantage of this, what if I could – what if I could design a metering system for my one-and-a-half-million square foot campus, that was accurate, that was real-time, that I could monitor from my computer desk via the intranet, the usage in each of my facilities, that I could even monitor at the substation, the power quality that I was getting, so that if there were voltage sags or outages, I could determine whether or not it was me or my utility that were causing that.

What if I could have everything in volume, such that I could be notified immediately if I had a problem with switches or transformers, and I could tie this into my energy management system so that I could control unique decisions about my school and save money. Because every dollar that’s saved in business is worth two dollars worth of revenue.

Well, it turns out that such a system didn’t exist, so we provided an RFP, we started to cobble one together, and we designed one that had exactly those kind of capabilities, in 1997.

So the Smart Grid is not new from the customer’s perspective. The customer needs information, that’s the beginning of control. That’s when customers can better begin to make to decisions. We’re not talking about

forcing customers to do anything.

In fact, the key nut here to crack is getting the information into the hands of customers. The issue that we should be talking about and, hopefully, we will later on today, is how do we get that information to many, such that they can get access to it on a real-time basis.

And that nut, if you will, is very much controlled by the utilities, it's information that they retain and hold.

Is the Smart Meter telling us where outages are and reading the meter? Well, that serves the utility's need.

But the customer needs the information with the Googles, and the IBMs, and forgive me if I leave out any companies, to develop software information around that information that customers will utilize.

The best example, probably, is the telephone. You know, I still have an old dial phone in my shop, just in case the power goes out, heaven forbid.

But it also, it reminds me that that's what we used to have. It said Western Bell on it, and it was one-size-fits-all. The big feature was you could pay a little more for a Princess phone.

If you all remember that, there was no innovation of technology around that. But as soon as that was made, as soon as that was opened up, it was just it.

One other thing is Commissioner Chong, former Commissioner for the Federal Communications Commission, one of the foremost experts in information technology is on the Public Utilities Commission.

Mr. Rosenfeld is Mr. Energy Efficiency. These policymakers understand these issues.

But from the customer's perspective, it's all about information and control. Let customer's have the information so they can make the decisions.

MR. GRAVELY: Very good. Okay, we have a couple questions from the audience here; I'm going to try to get those in before the panel has to break.

And a couple of WebEx customers, I'll review one of them as the individual walks up.

Is Stacey here, Stacey, it looks like Reineccius?

Okay, so you have several questions. If you could kind of like get those down to one consolidated question for the panel, we'll share the opportunity, if you would.

I got a comment on the WebEx about the white papers. Just to update, tomorrow's presentations will include updates on the progress of the white papers. My information is on the website.

Also, tomorrow you'll hear from Pedro Gomez, who is the technical team leader for this research.

So either one of us can provide the details, but

for those who are interested, we will be giving an interim update tomorrow, by the authors of those white papers.

Go ahead, Stacey, if you would, your question.

MR. REINECCIUS: Well, a number of the issues –

MR. GRAVELY: Can you identify yourself, first, for the record?

MR. REINECCIUS: Stacey Reineccius. I am Chairman and Founder of Powergetics, Incorporated.

We are developing a smart storage system, distributed grid connected storage system that goes on the customer side of the meter, requires no meter change-out. But we're very much looking at how to accelerate the deployment of this, how to integrate it and be a good citizen on the power grid.

Our customer types are people ranging from folks, like McDonald's, or other large chain stores that have very high and very spiky types of power use.

MR. GRAVELY: Can everyone hear Stacey? You need to speak -– it's a difficult system and – there you go.

MR. REINECCIUS: Got to bend down a little bit here.

The key question that we've been looking at, in terms of the regulatory, and some of the incentive programs that exist today, for example, the SGIP program,

some of the things going on with access to information, as you just mentioned, are really a thicket where it's halfway there.

And my key question would be can we get applications, such as stand-alone storage, incented within the SGIP? This would allow us to supplement any type of renewable, as well as applications where renewables don't fit.

And when these systems are deployed in sufficient numbers, we start to become a system that fit in with demand response capabilities and it does not affect the quality of life, or the societal behavior, which negatively impacts the economy.

And so I would really encourage the members of the panel to really consider including stand-alone storage applications, distributed grid-connected storage in with policies that you're looking at.

And, of course, we're happy to share our own research and our analysis on that, with anybody who's interested.

MR. GRAVELY: Go ahead.

MS. SMITH: I would just briefly comment. Technically, right now, I don't think the PUC could include storage in the S Chip program. Maybe, if you -- depending on your interpretation of the law, because the

Legislature's gotten involved too many times and legislated the technologies that are in the program.

There is a bill going through this year, SB 412, by Senator Chris Kehoe, from San Diego, that would allow the S Chip program to continue and allow the PUC to determine the appropriate technologies, rather than where it is just currently limited to just wind and fuel cells. That may help.

I also think, though, at least on the legislative side, there's been a little resistance. We all are in love with storage as it relates to renewables. We want to see it, there's not enough we can do for it. Especially, for instance, if it would apply to a CSI application, and really make that rooftop solar of value, so that that customer isn't turning around and pulling all their electricity that they really need from, you know, seven o'clock at night to seven o'clock in the morning, so they could really get value from it.

Our impression is that there's just not a lot out there right now that is commercially viable and affordable.

MR. REINECCIUS: That, along with the electric vehicles, has changed dramatically on the battery side. I can say we're having a good pool of engineers working on this right now. Our products will be shipping early

next year, for exactly this kind of thing.

And our analysis shows anywhere between about a 34 percent and 45 percent increase in the energy value for a customer with a solar electric system, and up to 87 to 95 percent increase in value for a wind system. And significant value just in stand-alone applications, whether neither wind, nor solar can be applied.

COMMISSIONER BYRON: It's a good point. We haven't quite figured out storage.

Ms. Smith, just to let you know, you know this, but the PUC and the industrial facilities aren't going to corner the market on innovation. There's a municipal program that puts forward 96 megawatts of thermal storage in customer's homes that would replace having to build another gas-fired peaking power plant, because it's cheaper.

So we have to figure out, from a rate structure point of view, how to do this at the PUC. But that's not stopping some municipal utilities from going forward with this.

MS. SMITH: And I know, I'll just summarize, certainly, the Legislature wants to see this. The question is does it make sense for rates?

We are, unfortunately, seeing some of the subsidy programs which -- this is the area I highlighted before,

it benefits a few at a great expense, and when you stand back at the 10,000-foot level, does it make sense for all ratepayers?

And so it's going to be one of that –- that cost issue that we're really going to look closely at.

MR. REINECCIUS: Thank you very much.

COMMISSIONER BYRON: Thank you.

MR. GRAVELY: There's a second question here, on the WebEx, on storage, so I'd like to address that question in response here.

And for those that aren't aware, this Integrated Energy Policy Report is a series of workshops. And we had a workshop on April 2nd, on storage. The question here was the challenge between storage not being generation, and not being distribution, and being multiple opportunities.

That topic was discussed aloud, and we formed a separate, small working group to come up with some specific policy recommendations for the IEPR and for the people to consider for the – and trying to figure out with the ISO, with the utilities, with the manufacturers, and with customers how best to categorize storage.

Again, for those individuals interested, tomorrow we will talk a little bit about that, myself, and Pedro Gomez. Again, he's speaking tomorrow. And our contact

information is available on the information here. And so we will be providing this information as part of the 2009 IEPR.

I wish it could happen faster, but it will happen, it will be coming publicly. The recommendation will be provided publicly and we will be looking for comments. Those that are interested can certainly contact myself, or Mr. Gomez, to keep track of the activities.

But we did take an action from that April 2nd workshop to prepare some specific understandings and policy recommendations on storage, to address this issue of ownership, this issue of value, this issue of how storage can help us with renewables and some of the policies.

So it is not – there's not a right or wrong answer, and so we're trying to come up with ways to do that.

And so one of the previous IEPR workshops had identified this issue as a topic for discussion, we have chartered ourselves to come back with some recommendations. It could very well end up as a white paper, or something, to go into the proceedings that Commissioner Chong is managing for the PUC.

So we have recognized this issue, we do see the challenges, we're all working it as a group, and we do anticipate some action or recommendations as part of the

2009 IEPR. So I wanted to point that out.

So I have one last individual for questions. Merwin Brown was interested in a question. Do you want to come forward and ask your question to the panel, because you'll be the last one before we break?

You have an opportunity to challenge the panel, here. You have a question here, you asked; do you want to ask it?

MR. BROWN: You can ask it if you want.

MR. GRAVELY: Come down and identify yourself, and ask it.

MR. BROWN: Okay. One question had to do with standards development, it's key to developing the Smart Grid. But one of the pressures to develop this standard is an unprecedented repetity here. It usually takes years to put standards in place.

I know I had a peripheral involvement, when I worked at the National Renewable Energy Lab on the standards for distributed generation, and that went on for years. Now, we're trying to do them in months.

So I guess I'd ask the question of what are the pros and cons of moving rapidly, because I guess I can see both? And I guess I'd like to hear some discussion on that.

COMMISSIONER CHONG: Okay, I'll take a cut, quick.

Well, what's the pros? Well, the pros is there is, at the Federal level, the feeling that there's an urgent need for less dependence on foreign oil, and I think it has to do with two wars that we happen to be fighting right now and the loss of American life. And I'm just cutting to the chase here.

So I think there's an accelerated interest in developing sources of clean, green energy, and that specifically includes renewables and other distributed forms of energy.

And so we've got to figure out how to integrate that into the grid. And the problem is we don't know whether the Smart Grid is smarter than a fifth grader. We hope it is, but we got to get it a little smarter to integrate these renewables.

So, you know, what's the rush? That's the rush.

Now, can you do it that fast? We don't know. But we're hoping you'll tell us you could do it faster than we were doing it, let's put it that way.

And so part of the Leadership Council is that the Secretary of Energy, Steve Chu, and the Secretary of Commerce, Gary Locke, is going to ask the CEOs whether they can commit to putting some resources to figure out if we could do this faster than it was normally going.

And we'll find out what the answer is on Monday, in

Washington, D.C., at the White House.

So do I think that's a good thing? Yeah, I do think it's a good thing. Yeah, maybe this would have taken us 10, 15 years otherwise. Could we do it, maybe, in five or seven? Yeah.

You know, this is America; we have the world's greatest entrepreneurs in this country. We have transformed the computer and the telecom industry in 25 years. Things are happening at unprecedented speeds.

So should we have the edge in this? Yeah, if we want to commit to it, sure, we could.

Is that a good thing for this country? Yeah, I think so, there's a global warming problem. You know, we need to protect our energy systems from cyber attacks. We need to have more renewable energy.

Does it come at a cost to consumers? Yes, it might. So let's quantify that cost. And we can't really quantify that cost until we have price signals and the ability to send those price signals, so that we can get the most efficiency and reliability out of the system. That only happens if you have a smarter grid.

So, essentially, we're trying to make sure that we can quantify the payoffs, and if they are there, then we'll slowly make that change. But it's going to have to happen a little faster than probably it would have

happened, yes.

And the con, you know, it's the cost. So we have to make sure this is a cost-effective experience. And that's what needs a lot of focus right now because we don't know the answers to that part, yet.

MR. DETMERS: Yeah, I would agree with Commissioner Chong on that, all of her points, pro and con. As well as I would add to the cons, Merwin.

You know, if we're all sitting back waiting for a standard to be developed before we actually produce something, the time is definitely a problem, and so that's definitely a con.

As well as, once you begin specifying what that standard is, and the developers have to meet that standard, then you're adding barriers, you're adding restrictions, you're adding, you know, potential complexity and potentially cost.

And so I don't see the standards to be an issue. I think we have to start out with some basic standards in place to meet our needs, and we first have to define what our needs are and what our –- what this transformed system looks like, that we want to move to.

But I see standard as being an evolutionary type of a process. So I don't want anyone in this room, or anywhere listening to this, to think that they all need

to wait for the standard to get here before we start trying something and start moving on things.

Because where we are is in a place where we have to move, and we can't just sit back and just wait for the old ways to -– that we always depended on, that was as you walk into this room and you flip on the light switch, everybody expects it to be there. That's a nice assumption.

But what we need to do is move to a new way of doing that. As you turn on that light switch, you should know how much cost it is to turn on that light switch before you come into that room.

I don't mean that we need, you know, technology to tell us all the way down to that point, unless it's very cheap and very reasonable.

But standards is, again, an evolutionary process, it's not something –- the standards that we have today, that we work with existing generating fleet, that was developed over the last hundred to two hundred years, and it wasn't developed just in one keystroke. And it wasn't developed before we started building new generation and different changes in the generation.

We actually went after and allowed the innovation to take place and then we said, yeah, that looks good, and we need a standard around that.

We need to start the moving before we just focus in our standards, though, is where I think we are right now.

MS. SMITH: I just want to make a distinction, and I'm not the technical person, but I think there's also this issue between – a distinction between the performance standards and the interoperability standards.

Politically, we don't want to end up with technologies that don't work together, because that's not an efficient use of ratepayer money.

And Commissioner Chung is so right, we have a country full of wonderful and creative entrepreneurers, some of which have already been in the halls of the Legislature, you know, over the past couple of years, trying to mandate certain laws that would end up only using their technology. And their technology, of course, then wouldn't work with anything else.

And so we do need to be aggressive, but we do need to watch for those pitfalls of things that don't work together. Otherwise, we end up with a system five years ago that is –- will remain antiquated, because it will not be structured such that it can be updated as our technologies continue to improve.

MR. GRAVELY: Okay.

COMMISSIONER BYRON: I think Ms. Smith has it

exactly right, I agree completely. I jotted it down in my notes here, you know, the interoperability versus proprietary issue, extremely important.

And if I could take it back to the cracking the information nut, I think that's really where that settles. So the pro is that we need those standards now, for that reason.

And the con is, as Mr. Detmers said, we can't wait.

MR. GRAVELY: Okay. In the interest of time, and the panel, and the other people here, I have one final question. There are a couple of questions that came in, that I believe we can answer after lunch, for the individuals, when we have the Utility Panel.

And that would be we have the opportunity this afternoon and tomorrow to bring together approximately 150 experts in the Federal Smart Grid. So I would ask each of you to take the opportunity to provide us, this group, and the people, there's about 60 people online, and we anticipate them today and tomorrow, areas where you think we can focus information you'd like to hear from us, I guess to charge us with what should we come out tomorrow afternoon, when this conference is over, and how can we provide information to the policymakers, so that the questions and the issues with Smart Grid are brought to the surface and the information you need to

make decisions is made available sooner than later.

So I guess we would take this as an opportunity to help us focus our discussions for the next day and half and, hopefully, help us to develop our comments for the IEPR.

So I'd like each of the panel members to give us their personal thoughts for myself, and the members here, and the members online as to what we can do in the next day and a half to make this more productive for the IEPR.

COMMISSIONER BYRON: Thank you, Mike. I was thinking, similarly, that we needed to end with something like this.

Let me ask a question before I speak. Mr. Detmers, do you have anymore time here or is this it?

MR. DETMERS: I have activities back at –

COMMISSIONER BYRON: That's what I thought. And Ms. Smith, we're losing as well.

So I believe the Commissioners will stay and we're going to continue to talk around this subject.

But I definitely want to thank both of you for being here and we want to make sure that we get our last remarks from you, before you leave. So I appreciate you asking me a question.

I'm going to pass on this, Mike. I feel like I've had enough opportunity to speak and I'm going to be here

both today and tomorrow.

MR. GRAVELY: Okay.

COMMISSIONER BYRON: And when we do workshops like this, where we start with the "talking heads," we usually get to hear from our panelists, and such, and that's why we're principally here.

So this is a little bit different. So like maybe for the benefit of Mr. Detmers and Ms. Smith, we'll pass it straight down the line here and ask if Commissioner Chong –-I'm sorry, Commissioners Rosenfeld and Chong would like to say anything.

COMMISSIONER CHONG: Art is so terse.

All right, I'm going to take a real quick one. So from the PUC's point of view, what I would really like people to focus on is taking California's State Energy Policies, as enunciated in the Loading Order, and to relate it specifically to how Smart Grid may help the PUC achieve those goals.

So I'm just going to give you a couple of examples, so greenhouse gas. There is some very good work being done by EPRI, showing how Smart Grid is green and can help in various areas in terms of greenhouse gas reduction. Now, that type of work was very helpful to me.

Demand response. There is tremendous potential for

Smart Grid on demand response. And I know Art is laser-focused on this issue, bless his soul. So that's an area that I'm very interested in.

Renewables. How can Smart Grid enhance distributed generation on renewables. That's of very keen interest to me, and I know it will be of keen interest to the Legislature, because they're working on renewable bills right now with great focus.

And then I have a personal interest in this electric vehicle issue because, you know, I woke up one day and just realized these things are right on the market. And in China there's a lot of them.

Japan, I drove a Mitsubishi car about a week ago, that 2,000 are being produced and already sold in Japan.

So this is happening elsewhere and they're going to come on very soon in California. A lot of these new EVs are coming to California first, of course, because we're always the nation's leader. And I don't feel like we're ready.

So I'm going to put some personal focus over at the PUC on looking at our EV tariffs, and talking with our utilities about what needs to be done. We're looking at some infrastructure outside the home to charge them up. So we're going to put some time into that this summer and see what we can do. So that area is of interest to me.

So that would be my focus. And I just wanted to say, Mike, thank you for your leadership on this research. Storage is an area that I realize is extremely important, both in the home, and in businesses, and in substations. So as you heard, we're holding one of our workshops with a focus on storage.

And I hope that as soon as your research is done that you will send it right on over to us. And, hopefully, you might be able to come to that workshop and present whatever you've got at that time. But I think that's a really important area.

And my hat is off to you for recognizing that and helping to educate me into why that's important. Okay.

MR. GRAVELY: Okay, Kellie.

MS. SMITH: I'm going to put it very simply, just remember at the end of the day, of all your work, what's in the best interest of all ratepayers, not just those few that are going to be using the system, and not just the utilities, the ISO, et cetera.

But at the end of the day, do you want to be on the other end of the phone when that ratepayer calls, and they get their bill, or their lights get shut off or, you know, whatever their problem is, and do you feel like you would have a system and a policy in place that makes sense to them, and controls their rates, and delivers

that electricity reliably.

COMMISSIONER CHONG: Okay, because of what Kellie just said, we have to factor in the cost-effectiveness of everything that I had said. Thank you.

MR. DETMERS: Yeah, and that's absolutely the fact of what we need to do. We don't have a blank check and we can't just implement everything that the dreamy engineers want to put into place.

But I will say, I think the initiatives that we just talked about today, of storage, storage by customers, and I was glad to hear the gentleman come down and talk about storage on the customer side, we really need to stop and take a look at how we want this system to change as we go forward. And we have every opportunity of making that cost effectively, doing it right for the customer, and doing it right for the way the grid operates, and for the utilities and how they operate the grid. Not for the benefit of everybody in the stock market, and what have you.

My two points, to go back to your question, Mike, I think I want to make sure that not only do we deal with the customer side of this transformation, and have smart customers and enable those smart customers with that information, but also on the resource side, with having the demand response be a capable resource that we need to

have. I think those are two key and top points.

But I also want us not to overlook the hidden system that's always out there, that I work with every day on the transmission grid, and we do need to move that forward.

And that goes back to what I think you're going to be hearing this afternoon and tomorrow, is the being able to accurately and effectively control this power system, with all of these changes we're talking about, is going to be a hard picture looking forward, and we really need the tools to be able to do that.

And that goes into the phaser angle measurement systems, and the WHAMs, and all of those types of things that help us get there. And I think we've moved quite a distance, but we still have a little bit farther to get us the information, so we can see what's actually happening on that system as well, and do the right things to be able to control it.

So I think we're on the right track and I'm excited for taking it to where it needs to go. Thanks.

MR. GRAVELY: Thank you.

COMMISSIONER BYRON: All right, are we ready to break or do you have something else to say, Mr. Gravely?

MR. GRAVELY: A change for the afternoon. We had some schedule changes, and so what I'd like to do in the

afternoon, in light of the tightness of the schedules, is to give a little more time to the utility and the manufacturing panels, so myself and Jim's opportunity, and the PUC individual was not able to make it here, so I'm going to move up the industrial and utility panels to the early afternoon.

So we'll start back about 10 or 15 minutes past 1:00, say 1:15, and we'll start with the utility panel.

And if we have questions after the two panels have gone, then we'll come back and do the CEC and other panel members here.

COMMISSIONER BYRON: Okay. I was not going to be as generous on the start, but we will start at 1:15 sharp. Thank you, Mike. We thank you so much for being here.

MR. GRAVELY: For those online, we'll keep the WebEx open.

Thank you.

(Applause.)

(Whereupon, at 12:10 p.m., the Workshop was adjourned, to reconvene at 1:15 p.m., this same day.)

--oOo—

1:15 p.m.

AFTERNOON SESSION

MR. GRAVELY: So I'd like to welcome everybody back. We have some minor adjustments to the afternoon schedule.

As I said earlier on, the first panel, the Government perspective Panel, we covered that in quite a bit of detail this morning and so we're going to go ahead

and start into a more detailed utility and industrial perspective.

If we have time, myself and the ISO will be prepared to answer questions in the afternoon, if we need.

We do have a visitor from DOE here, from the policy side, and so after this panel's done, before the break we're going to have a short discussion from him and a chance to answer a few questions from the DOE perspective. His name is Dr. Peter Karpoff, and he's from the DOE policy side, so he offered to provide some information.

So this afternoon discussion is now we're going to start looking, we're going to get down into the implementation of the Smart Grid.

We're going to start, the first panel will be the utility side, and the second panel will be from the industry, the manufacturer side.

Again, we'll go through, in this case we'll have each of the panel members will make a short presentation and then we'll have some discussion and open it up for questions.

Those of you in the room, again remember that we are using blue cards to record who wants to have discussions. There were two questions from the morning

session that were primarily focused on utility implementation, so I'm going to save those questions until this panel.

But feel free to get a blue card and turn it in down here, so we can get you in the queue for your questions.

And on the WebEx, if you have a question and we're not able to turn up the mikes, type it in and we'll pick up your question and put it on a blue card for you, from that perspective.

Any opening comments, Commissioner Chong or Commissioner Byron?

COMMISSIONER BYRON: Go right ahead.

MR. GRAVELY: Okay, so I'm just going to give a quick introduction to the panel members and then have them come, one at a time, we'll come down and give presentations.

So from San Diego Gas & Electric we have Terry Mohn. And from Southern California Edison we have Paul De Martini. From PG&E, Kevin Dasso. From SMUD we have Jim Parks. And from EDF we have Richard Schomberg.

And we have, in addition to the agenda, we have him seated, of course, we have from SCPA, from the Southern California Power Authority group, representing public facilities, Fred Fletcher will give a short presentation,

a short talk on that and be here to answer questions.

So with that I'm going to start off with Terry. And you want to talk from here or there, your choice?

MR. MOHN: I'll control from up there.

MR. GRAVELY: Okay, let me bring up your presentation real quick. Okay, now it's working. And you know just to flip it down.

MR. MOHN: Right.

MR. GRAVELY: Okay, thank you.

MR. MOHN: Thank you. I'm Terry Mohn. I'm from San Diego Gas & Electric. And at SDG&E I'm responsible for Smart Grid strategy.

I also am the Vice Chairman of the Gridwise Alliance, and I spent a quite a bit of time in Washington, talking with policy makers there.

So what has happened is CEC has asked us to answer a couple questions, so I put together some thoughts that SDG&E has in responding to those questions, but also, hopefully, I can convey a little bit of flavor from YC, the regulators in Washington.

The first question that we were asked to consider is what can policy makers do to encourage research investments in Smart Grid technologies?

And number one is that we have a complex regulatory environment in that there's a dividing line of approval

processes that take forth between Federal, the FERC, Federal Energy Regulatory Commission, and the CPUC.

And what we'd like to do is get a very clear understanding about what the clear distinction of authorizations occur between those two agencies as we start to deploy Smart Grid. Recognizing that Smart Grid covers a broad swath of the utility sector, from bulk generation all the way down to the consumer, the diving line of where those authorizations for funding takes place is muddied quite a bit, and so we'd like to get some sort of certainty for how those authorizations are going to take place for some of the projects that we want to implement.

And then each of the regions in California is a little bit different. WE have our own emphasis in areas that we want to explore research.

Right now, the PEIR program, CEC has a very large budget for research, they look at research at the macro level.

But with the region, within SDG&E, we have unique characteristics that we'd like to explore. But some of those projects require more than just minor amounts of funding and we'd like to have a little bit larger research budget to cover some of those issues.

The next answer to the question is we know that

there are a lot of great results from research that's already taken place across the entire nation. A lot of those results don't become public domain. And if it is, you have to go through an extensive search process.

What we'd like to do is see that some of the research that takes place, not only in California, but across the U.S., is posted in a way that we have direct access to it, and then we can search through it in a way that's convenient to point to the interests that we have.

We know the Department of Energy is going to be creating a clearinghouse in the future but, in the interim, is there something that the California Energy Commission can do beyond the website that they have today, that assembles all the great research that's been done around Smart Grid and make that available for the public.

And then lastly, one of the answers on this question is we know that standards are under development across the U.S., a lot of people have been watching what the National Institute of Standards and Technology is working on in developing a roadmap for standards for interoperability.

California's been doing a great job, we've been a leader in many areas, but we just want to make sure that we really stay connected to the national work, that we

have a strong connection to that work, and just ensure that, you know, California, if not a leader, at least very engaged in that activity.

So the question about are the policies in California moving away from the policies at the national level, and our belief is that not. In fact, our policies are very much aligned. The thing is that we have a little bit more aggressive goals in our policies than the rest of the nation. And so that takes on a little bit more risk for us because a lot of the rest of the nation, in terms of overall purchasing power, California is typically the first purchaser, first of a kind. And that puts us a little bit more at risk in making some of those acquisitions.

So we just want to make sure that we have some sort of alignment with where the Federal policies are going.

So the carry-on question is are we too aggressive, is California energy policy too aggressive?

And getting back to the statement I was just making, we believe that we're very progressive, particularly in the area of renewables, but we want to just make sure that as we implement our portfolio requirements that we don't get into a situation where we have stranded assets. So we just need to make sure that

we have provisions in our policies that give us rate recovery.

That a lot of the conversations that took place this morning around intermittency of renewables is a very big issue for us. We are kind of the cul-de-sac in San Diego, of the transmission grid, and so our issues are a little bit different than they are mid-state or north. And so we need to ensure that we have a way to mitigate those variabilities.

And then, of course, most people know that we're where the pockets that renewable generation exist aren't where the load pockets are, and so transmission getting, you know, the power from where the generation is to where the load is, is one of the bigger issues.

And those of you who have been following this in San Diego, you know, Sunrise Power Link has been in the news for the last four years and we're still not implemented, it's still going to be a couple more years. So just the fact of getting transmission sited is a very complicated situation, so that's one of the areas that I think California can be a little bit more progressive.

How do we avoid repeating the problems experienced during deregulation? Well, we saw that during deregulation we had a disconnect between wholesale and retail markets, and so some of the stakeholders that were

managing the decision making on both of those sides, some had more influence than the others. And what we wanted to have is a balanced playing field, where everybody has the same voice.

So what we can do is learn from that experience and make sure that we have a very transparent process, that all the stakeholders are listened to. And even what's happening now, with Cal-ISO, with the real-time rates that that information now is becoming public and we can use that in a real-time manner.

And then, lastly, what do the policy makers need to do to make the Smart Grid a reality?

As I mentioned, there's a vast amount of work that's taking place at the Federal level, there's a vast amount of work that's taking place here, in California. California has always been deemed a leader; it still is being deemed a leader. But there are other pockets, other states that are coming forward with their own recommendations at the public utility level.

And it would be great, as our regulators work through the National Associated Regulatory Utility Commissioners that we have a common vision on what each of the states will do and it will be consistent across all the states.

So even as the Federal government comes forward

with their policies, that each of the independent states, as they're coming forward with their policies that they all look consistent. And that way, as we start to procure products and new solutions that they're not just state-centric, that they are universal.

And one can almost argue that the vendor community, when they come to sell products into our business, they're international companies. So perhaps it's worthwhile to look at what are the international rules, more than just even what the national or state level rules are.

Another challenge that we have in implementing Smart Grid is that we know that all of us have a vast amount of existing investments in legacy equipment that has been built over the last hundred years. It's not a simple matter just to replace that because Smart Grid is in vogue today and we need to introduce those new technologies.

But what we need to do is ensure that we have the opportunity to integrate technologies as they're appropriate and cost effective, and the standards for interoperability make sense.

That sometimes means that we do replace existing technology that isn't fully depreciated. So what are the rules around how do we do that? At what point do we make

the decision that it's okay to remove an asset that's not fully depreciated, but the shareholders -- I'm sorry, the stakeholders and the ratepayers aren't carrying an extra burden for paying for multiple assets.

And that concludes my discussion, thank you.

MR. GRAVELY: So one quick admin discussion for here in the room, I didn't mention earlier, but there was a pair of rental car keys found during the lunch break. So if someone is looking for those, they are at the security guard out by the front door. I'm assuming when they want to go home, they'll need those.

And so as we go through we'll have an opportunity for all six panel members to talk, a short presentation like this, and then we will have some questions for the panel that I'll have, and then we'll throw it out. And then, also, the Commissioners may have some questions for the panel, and then we'll open it up for general discussion.

Our next presenter is Paul De Martini, from Southern California Edison. You want to speak from there?

MR. DE MARTINI: Yeah.

MR. GRAVELY: Okay, let me get your charts up real quick.

MR. DE MARTINI: I don't have any charts.

MR. GRAVELY: Okay, just a title. I'll just stand here, then. Thank you.

MR. DE MARTINI: Well, thank you for the opportunity to participate in the panel today and, of course, tomorrow as well, we look forward to it. The ongoing discussion this morning was very informative and appreciated the comments from the Commissioners and the other invited speakers.

For the five questions that were given, and I'll go in order, the first in terms of what policy makers can do to encourage research investments?

Edison asks that the policy makers in this State, not only the Commission, but the Legislature and others, fully recognize more research is needed particularly in applied research, electric system analyses, and technology demonstrations.

The most promising energy technology, such as utility-scaled storage and superconducting field equipment require additional development to become commercially viable.

When we look at information systems and telecommunication networks, more work is needed to refine the business uses into architectures that will address not only the path forward, but also a graceful transition from the past. In particular, the operating

complexity of the electric system, overlaid with a pervasive telecommunication network and highly integrated set of mains of sensor nodes, new control systems, and field switching devices is massive.

These efforts also need to bound enthusiasm with the clear recognition that rate pressures exist and customer value must be demonstrable.

As a result, the range of engineering, organizational, and customer issues that are raised are significant and are attracting the best minds in the industry, utilities, and academia to solve.

Today we have a fantastic opportunity to take advantage of this talent to help us design and implement the grid for the 21st century.

However, State and Federal programs cannot do it alone. Too much needs to be done and utilities, vendors, and other California universities can play roles in furthering Smart Grid research and development.

Edison, and other California utilities, often serve as the path to commercialization for PEIR program technologies and those of product manufacturers. Without intimate knowledge and hands-on experience providing feedback to product manufacturers and developers, technological progress is often delayed or

never reaches commercialization.

As a recognized industry leader in the development and deployment of Smart Grid technologies, Edison has been actively engaged in many innovative technology development programs, including Edison Smart Connect, Our Circuit to the Future, electro drive systems, and Synchrophaser measurement applications.

These programs have been developed at a relatively low cost; they are expected to create significant benefits.

However, the current level of funding for utility RD&D is insufficient to achieve the transformation of the grid, needed over the next decade or more.

The CEC, California Public Utilities Commission, and California Air Resources Board support for electric utility RD&D would significantly accelerate the development and deployment of the Smart Grid.

California is home to nine of the world’s best research universities, with engineering schools interested in Smart Grid research. Six in Southern California, got to do a little local plug.

We are also fortunate to have California State University system and many national recognized private universities, with an interest in educating the next generation of researchers and professionals for the

electric industry.

Several schools are starting to reinstitute power certificate in their electrical engineering programs, and students have begun forming special interest groups on campus around Smart Grid, and the like.

This year Edison helped to form a university Smart Grid research consortium, in Southern California, that includes UCLA, USC, Cal-Tech, UC Irvine and Santa Barbara to start.

With the pending age bubble, although it's been a little bit stalled become of the economy, we do expect that to come back, as a backdrop we had been given an opportunity to align several policy interests, including achievement of environmental goals, grid modernization, and workforce development through expanded research.

Policy makers in the State should support a broader engagement of universities across California in their pursuit of funding opportunities at the State, Federal, and industry research.

One of the things we talk about with stimulus funds is focus on the Smart Grid, but there's also this other pot of money, ARPA-E, that has become available, and many of the research universities in the State are very interested in this. Those applications are due,

those white papers, concept papers are due June 3rd, I believe. So there's a lot of interest going on right now for those universities to try and get access to that fund, set of funds, and also at the National Science Foundation, as well.

Are California's policies driving the California grid away from the national grid? We don't believe so.

We do, as Terry said, believe that California's policies are driving California's grid to the national vanguard. This is positive in that we have an opportunity to shape national perspectives on many elements of Smart Grid development and implementation.

California's early adoption of these policies does require us to move more quickly than the rest of the nation, which may temporarily cause gaps with national efforts. Yet, based on the current Administration and Federal policy, the goals appear consistent.

Edison and our colleagues at PG&E, in San Diego, are very active at the national and international levels to address this issue. However, we do need to be mindful of these efforts and remain engaged in the policy discussions, legislation development, just to give you an example there were four cyber security bills released in the last three weeks, at the House

and Senate, Federal regulations and standard development, so that the California Smart Grid investments do not become stranded.

Are policies too aggressive? There is no doubt that California energy policies are aggressive particularly compared to Federal policies or those proposed by other states. Edison believes that many aspects of a Smarter Grid will need to be in operation by the year 2020, similar to what Mike shared earlier, to enable our ambitious policy goals, such as AB 32, Zero Net Energy Homes, California Solar Initiative, advanced metering infrastructure, renewable portfolio standard, load carbon fuel standard, and the wide-spread adoption of plug-in electric vehicles, and that's just the highlights.

To achieve these goals significant investment in RD&D, capital deployment and workforce training will be needed. It will also require effective engagement with broader State and Federal stakeholders.

And the challenge is managing the development of this future grid while replacing the basic elements of the existing, aging infrastructure, not to mention maintaining critical day-to-day operations.

These challenges can be simplified into basic scope, schedule, budget and resource questions. For

example, how much can be accomplished over what time period, at what acceptable ratepayer impact, and given qualified and available resources.

I think sometimes we tend to forget that there are only so many qualified line craft people, so many qualified technicians that are available in the marketplace, and so there is a resource constraint in the near term until we get other folks trained up to be able to implement these systems.

The 2020 vision roadmap, proposed by EPRI, on behalf of PG&E San Diego, and ourselves, along wit the CPUC, Smart Grid OIR workshops should help us better understand the answers to those questions.

In terms of how we might avoid repeating the problems experienced during deregulation, one of the aspects that we think about is the concept of Smart Grid for many evokes the opportunities that we've come to expect today from the internet, in terms of ubiquitous information and transaction capability. However, we need to remind ourselves that the internet, as we know it today, evolved over 40 years and the national electric grid, today, is not much different than when the internet started in the late sixties.

The electric grid will require phases of evolution that add increasing functionality and

complexity, understanding both the potential benefits and potential consequences of the complexity of each stage before implementation is an essential aspect. Otherwise, we're likely to write a sequel to the beautiful theory meets ugly reality story.

It's really important as we start to think about these increasing levels of capability that the complexity factor really goes up almost geometrically when you think about it in terms of the numbers of nodes and points that we have to think about, 3,000 is really on the small end when we ultimately get to multi-millions of end points, potentially.

Also, this evolution is not based on a linear function. But rather, will fall along a diminishing returns curve. As we pursue greater levels of distributed resources, intelligence and control, the cost of aggregated components, integration and management require a rate greater than the marginal value of increasingly smaller resources, whether supply or demand.

So it shouldn't be a surprise, it is the reason Smart Meters were deployed and, for example, in our service territory, for the approximately 13,000-large seeing eye customers that consume 60 percent of the energy, before pursuing replacement of 5 million small

commercial and residential meters for the other 40 percent.

Concepts like vehicle-to-grid or neighbor-to-neighbor transactions ultimately involved millions more points of integration for IT systems and for the physical grid. The current distribution system is not designed for two-way power flow, not to mention hundreds of points of interconnection on a single distribution circuit.

We are working to understand the technical challenges, but the solutions will likely to be expensive and take time. Setting priorities with the diminishing returns curve and systems complexity, along with the associated risks in mind will be essential to an effective plan.

What are we looking for from policy makers to make the Smart Grid a reality? We would hope that the California Energy Commission, the Public Utilities Commission would support ratepayer-funded utility research, development and demonstration projects to accelerate the development and deployment of the Smart Grid, continuing to engage the California utilities in the development of the policies for the Smart Grid, because we believe that at the forefront, we're very active at the forefront, both internationally and

domestically and have a lot of insights to share. We think they can contribute.

Continue to support and maintain alignment of the Smart Grid efforts led by other regulators and law makers, including the California Legislature, U.S. Congress, FERC, the U.S. Department of Energy and the U.S. Department of Commerce.

Also, to seek to clarify the jurisdictional intersections between states and FERC that must be met in order to implement a comprehensive Smart Grid across California and the west, which includes municipal utilities and non-California WECC utilities, and continue to support California utilities in their applications to the DEO for Stimulus funds. And ultimately at FERC, for cost recovery of prudent transmission-related Smart Grid investments and management of related assets and resources.

In closing, Edison would like to particularly thank the CEC for its acceptance of our pre-proposal yesterday for the plug-in electric vehicle charging infrastructure proposal, that we're making forward, actually today, to DOE for the electric transportation Stimulus funds.

So thank you very much.

MR. GRAVELY: All right, sorry. Thank you.

Our next speaker to give their presentation here will be Kevin Dasso, from PG&E.

MR. DASSO: Well, good afternoon, everybody. My name is Kevin Dasso, from PG&E. I think I'm going to probably say a lot of the same things that my colleagues have mentioned here, so I'm going to try to be sure that I put maybe a little bit of a PG&E spin on things, kind of emphasize what we're doing in the same way that, again, I think my colleagues have mentioned, we're doing a lot of the same things.

In terms of the first question, what can policy makers do to encourage research investments? I think one of the key issues as we think about it is to build on the success that we have already implemented and are implementing here in California.

In PG&E's case, we have already installed over 2.4 million new version meters, automated meters, Smart Meters, we're reading of 2 million of those, so we're already implementing the kinds of technologies and the capabilities that many other parts of the country just dream about in terms of their capabilities around Smart Grid, so we're already there.

As Mike Gravely mentioned in his slide earlier, PG&E's plans are to implement about 10 million gas an electric meters by 2012. So again we believe, just

generally, California is uniquely positioned in the Smart Grid space.

In terms of research, though, one of the points that I'd like to make is that we're not sure that we need to do a lot of research in the basic capabilities. In fact, I think that was really what both Terry and Paul mentioned. And we need to really focus on pilots and demonstrations, how to connect these together to make, really take advantage of the real capabilities of a Smart Grid.

The types of areas that we're talking about will be looking for pilots and demonstrations that would enhance system reliability, demand response, a lot of the discussion this morning. We know how to do that, I think the issue is how we integrate that with other capabilities.

Dynamic pricing, Commissioner Chong talked about the program that's already being developed here, at PG&E.

So again, we know a lot about this stuff and I think really the research aspect of it, if there is any, is how to knit it together and to really make one plus one equal three and move forward.

So that would be the focus area I would -- the guidance I would offer to policy makers in this

respect.

California versus the national policy, again, California's in a leadership position. I think the key is that we maintain that leadership position and do the kinds of things that demonstrate that leadership, building on our successes. There will be many that suggest that we're too far ahead and that we should slow down, and we would encourage not taking that strategy and taking advantage of what we have already developed.

As my colleagues mentioned, we're very active in the Federal standards development and we need to stay coordinated on those efforts, and I believe we are. I think we also need to be sure that the regulatory community and the legislative community know more about what we're doing, so they understand how can they help us in that regard.

One of the other points I'd like to make here is that, not just in California, but around the nation every utility is really starting its Smart Grid journey from a different position. We all have different levels of automation, we all have different types of technologies, and as we think about policies going forward, we need to be sure that those functions are compatible and those technologies are compatible, but

we're not all going to go down this journey of achieving a Smart Grid in the same exact way.

The last point is really to, I guess, avoid the temptation of focusing only on California. Because as I think was also mentioned, we buy our equipment in an international environment and so we need to be sure that things are interoperable and that California can get what it needs through the vendor community.

Are California policies too aggressive? No, but there are some things we don't know in terms of how to implement. I think one of the key questions that we have, that was discussed this morning is resource, renewable resource intermittency is a big question, how do we deal with that?

How can we truly take advantage of demand and customers as a resource in the mix? Again, those are all things that are a part of our plan; we don't necessarily have the answers to that.

I think the other points is that we really need to be flexible, particularly as we think about our RPS and greenhouse gas requirements. You know, our view is flexibility is key, we can't know all the things that we're going to need to know between now and 2020 and we don't want to lock ourselves into a narrow path that we really can't achieve the overall goals.

The last point, last but not least, I think it was hit very hard in the panel earlier today, and that is that we really need to have safety valves focusing on cost to customers. We don't want to just march down without regard to cost to customers or the impact on reliability, so those need to be factored in as we go and checkpoints along the way.

Lessons learned from restructuring, I think, you know, some of the, lots of reasons that people have given to why we had issues during the initial stages of restructuring. I think, certainly, market design issues, the disconnect between customer prices and energy development prices, and then resources. You know, were the resources available when needed and during those critical peak periods?

Smart Grid really enables or addresses a lot of those issues; I think we're going in with our eyes open. Dynamic pricing, demand response, and energy storage are all aspects of the Smart Grid that are aimed at addressing some of the issues that we've seen in the past.

And then last, but not least, you know, flexibility as we go forward. Again, we can't know how this is all going to evolve.

So how can policy makers support our journey?

And I really commend Commissioner Chong in her remarks at the Smart Grid OIR, both workshop, as well as the pre-hearing conference in terms of talking about this Smart Grid as a journey.

There is no, we don't believe that there is a defined end state, it is a journey. And so one of the things I think we can do here, in California, is to remind people of that, that it is a journey and that, however, it needs to be a somewhat disciplined journey to focus on really developing the infrastructure.

And as a grid person, I always want to remind everybody that the second word in Smart Grid is "grid," so don't forget about the infrastructure, let's be sure we keep that in mind, but build on that infrastructure.

Focus on standards. Again, there's a process that we go through, pilots and then, ultimately, you know, full-scale deployment.

So Commissioner Chong asked everyone to think about so how can the Smart Grid help us achieve our policy goals?

The way we look at it is that the nice part about Smart Grid, at least as we think about it today in the early stages, there isn't anything that people have assigned or associated with the Smart Grid that isn't -- that is not infeasible. I mean, all those things can

be done, potentially, if we followed a disciplined and managed process where we think about the standards, we test those technologies before we engage any customers. The last thing we want to do is put equipment that doesn't work in a customer's home, and send those kinds of issues. So test the assets before they get deployed, demonstrate them through pilots in a controlled way, and then move forward to a full-scale deployment.

So as we think about the different capability we follow this, what we think about internally as kind of this virtuous circle here of developing technologies and deploying technologies.

The benefits that have been associated with the Smart Grid we believe are all capable, they're all potential there.

So that concludes my remarks, thank you.

MR. GRAVELY: Thank you, Kevin.

Our next speaker with introductory comments will be Jim Parks, from SMUD.

MR. PARKS: I agree with what the other panelists have said so far, I'll just add a few comments on this.

What can policy makers do to encourage research investment in Smart Grid technologies? I think this is already underway but I think you should define

California's Smart Grid vision. We think you should determine the gaps to establish the research priorities and then also fund those priorities.

If you look at the recent FOA and NOI that have been released from the Federal government, you'll see that there's a focus on synchrophasers, distribution automation, large scale energy storage, demand response, plug-in hybrid vehicle, infrastructure and then a lot of transmission and distribution focus.

I think we need to make sure that we ensure also a customer focus. I think the Smart Grid can help end-users become more efficient and help lower customer bills.

Also, I think we need to recognize there's a continuum between the supply side clear on down to the demand side that can enable the entire system to be more efficient and reliable.

And then we also believe that you should align Smart Grid priorities with California's policy objectives around climate change, renewable portfolio standards, and energy efficiency.

Are California policies driving the California grid away from the national grid? I don't think so. I think California has always exhibited leadership and I think California should continue to do so.

SMUD believes that transmission planning, development and cost allocation are best done regionally. We think there's some advantages to that. We think a national approach could force investment and transmission assets that might not benefit local or regional entities and could reduce investments in regional renewables.

We think California policies should drive the national grid to California, rather than the other way around. Now, some of the examples where California has led the way has been building efficiency standards, appliance standards, emissions standards, renewable portfolio standards, and we should continue to do that with our Smart Grid efforts, also.

Are California energy policies too aggressive? I think I heard a few panelists say no and one say maybe, and I say sometimes. We kind of like the high-level goals, examples of that would be AB 2021, which at least from the municipal utilities required 10 percent energy efficiency over ten years, AB 32, the greenhouse gas goals, and SB 1.

But once we have the high level goal there tends to be, the policy makers tend to move into what I would call the micro-management mode. It's like now you're going to tell us how to achieve those goals.

And we really prefer, once you establish that high-level goal that you give us the flexibility to achieve those goals.

So the issue is outlined in how the goals must be met, the micro-management and I'm saying, you know, resist the urge to micro-manage. Once you establish the high-level goal, give us the opportunity to figure out how to achieve those goals, give us the flexibility.

Keep the goals in line to the low-carbon end-game and support the

principle of technology neutrality, along with the local solutions and specific services, or best practices to be proven in a competitive market. And then there's the opportunity to intervene after it's clear that we're not achieving the goal or the intent of the goal.

How do we avoid repeating the problems experienced during deregulation? We didn't quite view this as the same thing, but we think there are some things that can be done. We need to establish reference design gateways and open protocols for control devices.

Regulation should also focus on consumer protection. And we'd also recognize the important role of customers serving utilities as new third-party

players enter the game, and then maintain a level playing field as third-party players are not subject to the same regulatory framework.

And there's a couple of instances where this comes into play that I can think of right now, especially concerning electricity as a transportation fuel. Right now we've got greenhouse gas goals, we have targets, we're supposed to reduce our electricity consumption, reduce our greenhouse gas footprint, and yet we're supposed to supply electricity for, say, plug-in hybrid electric vehicles. If it goes according to plan, we'll need an additional 750 megawatts just in the California --just in the Sacramento region by 2030 to supply the electricity for the plug-in electric vehicles.

Now, if we're not getting the credits for that offset in fuel, that's going to be a problem for us. And if the third parties are giving us credits, that's going to be a problem. And I'm sure there are other examples that I'm not mentioning right now.

What do you need from policy makers to make the Smart Grid a reality? Once again, I'd hit on establishing high-level goals and ensuring the flexibility to achieve those goals, establish open protocols that are fair and drive down costs, ensure

fair play in the market. And then I say go back to question one, which is really defining the Smart Grid, finding the gaps, and then finding research and development that will fill those gaps.

Thank you.

MR. GRAVELY: Our next speaker will be from Electicite de France, Richard Schomberg.

MR. SCHOMBERG: Thank you. It's a great honor to be here today and thank you for having me.

I'm a bit of an outsider here, so maybe it's easier for me to look at the same thing through a bit different angles. And I hope I'm not going to be too naïve or provocative.

COMMISSIONER BYRON: No, Dr. Schomberg, it's great to have you here, but I think everybody should note that one of the reasons we have you here is because you're very involved in this area and we recognize your expertise.

MR. SCHOMBERG: Yeah, maybe it has value to mention. Okay, I'm in charge of research and development for a large international utility, EDF. But I am a member of the OSDOE, Gridwise Architecture Council. I am, which is not written here, a NIST Co-Chair of the Domain Expert Working Group. And I am Chair-elect, President-elect of the IEC for

International Standards on Smart Grid.

That's really new, many things are going on.

I'm not going to touch too much on standards today, because there is a presentation tomorrow where I will expand a lot at the international level on standards.

I will try to stick to the questions that have been provided, and I think it's very helpful, actually, to focus a presentation there.

So, first, well, how to encourage research investments in Smart Grid technologies? Actually, well, of course, we can – California can put in place incentives, and that's very efficient, that will always work. You can find some mechanism, some money mechanism. But to really show you what is driving me is that I have the impression that the most valuable resource, one of the most valuable resources of California is not fully at work today, which is the incredible brain power California has in all the universities.

And I attended, I was invited in a symposium a couple of weeks ago, where I was very surprised how academics, over just a one-day session, were able to brainstorm and come up with completely new ideas.

So I guess there might be interesting processes,

not to go through RFP. The problem with RFP is it's good because it's providing money, okay, and money is the fuel. But people, to respond to RFP, have very limited time. So how, actually, to be sure that we can tap into all the brainpower? Maybe organizing some kind of contest, or something like that, that actually gives more time for teams to come up on specific topics like, today, you have those five questions for the panel. Well, if you come up with sharp-tuned topics it will be incredibly refreshing to see what the new eyes would bring to the table.

At minimum, if it cannot be used directly in projects, it would considerably fuel the thinking.

And, of course, now, as we are talking about research, there are many different types of research, actually, we cannot just answer to that question, and I need to touch on the research can be just really applied research, where you try to assess capability of remedial technology, or assess the capability of integration of different types of technologies, or develop new disruptive technology. That's complete different, okay.

And there is another type of research that is not very often mentioned, which is actually participating in the development of standards. And as Jim Detmers

said this morning, don't wait for standards. Being a standard person, I would say, I'd concur completely. You have to decide and fine-step ways to move forward. But doing this is very dangerous because at the same time you have -- you can do that if at the same time you organize the evolution of standards, you see. It's not just a jumping in something and that's it, because you're going to pay a very high price later on if, at the same time, you don't invest of standards.

So I'm okay to jump on projects now, with what exists, just to buy time, but to buy time for something.

In one topic on which I haven't seen any real research going on, and it's a bit coming in Europe, is working on the intelligence, itself, of a Smart Grid. Because a lot of the projects are just, A, let's add sensor actuators, and integrate all this, and have a capability of actually reaction of a system. But more than reaction give some IQ to the entire system, and that goes really, really far. And then you can cooperate in market design, asset management and, of course, some value can rely, the value can rely in the anticipation.

If you know the information in advance, that's a very general statement, but it's always, it's proven to

be true, if you know some information in advance, if it's temperatures, if it's evolution of a conception, whatever, 24 hours in advance, you can derive huge amount, huge value.

So my message here is focus on the intelligence of the system, which I haven't seen really well, not in California, but even much elsewhere. So enough said about research.

California policies driving California Grid away from the National Grid? Actually, is there a National Grid? Well, California has been leading the way, completely leading the way with energy efficiency, AMI, DR, you see it at the Federal level, the Energy Act of 2005, which was actually the generalization of what California's has been doing. Well, that was my reading.

But, but actually, now, I have the impression that other states, or at the Federal level, you see, the big ball is started to roll and actually it seems to move fast, and well it doesn't do justice to what California did, definitely. But there is something very dangerous because California has probably the highest number, largest size of projects and definitely if the other states and Federal are leading the way, and if California is somehow slowing down, or still

looking around and losing the momentum, then it might actually hurt the California projects. That's my reading and I hope it's not going to happen. But that means that there's some kind of urgency to whatever exists today in terms of legislation, or whatever, and I will touch again into this.

You see, it's like our standards, you see, move, but move knowing there are things that are not perfect, and that knowledge were the things are not perfect, it's a given, it's a decision, it's an informed decision, and so move and buy time to actually do better for the next round.

Now, are California energy policies too aggressive? And I would provide a different answer from the other panelists. Actually, maybe too much aggressive but, actually, you may do not enough. And I think everyone would acknowledge that electricity is the cleaner and more efficient energy vector. And this notion of fuel has been touched upon there, you see, because it's just an energy vector, it's not a primary energy, right.

So if it's the cleanest and the most efficient energy vector, then why California would not extend the first priority of the existing loading order, which is an energy efficiency first. Then why not pushing very

hard to actually having the processors that are using fossil fuels to switch to electricity.

And, of course, and this is possible in effect in the industrial sector, definitely, and in the transportation sector where, of course, it raises the question of we may be building trains, you see. But if you had a high-speed train between Sacramento and San Diego, I'm sure that there would be a lot of cars out of the road or a lot of flights canceled, you see.

So pushing this aggressively, you have an effect of increasing the demand for electricity. And this is where it's interesting because you see everything we've been discussing here is very much okay, you cannot -- it's difficult to build new power plants, it's difficult to build new transmission lines. So actually go around the problem and try to de-centralize things, okay, and rely a bit on what is at the end of the grid.

That actually you find out limitations to this very quickly. And if all of the sudden you have a much larger load to serve, then it can switch paradigm, then it can actually change dramatically the value prepositioned for, well, maybe in building transmission lines that you would not have built otherwise, maybe build power plants. And, of course, build bold Smart Grid projects without any -- see, you can always put

that in a nice value preposition for a Smart Grid project, but that would be bold. Okay, so the message here is switching paradigm. Actually, the problem we're trying to solve is that we want to lower the electricity consumption and actually adjusting it by increasing. We might find much better, other solutions. And I know it's a bit provocative.

And I'm not going to suggest that you build nuclear power plant, but that's another story.

And so how do we avoid repeating the problems experienced during deregulation? That question puzzles me a lot until I decided to give it my understanding. My understanding there is that typically it's really centralized versus decentralized, you see.

The decentralization that was put into place was deregulation, allowed to work around limitations of the centralized established system. But actually there really was a threshold when you decentralized, a threshold at which you start to get actually new or more problems, you see.

So to summarize, centralized has some limitations, okay, let's do some decentralization around this. That's okay, you jump on this, and you jump on this, and you build on this, and all of the sudden you discover other limitations and maybe, maybe

larger problems.

And let me give two examples. And that's a bit frightening, that's a very important part of the points I want to make. You see, the first example is security. And you see all the OMI projects going on, security started to be discussed quite late I would say.

The project started and a couple of years later started the entire discussion about security, okay. And actually, if you start to – because you can't rely on centralized, that you want to increase the decentralized infrastructure, whether it belongs to the utility, whether it belongs to the customers, that means you're going to have on the ground much, much more equipment.

And if you have more equipment actually it lowers the reliability. That's basic engineering. So if you want to increase availability because actually, when you say the grid is not reliable, people really mean it might not be available enough. Therein, to increase availability you actually take the risk of actually decreasing the reliability, which means you increase the risk of failures.

And the message here, I'm not against the Smart Grid, I know that, I'm really in favor of that, but

that system engendering lessons, you see. If you have burned your fingers on that type of projects, then that's the kind of thing you start to figure out, that count actually is the concept of dependability. And I'm not going to give a tutorial here on dependability, because it's so explained, it's so state of the art, it's well-known in our industry. And dependability actually includes the availability, security, reliability and many other things.

And this is really, you see, looking at a project it actually is not just that one project and one utility, it's interesting to look across the chain.

Another thing, the example of Cal-ISO success is very interesting because they've succeeded to do something that is really great. This is because maybe they had the capability to work across the chain quite widely. It's not that they solved the technology problem, technology is there, okay. So I would look into the dependability of anything I would try to start.

And, of course, while deregulation is bringing freedom to players and of course we hope that is going to benefit to everyone, but the game cannot generate, cannot create its own rules. So extensive modeling and simulation at many different levels should -- if you

want to distribute behaviors, you see, if you expect utilities doing things, customers doing things, vendors doing things, hey, let's model and simulate them.

By the way, you have a lot of people in universities that have modeling and simulating things that have no economic sense today, if you allow me. So it's possible to do that and that would actually avoid repeating problems experienced during deregulation.

Now, and I guess that's the last point, what policy makers could do to make the Smart Grid a reality? Well, the first thing is really -- see, I still don't understand why the AMI and programmable communicating thermostat are not already deployed. Because if you look at what it is, technically, it's nothing, it's nothing compared to a lot of other projects that are envisioned, and it's not on the ground, it's ongoing.

So I have no idea here and I'm not trying to -- I'm not judging anything. But, of course, the first thing would be to really end this thing quickly, the cues for success from this very simple step, okay.

And of course Smart Grid, Smart Grid is just a concept. So to conclude, it can be whatever you want it to be.

So and this is the last point, and this is really

something that I, over a year ago I had this in mind, that I think there is an absolute necessity to communicate very quickly on what exists already and show a very simple, clear direction on one, two, or three things or goals.

See, likewise, the AD. The AD is fantastic, everyone knows it, yet it makes sense, it's not discussed, et cetera, so why not having a kind of likewise a communication thing that for a Smart Grid project there is a kind of immediate reaction, okay.

And you see the last bullet is why California, I think California is probably the Smart Grid state. But actually what is missing is the theme park to demonstrate it.

And it's half a joke, you see, because there are a lot of people have been able to make hype with not much, actually, a hundred million dollars, you see.

So I think it's urgent to build up the nice story that actually assembled already what is in the ground.

Thank you for your attention.

COMMISSIONER CHONG: Mike, I just have to jump in and say I think the all-or-none gives us the opportunity to build the Smart Grid Disneyland of California, which you're -- you guys, I'm looking at you three. Oh, four of you, four of you.

MR. GRAVELY: Thank you. Our final panel member today will be Fred Fletcher, from the Southern California Public Power Authority.

MR. FLETCHER: Thank you, Mike. Coming from Southern California, I come from a place where there's a lot of utilities. We are clearly e pluribus unim, one of many. We've got Southern California Edison, Los Angeles Water and Power, and many municipals.

But if you're outside, on the national level, we're basically Los Angeles, and that's kind of what they tend to think of us when we go out there.

And Los Angeles area, we've done a lot of research, we've done a lot of development over the life of Southern California, and it really comes down to developing products, developing things and getting them done with people, and that's a whole chain.

We're all working stronger with our universities. As Paul mentioned, work is going on with the major, pinnacle schools, but we're also taking a look at some of the fine arts schools.

I'm talking over with the Art Steinhold from Pasadena. And there's an important element here to not just include the technical stuff, but take a look at the whole experience that people are going to have with this and start looking beyond electric utilities.

That kind of reminds me about the commercial they did with orange juice, that it's not just for breakfast anymore. Well, you know, Smart Grid isn't just for electric utilities. When you look around, there's a lot of other things that need the same thing, right in our backyards.

For example, we found water meters need to be read. If we can give people in Southern California an idea of how much water they use today, we can help them conserve water at a time when water is going to be a crisis, perhaps for a generation.

We know the facility's other applications for Smart Grid is important. Another thing is when we look at how we're going to deploy this, what we're trying for an experiment is we're deploying using Wi-Fi for our medium that goes out.

We've covered 30 percent of the city, and this last week we've been doing the initial testing, and with that kind of technology we can reinforce the Zigbee mesh associated with a Wi-Fi mesh. When you put the two together you get a very robust network because you've got two different modulating coding methods, talking like an engineer. But the thing is it does increase reliability and it gives you a platform that you now can use to springboard other technologies,

other methods.

The water meter, they use a different technology than the electric and we can pull that in faster.

The police and fire, you can do things with the police and fire now. At a time when the cities need to find ways to save money, we can find ways to help the city save money.

Fit in with the county, it can help put sensors out there so we can watch what the traffic's doing; we can watch where fire might be starting.

But there's things the Smart Grid can do that's on the development side and we need to get outside and find some of those new developments.

The Emergency Operations Center, there's needs there for how we can best handle and use the information of Smart Grid. The Smart Grid is fundamentally going to be built, solid, secure; it's going to be a network that's got to survive an earthquake. It's going to be a perfect thing to help work with EOCs better. So it's a valuable thing that we see across the entire city.

So on the research and development, I see development's the key thing, and that means you've got to work with the businesses, companies that are actually going to build stuff. I spend a lot of my

time talking with new companies, how they're going to start off.

Well, that moves to the national level. How we're going to do it in the national level, it depends how effective we're able to produce products that other people can use, that other people can replicate in their applications, whatever they may be, because we can't necessarily guess what's going to be important someplace else.

But I think the national level is going to be the key in how well we do things that can adopt the standards and can be practical products.

On the business of being out there, too aggressive, perhaps we've been too aggressive in emphasizing that we have to put the meters to everybody and everything right away. And maybe there's been too much emphasis on the meters. Smart Grid really was bigger than that, but we focused so much on the meters, I talk about Smart Grid and everybody things, oh, the first thing you do is put meters on everybody's house. And, you know, when I first started looking at this thing, I put 200 meters in Burbank, and I got 55 percent of my energy sales covered. And that's not a big risk. And I can sit there and start playing with this and seeing how this is going to work.

But this is a big risk if you got to do the whole, all the meters at once. But maybe that one's too big, too far down the road, but it is an aggressive step because you're making a big, huge commitment on something you could be wrong on. But a lot of times you've got to find a way to ensure that risk can be contained, because you can never be sure you're right.

Unfortunately, technology has risks, and there's the risk of the unintended consequence. When you go out and do something, I can have it all figured out, but it might be a completed different type of thing than you think.

That's one of the nice things about having a lot of municipals working on this stuff and a lot of different utilities, kind of going a little bit different directions, because you reduce the risk, you find out what's going to happen.

I know, we've gotten our utilities together recently, and we're talking more, and we're seeing each of us are doing things a little differently. And we know we're learning from one another because they argue it a little bit differently, and we're seeing some things that might work better over here, and maybe some things that maybe we shouldn't be doing here, so it kind of helps us. Because it is a complicated thing,

no one has all the answers.

Let's see, I look at the Smart Grid thing and say we've got the -- working together with the plug-in hybrids. Plug-in hybrids are probably the biggest change agent to come off here, and they're not going to be a regional thing, they're going to be a national thing. And plug-in hybrids will go in as fast as the price of gas goes up. And they're probably not going to behave quite as well.

I was talking this last week with some people, on the plug-in hybrids, and there are people saying, well, we'll just put that into a parking structure and we'll just charge an extra $5, $7 to the current bill and tap off the battery when people come in.

Well, if they're willing to pay 5 to 7 dollars just to add 5 to 10 kilowatt hours to their stuff, that's going to be really hard to send a price signal to. You know, it's -- it can be really difficult if we're just going to rely on that, when you've got people who are willing to pay $3 to valet park their car, but paying $3 to dry their clothes is a crazy thought. Most people don't spend $20 a day for electricity.

And so putting the whole thing in perspective with the whole experience, because once it hits that car it changes the whole thing of how we -- how people relate

to money and how they spend money. Maybe that's just a Southern California thing, but I do know that cars are a different type of expenditure than washing your clothes.

I think the key thing here is that we have to work together, respect our differences, and try to think through on the business models how we can control our risks, improve value, and hit the synergy.

Because as we've seen with Silicon Valley, as we've seen with Hollywood, putting a lot of talent together in one place does help to create new ideas and develop new products and services.

MR. GRAVELY: Okay, thank you very much.

Now that we've heard from the panel, Commissioner Byron or Commissioner Chong, do you have any comments or questions before I ask any other questions?

COMMISSIONER BYRON: Thank you, Mr. Gravely, thank you very much. I'd like to defer to Commissioner Chong, we may lose her shortly, she needs to hit the road. And I was just checking, Commissioner, if you had any questions or comments you wanted to make or if you're going to be staying with us a little longer?

COMMISSIONER CHONG: I'm staying longer because it's so interesting. But at some point I do have to get on the road, I have to get up north to Redding by a

decent hour.

I did have a few questions; I'm just fumbling around for my notes. I think it was this gentleman. Yes, it was Mr. Mohn.

COMMISSIONER BYRON: Uh-hum, San Diego.

COMMISSIONER CHONG: San Diego, here we go.

On your slide five you were talking about we have to have sound policy that can't be manipulated by third parties to their advantage, and I didn't really understand what you meant by that, so I was wondering if you could give me a little more detail on what situation you're talking about and which types of third parties you're talking about.

MR. MOHN: The question was pertaining to the period of deregulation where we had, after the fact, we found out through the press that some manipulation of the markets took place.

The point that I was making was complete transparency and the ability to allow the market to thrive, both in the retail and the wholesale markets, jointly.

I've heard remarks, even today, that if deregulation is considered that we need to protect the consumer, which goes back to the same conundrum we had, if you protect the retail market then the whole sale

market really can't work properly.

So it had to do with information that was found after deregulation, through the news.

COMMISSIONER BYRON: Well, can you – I didn't understand that. What information are you talking about?

MR. MOHN: Oh, my understanding is that there were contracts that were made in the whole sale market –

COMMISSIONER BYRON: No, no, I didn't mean to go back to deregulation, I'm talking about today, we're talking about the Smart Grid and the information –

MR. MOHN: Yeah, the concept was if we look at lessons learned from deregulation how do we ensure that we don't repeat the failures of the past. How do we remain transparent in our means in which we transact the relationship between wholesale and retail markets?

COMMISSIONER BYRON: Okay.

COMMISSIONER CHONG: Okay, so to fast forward ahead to a Smart Grid, how does that relate specifically to issues relating to the Smart Grid?

MR. MOHN: Right now we have jurisdictional issues. We know that, as I stated and a number of other speakers stated, that Smart Grid transcends everything from generation to the consumer, and those

jurisdictional boundaries are still a little bit cloudy. It would be great to have clear distinction on how that we can recapture the costs that we incur when they transcend those boundaries.

Those are still unclear and we'd like to find out how do we get them clarified.

COMMISSIONER CHONG: You talked a little bit, on the prior slide 4, I think it is, about how transmission is a big issue. I got a kick out of you describing San Diego as the cul-de-sac of the electric grid that was awfully cute.

But back to transmission, I was just at a House Subcommittee hearing in Palm Desert; where it was 102, let me add –

COMMISSIONER BYRON: Was that inside or outside the building?

COMMISSIONER CHONG: Luckily, we were inside, in lovely air conditioning at UC Riverside. But when you went outside you could distinctly understand that it was 102.

And one of the things that was being discussed there was this jurisdictional issue and one of the things that was asked was whether a Federal backstop authority relating to transmission would be helpful to keep the states or local jurisdictions "on track"

towards achieving transmission, particularly for renewable sources. I was wondering if anyone here had views on that?

MR. DASSO: Well, this is Kevin Dasso, I can take a shot. That's a risky place to go. I think I'll just offer that we haven't, you know, completely formed our opinion. This is an issue that's obviously playing out at the Federal level right now, there's what, four bills, all of which have some aspect as it relates to Federal backstop, whether it's for planning or whether it's for siting, and so on.

Our view is that it's not as simple as just saying the Federal -- the Federal government needs to step in and take that on and address that. I think there are local issues that have to be addressed and so whatever process that exists needs to factor in the local perspective, the local issues.

But I think there ought to be accountability in terms of timing, you know, that we can't wait forever for decisions. But that's just, you know, having, designating the Federal government as the lead there doesn't necessarily solve those issues. I think there are probably -- it's more complicated than simply stepping in and designating the Federal agency. That's probably what I'll be able to offer at this time, we're

looking at that very issue right now to decide.

COMMISSIONER CHONG: Very brave, but wishy-washy answer, Paul, appreciate that.

MR. DASSO: That's all I have, I'm afraid.

COMMISSIONER CHONG: Mr. De Martini?

MR. DE MARTINI: Yes.

COMMISSIONER CHONG: You had a statement that you thought the current funding of R&D – the current level of R&D funding was too low for Smart Grid.

MR. DE MARTINI: Right.

COMMISSIONER CHONG: That's an interesting statement. So do you have a general sense of how much R&D funding would be better in terms of not just a dollar figure, but is it 2X the current amount, is it 3X? Should we focus primarily on near-term solutions, but also some on long-term solutions, what would your mix be?

MR. DE MARTINI: Well, it's a good question and the way that you phrased it, I think, is the way that we look at it.

So first of all, I think you'd have to look at each of the three investor-owned utilities, from the Public Utilities Commission, and each of us have a different level of R&D funding, your know, or not in some cases, and so I think that, you know, the starting

point for each needs to be considered.

But with respect to Southern California Edison, our current level allows us to do many things that, as I've alluded to, that we've done over the last decade and it's a good base level.

However, the challenge is, is that many of the technologies we want to start looking at, that are promising over the decade, like storage, we do not have sufficient funding to be able to support demonstrations of that technology. It starts to get into, you know, tens and 20 million dollar sort of projects.

The compressed air energy storage project that we're talking with as a demonstration for the above-ground with EPRI, is a $26 million project.

So even if we're able to get, you know, a 50 percent match from the Federal, we need to come up with another 11 or 12 million dollars, or 13 million dollars, in that case, to match that.

And that's just one technology, then you have battery storage, and some floor battery technology we're looking at.

So if we're able to take on some of these and, obviously, we're working with our colleagues, actually, through an initiative that Kevin and I are part of, to coordinate research and development for the Western

Region through the Western Electric Industry Leaders Organization. So we're trying to optimize how we do this across the west but, nonetheless, we still need to do some of these. And the dollar, the price tags start to get bigger as we start to move into demonstrations.

When we're in the lab, when we're doing applied analysis, the funding levels that we've had are pretty good. There's more research that needs to be done in the intermediate term to address what several of the panelists had addressed, and I think Mike referred to it as well this morning, in terms of understanding this dynamic on the grid.

So as we're looking at renewable integration and I know we've gotten some work out of the PIER program, through Mike, and working with some others on wind studies, but as we start to look at more of this distributed issue, as we look at the plug-in electric vehicle, the distribution system that, in itself, is probably the single biggest area that hasn't really been looked at as much as it's going to need to be in terms of if we're really thinking about aggressively looking at distributed resources as a solution. The amount of work that's needed there in terms of looking at system impact, looking at some of the technology evaluation, both in the lab and then in demonstrations

in the field start to get very expensive.

Hopefully, the Stimulus money will help, but that's only going to carry us a little bit and we need to look over the next ten years or more. And so I would sort of break it down in five-year chunks, perhaps.

So what's the next five years that we need to do, which will be the technology that we implement in the second five years to get us to 2020, what are the technologies that we're looking at that come right after that, looking at about a five- to ten-year horizon.

So some of the work that we're doing in talking with the venture capital firms, where they have these ten-year horizons on investments, or what is the technology that's coming in 2021, what's the next set? So that's an early stage, but still needs starting to look at in helping to work, shape the products so that they're effective when they come to market.

And then what do we need to be thinking about farther out, which is where we're really looking with some of the university that, you know, touching on what Richard talked about is looking at some of these really complex systems where, if you're having all of this intelligence and you're having all of this information,

literally millions and millions of pieces of information, how do you take action on it? How much of that is distributed versus centralized? How do you interact with all of these independent actors out on the system and understand that you can, in a phenomenon world, so that you know that you can maintain a stable grid.

So a lot of work to be done and, again, different time horizons didn't you see, the big ones are really the demonstration projects, the dollars there are so much bigger than what we've been able to do in the past.

COMMISSIONER CHONG: Well, thank you. It seems to me that because of the big price tag of some of these longer-term projects that there should be active collaboration between the larger utilities or the public utilities, it doesn't matter to me, to partner, and so that one group of ratepayers doesn't bear the burden of particularly the longer and middle term research.

MR. DE MARTINI: Right.

COMMISSIONER CHONG: That seems sensible to me and also to use some of the national resources towards that and some of the research money, such as the EPRI money.

But can I just -- can I just say something because it strikes me that you keep telling me that this is, you know, so hard to integrate and everything is so new, yet I understand there are countries where there is a lot of wind and there's a lot of solar being used right now in that country, yet their operating system of their electric utilities are able to integrate it.

There are places where there's a lot of electric cars that are being used and they seemed to have solved how to plug it in, and when to plug it in, and what rate to plug it in at.

And so I guess have to say in some areas, not all of them, it seems like there are some things that are going on in the world that we could advance our knowledge or, of course, everybody's system is a little bit different, I understand this, but I don't feel like this is something we can't solve with a bunch of the smartest people in the world right here in the United States, particularly our entrepreneurs.

MR. DE MARTINI: I totally agree. We do think it is something that can be solved, it's just it is going to take, you know, it's going to take some effort to do it. That's why we are working very closely with the universities, that's why we formed the consortium that

we did, that's why we held the symposium that Richard talked about, that Commissioner Byron spoke at, to get those folks engaged and looking at stimulus opportunities for research. We are looking to work with our colleagues and we are. We're trying not to duplicate projects.

And by the way, this effort west-wide includes, you know, the public power folks --

COMMISSIONER CHONG: Great.

MR. DE MARTINI: -- you know, including SMUD, and so we are trying to share the wealth in terms of what we do. There are some nuances to each system that we have to understand, that's true, but we are trying to leverage everybody that we can in this effort.

COMMISSIONER BYRON: You know, Commissioner, it is kind of interesting, this industry does spend a pittance on research. I don't know if it's true or not, but it's a great sound bite, I heard once that we're right behind the pet food industry in terms of what we're spending on research.

But it is ironic, as well, that an economic crisis that we're in right now has opened up the Federal coffers for this Stimulus funding that increases, really, on the order of a couple of magnitudes the kind of spending that we've been talking

about, certainly through PIER and other research programs that exist in this State.

MR. DE MARTINI: Uh-hum.

COMMISSIONER BYRON: So it is ironic, but fortunate, that that's the case.

MR. DE MARTINI: Yeah, I might add, Commissioner, that it's not slowing us down, so we're moving forward. What we're looking at is to say, okay, if we get through the next five years what do we need to be doing the six through ten? The next five, they're in the pipe and moving. We've got one and a half billion dollars in capital for now.

COMMISSIONER CHONG: That's right. But isn't the challenge, Paul, when you bring those types of things before the PUC, our consumer groups say, hey, you know, we don't want to fund this.

MR. DE MARTINI: Right.

COMMISSIONER CHONG: Is it cost effective? It's too far out, it's too innovative, it's too risky.

MR. DE MARTINI: Right.

COMMISSIONER CHONG: That is the type of thing that we shouldn't have ratepayers paying for. So how do we marry that up? And that's why I think these collaborative efforts, particularly on the larger scale, are the way to do it, and that we need to have a

new paradigm to understand that in the Smart Grid area technology is going to be moving a lot faster than traditionally it has. So accelerated depreciation, all those issues, I get that.

Because in Telecom, for example, everything goes along about every two months.

MR. DE MARTINI: That's right.

COMMISSIONER CHONG: And so depreciation's at about three years and that's a heck of a lot better than whatever you guys have, which I think is like 15 or something, really high.

MR. DE MARTINI: Seventeen.

COMMISSIONER CHONG: Okay, I have one last question, and I do beg Commissioner Byron's indulgence, I know I'm asking a lot of questions, but I do have to go.

Mr. Schomberg, you talked about working on the intelligence, itself, for the system, and I was wondering if you meant things like artificial intelligence, that type of intelligence, or in what way did you mean that?

MR. SCHOMBERG: Well, it could be very basic intelligence. Actually, I believe in layers of intelligence which, of course, we are just at the stage of having, well, sensors, actuators, and you add ears

and eyes everywhere, and yet it could be the ability to react. That's maybe what the dinosaurs were able to do, right.

Now, if you add one layer, it could target a specific value. It might involve maybe not in an artificial intelligence, it can just involve working involving different databases that are nontraditionally associated to some type of operations.

Now, this is where the use case approach of the AMI projects, see the AMI projects, that's a very interesting example, where the meters are just the tip of the iceberg. An incredible effort has been done in California that actually, I would say, is driving the world on this. And actually, I have to confess, I took this methodology and I had it rated as an international standard, so it exists and a lot of people in the world are following this.

So the use cases, you go through the analysis of the business processes cross-cutting the entire company and this is where you can identify real value streams, okay. Then you work on the technology, you put in place infrastructure, but that means that this analysis has been done. And assume this infrastructure is in place and worked, then you can just have to add layers of intelligence. And, of course, if there is any

artificial intelligence that is available, that's for sure we'll be even more excited.

MR. GRAVELY: Thank you.

COMMISSIONER BYRON: I don't think we're done with the panel yet, but I have a feeling that we're losing Commissioner Chong, at least from today. Commissioner, we're fortunate to have you on the PUC, but we're also fortunate to have you here today. Drive safely.

COMMISSIONER CHONG: Well, I would like to thank everybody who came today, it's a great audience, and also those out on the Webinar. I'm sorry to miss the last panel, so I hope you take good notes, Commissioner.

COMMISSIONER BYRON: I don't think we're done with this panel, yet, are we? How much more time do we have.

MR. GRAVELY: We have a few questions from the audience and from WebEx that I'll handle, and then so I'll give them a chance to do that and then there may be other questions.

COMMISSIONER BYRON: How much more time do you think, Mike?

MR. GRAVELY: About ten minutes, and then we're going to have a short presentation by DOE.

COMMISSIONER BYRON: All right, good.

MR. GRAVELY: So do you have any questions?

COMMISSIONER BYRON: A couple quick questions, if I may?

MR. GRAVELY: Sure.

COMMISSIONER BYRON: Mr. Dasso, I should say that this gentleman and some of you in the audience serve on a Research Advisory Committee that we have at the Public Interest Energy Research here, at the Energy Commission, and I actually have the privilege of chairing that group. So we deal a lot with these kinds of issues about three or four times a year.

And so the synchrophasers, and the kinds of control, and information technology that exists at the higher transmission we deal with on a regular basis. And I think we'll be getting into that some more probably tomorrow.

But I can't help but ask, Mr. Dasso, you put up a picture of a Smart Meter. Where was the customer connection with that Smart Meter? Was it behind the meter? I mean, it's not just the energy, clearly there's information that that's gathering, how does the customer get that information?

MR. DASSO: Well, I think that's the -- the microphone's on, okay. That is really one of the

benefits of the Smart Meter that we're deploying today is that it has the capability, it has the capability to do or support communication with the customer through a home area network kind of an arrangement.

So it is really the portal, it's kind of the way in which we can -- it's kind of the entrance into the customer's panel, the new -- into the customer's home. The new meters have that capability, whereas before it was just reading a meter remotely. We now have the capability to do that.

COMMISSIONER BYRON: So the meter has an innate protocol?

MR. DASSO: Yes.

COMMISSIONER BYRON: Very good, thank you. You know what, I'll skip the rest of my questions because I want to make sure we get the – I see you have a stack of them there. Go right ahead, Mr. Gravely.

MR. GRAVELY: Okay, so I'm going to take a few questions. Many of these are from the WebEx today. So this is from a David Erickson and this is for the panel in general here, and it says, "given the vested interest by the utilities in preserving revenues from transmission how can the Smart Grid development be incentivized to reduce dependence on transmission and

focused on more distributed renewable resources?"

So anybody who chooses to answer that?

MR. MOHN: I can offer one that actually, probably, echoes quite a bit of what Paul and Richard were saying. We really want to introduce distributed resources into the edge of the grid, but it's a real challenge in that most people who know how electric distribution is designed, it's radial in nature, and because of that the ability to create a self-healing grid, which is a reroute of power flow at the edge, and using those resources requires not only intelligence to switch the power, but the control systems and the power lines to allow that power to flow. A lot of that doesn't exist.

So, certainly, it's one of the areas that we want to explore, SDG&E, as to pretty large projects right now, designing micro-grids, where we bring a community who has, a customer who actually owns the assets, another program where the utility owns the distributed assets, trying to understand how does that mix of technologies, plus redesigning the grid actually work, and what are the important things that we need to introduce.

But those are, you know, you can imagine where you have hundreds or possibly even thousands of radio

lines where the investment is going to be quite large, even in comparison to central generation.

MR. DE MARTINI: Yeah, I think from Edison's perspective, it's not a question of either/or, this is not mutually exclusive and we anticipate that there will be as much centralized large renewable development and, likewise, there will be quite a bit of decentralized distributed renewable development, as well as absolutely ongoing work that we do in support of the State goals for energy efficiency and demand response at the customer side.

So we actually see both developing. The question is, you know, to what level of distribution or, you know, distributed resource are we talking about. At some level, as Terry said and I said in my remarks, it becomes increasingly more complex. But that's not to say that you couldn't have distributed resources at the substation level or at a larger level on the distribution.

And in point in fact Southern California Edison, and I believe my colleagues in the State have also pursued similar large solar, rooftop programs, for example, that are basically distributed resources on the distribution system in fairly sizeable amounts.

And so we are anticipating that those

developments will occur, we're expecting the same with energy storage as that develops, and so that's part of some of the demonstration projects we're looking to support.

MR. GRAVELY: Okay.

MR. DASSO: If I can just add, this is Kevin Dasso, with PG&E; there are things we can do in the short term as it relates to a Smart Grid. We, in our service area, have something on the order of 30,000 PV generation devices in our system; we think the largest in the U.S., certainly. Unfortunately, we have no idea what they're doing. We know how they have affected the customer's meters once a month. We think it would be a lot more helpful to understand what are they actually doing today that could be informative to our operators and to our purchasers today.

So I think getting information about those existing devices, getting information about those devices as they are deployed is something that the Smart Grid, even as we see it today, could support.

MR. GRAVELY: Okay, thank you very much.

The next two questions are fairly simply and I think they're very quick, but I want to ask them. One question is in my presentation I showed how GPS and the timing was used for synchrophasers, so the question is

"does the Smart Grid use GPS within the system or are there other applications within the Smart Grid that you envision GPS being part of the system?"

MR. DE MARTINI: GPS and, you know, just in general, geo-spatial information is going to be an important element. It already is, I think increasingly so, in the utility operations. But as we start to have a better idea of where all the assets are and being able to track the location of assets with, for example, just being able to map, you know, very accurately, which customers are off of what transformer, off of which circuit, as circuits switch around, as Terry mentioned, which happens frequently on distribution, being able to know where that might be and where they're being fed helps us to be able to triangulate things like outages and other events.

Certainly, linking this dynamically with in the case of potentially wildfires and how those assets, you know, tie into understanding where the path of the fire is so that we can be more responsive.

Another thing we're looking at right now is just, you know, how you look at this in terms of analysis, with things like adoption of plug-in electric vehicles and the like, and being able to understand how those penetration rates may map to the assets that you have

out in the field, being able to understand what that dynamic looks like.

So is it the end-all/be-all? No. But there's certainly elements, like it does in the phaser, provides a key piece of information that helps us really make a lot of the rest of it work very effectively.

MR. MOHN: I'd like to add that –

MR. FLETCHER: Okay, it's –

MR. GRAVELY: Speak into the mike.

MR. FLETCHER: We're using GPS to coordinate time on all of our stuff and incorporating propagation delays through the network, so that when the stuff gets to the meters and to the other end it is all time coordinated.

And like Edison, we run everything on – we have a GPS for every – we have a location, XY&Z, on our GIS system for all of our meters, as well as building onlines, and location of all of our assets are in XYZ.

MR. GRAVELY: Okay.

MR. MOHN: The remark that I was going to make was the same one that Fred made. Every one of our new electric digital meters that are being installed are geocoded using GPS.

MR. GRAVELY: Okay, thank you very much.

One final question for this panel right now is, and it's actually specific for you, Richard, "a question for EDF, could you please repeat your statistics on the degree of which AMI and PCTs are already deployed?"

MR. SCHOMBERG: Well, we have – so Richard Schomberg from EDF. So I guess the question's specific to EDF?

MR. GRAVELY: Yes.

MR. SCHOMBERG: Right, and so I will make an answer for EDF in France, which is that we do have 35 million meters under deployment, that's mostly is – but we already have 10 million meters that are solid state, that we have had this for many years now, actually 10 years, because we started to replace one million a year in electronic meters.

And there is a direct load control system, actually, very, very simple, that allows to trigger the electric regulator at night, every night at 10:00 p.m., which allows actually to store energy in the electric regulator of 10 million homes, which is the equivalent of 20 nuclear power plants. And then we have 60 nuclear power plants. And so actually every night, at 10:00 p.m. through those meters, and just at the deployment level of I would say 10 million of solid

state meters, we store one-third of our nuclear power.

MR. GRAVELY: Okay, thank you very much.

For the panel, just for logistics, if you would stay here for a few more minutes, DOE has offered to give us a few comments from the policy side and from their perspectives on Smart Grid.

So Dr. Peter Karpoff, who was coming and he pleasantly agreed to give us some comments and maybe answers some questions, we'll see.

COMMISSIONER BYRON: Great.

MR. GRAVELY: He's going to talk to us a little bit from the DOE perspective.

COMMISSIONER BYRON: Welcome, Dr. Karpoff. And if I may say, you've heard a lot of presentations about how California's a leader and how we're really pushing the envelope on Smart Grid technology, and we are spending money on research and development, but I hope that in no way lessens the amount of Stimulus funding that the Department of Energy invests in this State. In fact, quite the opposite, we hope that we can provide the kind of leadership that you're looking for throughout the country.

DR. KARPOFF: That adjustment will depend entirely on the questions that may be raised after.

COMMISSIONER BYRON: They will be very nice questions, I assure you.

DR. KARPOFF: No, let me say at the beginning, I have no personal role in the distribution of those funds.

But I heard Mike say this morning that the DOE participant was a no-show or regrets, or something, and I'm thinking, well, I'm from DOE, I'm sitting here in the audience, do I raise my hand or not? And I thought, well, I ought to at least wave the flag a little bit for the Department and contribute just a bit about what's going on with regard to these important topics that have been discussed here today.

DOE is certainly vitally interested in Smart Grid development. And in the person of our new Secretary, Steven Chu, a Californian, no less, and with great links into the laboratory system, he's a hands-on, pretty smart guy, and he's given us some marching orders. He's interpreted the President's positions to put a priority on recession recovery, on reducing oil imports, and on climate priorities.

So you bring those things together and look at them from an energy perspective and it's not too hard to think what that tells you. I mean, what it really means is we're interested in Smart Grid and efficiency

for all the reasons Commissioner Chong stated this morning, but particularly efficiency in all its various forms, through the grid where possible and through other means where the grid isn't really the answer.

Carbon reductions, which means bringing in renewables to the maximum extent possible, connecting them through the grid, all set in the intermittent aspect of many of these renewables, either through aggregation of many types of renewables or through storage, as many of the people here on both panels, actually, today have described.

Certainly, there is an issue of electricity reliability that comes in through the grid and the Department's budget for the year 2010 makes a tremendous increase in the amount of resources devoted to grid activities.

And let me just read some of the dollars that are involved here. Specifically, for grid modernization, as part of revitalization of the Nation's energy infrastructure, the DOE fiscal 2010 budget requests $174 million, which is a doubling of resources from 2009.

However, this money is directed towards research and development that improves the reliability, efficiency, flexibility, and security of the Nation's

electricity transmission and distribution systems.

Now, to me that sounds very much like a beefing up and hardening of the existing grid, and it's not really directed specifically, by that language, towards the Smart Grid aspects that we've talked about here. That is the two-way communication, the opportunity to really optimize so many things that are not yet optimized on our grid.

Then it goes on and it says building a Smart Grid that integrates state-of-the-art technology is critical to effectively using renewable energy sources and creating new jobs. Now, there's no money attached to that statement.

Then there's a third statement that says these investments build on the Recovery Act investments to modernize and secure the grid, which is again back to this heavying and hardening of the grid, and the Recovery Act provides $4.5 billion and these are, I believe, for conductors, and towers, and all sorts of hard stuff that goes into our existing type grid.

So I think it's incumbent on the industry and people here on this panel, to my left, to really make the case that there's an important area of expenditure for Smart Grid that's really distinct from conventional expansion of the existing grid. And certainly, the

door is still open for those sorts of adjustments and this is only a proposed budget from DOE that I'm talking about and reading about here. So that the opportunity still exists, I think, to make the pitch that there's much more to Smart Grid than just doubling up the conductors, or building parallel sets of towers, or creating links where they're not effective links at present. There's much more to be done and a voice needs to be raised in favor of all that.

On the question of technology, Secretary Chu has established a goal of establishing eight energy research hubs. He's spoken of these things as lablets, essentially small labs. They'd be far less comprehensive than the existing national lab system. Each would have a specific mission and they would have -- they've identified eight areas in which these lablets would operate and one of them is --let's see, I really should have brought my reading glasses -- the initial set of research hubs will explore the following topics, solar energy, fuels from sunlight, batteries and energy storage, carbon capturing storage, grid materials, grid materials, devices and systems, energy-efficient building system design, extreme materials, and modeling and simulation.

Now, these lablets are not necessarily a new and

novel idea. Yesterday, I made a visit to the California Lighting Technology Center, at UC Davis, and my thought after a 30-minute presentation there was that these guys are the poster child for these lablets, it's going on already. That place was started with some seed money from Department of Energy, but Department of Energy has basically ignored them since the initial planting of that seed, and these guys have done some fantastic things with some very limited resources.

They have some partners, affiliates, including SMUD, I might add, whose logo was prominently displayed on their paperwork. But with a few students, I think not more than two dozen students; they have come up with some terrific ideas. They give examples of a produce warehouse where they had lighting inside this place, they open the door, no one's inside, and nothing but strawberries in there on pallets, and the lights were on. And they said, well, why do you need lights in here? And they said, well, nothing goes on in here much except every once in a while a forklift operator comes in and he moves around some pallets, puts in new stuff and takes out the old.

And so they came up with the idea of dimming the lights to 20 percent of their intensity and mounting a

whole bunch of light bars on the forklift. So now, when the forklift comes in the guy can see whatever it is he wants to work on and they're saving, I don't know, hundreds of dollars a month on the illumination.

They had another example where they're working with the National Park Service, and there they suggested dimming the illumination at night, security illumination primarily, dimming it at night and having motion sensors that would increase the illumination when somebody was detected around the place.

And at first the police who were in charge said, oh, no, it's not going to be very good, too dark to see when there's nobody around. And they used it, they tried it for a month or two and they said, you know, actually it's better. When the lights are dim we figure there's nothing going on, we don't have to worry about it. When the illumination comes up, that means something's going on and we should take a closer look.

So here they're saving electricity on the overall lighting of this situation and, at the same time, they're really getting an improved level of service.

Well, that's an illustration of what a little brainwork directed towards these problems can really do.

Then today I had a meeting with the Renewable

Energy Institute, over here at the old McClellan site and these guys over here, on a shoestring, are developing some very interesting technologies for renewables to produce, actually, liquid fuels from kind of waste streams, basically, construction junk that has a lot of wood in it. They can use municipal waste streams, but for some reason they don't like that quite so much. They have a project to use agricultural waste and they're producing liquid fuels and generating some electricity from that.

So there are all kinds of ideas out there and I know that the Department of Energy is interested in promoting these things. And I'm going to back home to Washington and suggest that some people from there come out and see some of this stuff, firsthand, to see what's going on.

But I would also encourage the Commission, both Commissions here, and the utility reps to really try and be open-minded about some of these things. And we recognize that the utilities have tremendous invested capital here, and it's a delicate system and needs to be carefully managed, and even conservatively managed, and sometimes the Commissions have a tendency to go a little slow on important changes.

But I would just encourage that everyone here on

the scene be open-minded, where possible, and get out and see what some of these alternatives are and see if some of these things can be brought in, under controlled circumstances, to contribute to the renewable energy targets that everyone's working under to help reduce oil imports, to help boost efficiency.

And we think, importantly, as a national priority, some of these things will create some jobs, both in installations and development of these things.

So without wanting to intercede in what's a great program here, that the Commission has planned, I just wanted to add these things and not have DOE show up as missing in action, or missing in inaction, as the case may be, and wanted to contribute those thoughts.

Now, I'd be happy to respond to a couple of questions, if that meets with the Commission's time schedule, but I don't want to delay things that you may have planned.

COMMISSIONER BYRON: I would defer to my panel. Do you have any questions for the gentleman from DOE?

You know, I think we're probably about the end of this panel. I thank you very much for joining us and for carrying the flag. We do not think DOE is missing in action. We know they're very busy.

I caught an article this morning, I would just

like to share a brief excerpt, it's from Energy Washington Week, the title is major grid -- excuse me, "Major Groups Assert DOE Smart Grid Grant Program Too Restrictive," identified a number of letters that have been written in response to the NOI. It cited one in particular from the Department of Energy Secretary, Dr. Steven Chu, and the Office of Management and, I think it was – yes, it was to both Dr. Chu and the Office of Management and Budget, Peter Rosen.

And everybody is going after all kinds of corrections that they're looking for, and I was quite encouraged the $20 million cap is one that everybody's identified. We want to make sure that the NOI is correct in allowing Department of Energy to select the best and the brightest of these opportunities.

I think I'll stop there. I want to thank our panel very much. Thank you, gentlemen, for coming up, particularly from Southern California, appreciate very much your comments.

And I'll turn it back to Mr. Gravely. I think we're going to take a break, is that right?

MR. GRAVELY: Yeah, we're going to take a ten-minute break here, if we would, and then come back and we'll put the other panel up, and we will hear from the industrial manufacturing view of the world. Thank you.

About ten minutes, make the break about ten minutes.

(Off the record for a ten-minute break.)

MR. GRAVELY: So we're now going to go into the industrial manufacturing panel, and understand from an industry perspective the challenges of a Smart Grid, the opportunity of a Smart Grid. For this particular panel one of my individuals, who works in our office as a consultant, Ron Hoffman, who's very actively involved with industry, and he arranged this panel, and so I'm going to ask him to moderate this panel because he knows the topic much better than I and he knows the players much better. So Ron, I'm going to turn it over to you.

MR. HOFFMAN: Thank you. Good afternoon. I think from seeing the last panel, you sort of understand how we're going to run this panel. It's going to be almost identical, different group of people, the same questions that you saw before but from a different perspective.

In the previous panel you heard a very specific utility-centric point of view, a very necessary point of view because they run the grid. And in this panel we're trying to get sort of a consumer-centric point of view as described by the vendors that provide technology and equipment for consumers and for the

utilities.

So we have a great group of panelists and I've asked them each to spend something like five to seven minutes with opening remarks, addressing some of the questions that the utility panelists addressed. And then we will open it up to questions after that.

So and our first speaker will be Mike Brown from GE Communications.

MR. BROWN: Good afternoon, everyone, it's my pleasure to be here this afternoon visiting with everyone regarding such a dynamic and exciting topic as our industry continues to progress towards what we're all looking at, is a Smart Grid.

And I think what's interesting out of this is that with all the technologies that are available and the solid sound network that we have throughout our electric delivery system, I'm very fortunate to have the opportunity to work with utilities around the globe. And the ball's and the implementation of what we're doing with Smart Grid here in the States and again, specifically relating to California, has got a great deal of interest to utilities from the Asian continent, to Europe, to Africa, to Australia. There's many utilities looking at what's being done here in California, alone.

You know, what's important with understanding the Smart Grid? A lot of discussion and what we see in the marketplace is a lot of buzz and a lot of interest specifically relating to what the consumer's seeing as far as the information available to them.

And not to downplay the important of that, but the electric -- the Smart Grid, and what it means to the consumer is electricity reliability, and making sure that we have electricity available at a cost-effective measure and one that is -- one that is consistently available to the consumers.

In looking at the Smart Grid one of the important factors is the communications back-home, back-home networks. As we're looking at the Smart Grid, we certainly need to understand how we're going to information-enable all these assets so that we can monitor and control each one of those assets out there to ensure reliability and ensuring cost-effective measures.

You know, in looking at the communications infrastructure for the Smart Grid, we look at self-healing aspects of the network infrastructure and what that means as far as the self-healing aspect of the electric delivery system.

Certainly, whenever we start looking at distribution automating ensuring that through rerouting mechanisms in the electric delivery system that the intelligence and the communications infrastructure is there for those automation devices to make those intelligent decisions.

Certainly one that is a communications infrastructure that is interactive, you know, enabling the two-way communications with the consumers, enabling communications to the utility to make real-time decisions in relationship to demand response concerns there.

Optimized and certainly a one that is very important is the security-sentrics around the Smart Grid communications network, one that is predictive. Distributed with the information enabling of these assets there are tens of thousands and, in many cases, millions of devices within a utility infrastructure network that need to be monitored or used as leverage for control assets and, importantly, one that is integrated.

With the infrastructure that we currently have within our utility system is one that we can leverage existing private infrastructure, whether it be from communications to network management tools, to

operation control centers as well.

In looking at the communications infrastructure for the utilities and one we find is of utmost importance here is understanding that this communications infrastructure starts at the generation, through transmission, through distribution, substations, all the way through distribution automation for pole-mounted assets, pad-mounted assets and, in many cases, vault locations.

We also have AMI infrastructure throughout the residential and the industrial facilities. And again one that is continuing to evolve is through distributed generations.

What's important with this is for our utilities to be able to monitor and control, having the additional capacity for future demands on this communication system that may consist of fiber infrastructure, as well as wireless infrastructure.

Certainly, to the gentleman's point earlier is reliability. And at the utmost part of that is the dependability of a network infrastructure, one that -- really, one of the things that we've seen through the infrastructure, communications infrastructure with our utilities throughout the Gulf area, whenever the hurricanes have hit over the last ten years, is the

availability of a private infrastructure. For most utilities it remained intact and on a large percentage.

The ease in manageability, being able to maintain, being able to diagnose causes and faults within a network are very important.

The encryption authentication, I can't stress enough the continued need for continued cyber security mechanisms and specifically related to our Federal NERC CIP requirements.

One of the things that I, you know, work with many utilities on is understanding what the network demands are for now and also for the future. One of the things that we see is the continuing evolution of new wireless communication networks and infrastructures, but we need to understand what the importance of those critical assets are. And one of the things that we do see is that not one technology or not one single network will handle every aspect of the electric utility on the grid.

And that's why open standards have to be, in some cases, mandated and reassure that vendors are working with our utilities to implement systems that are based upon open standards, ones that are future proof, ones that support our legacy systems, whether it be through telemetry protocols, such as DNP-3, or the IEC 61850

are all important factors, and ones that are not only just leveraged here, in the State of California, but nationally and around the globe.

One of the biggest things that we see as a need within the communications infrastructure is the ever-increasing need for frequency spectrum for our wireless networks. With the millions of devices through metering, the distribution automation devices with tens of thousands of devices, the ever-increasing demand that we're putting on our communications networks with the substations for protection and control telemetry, and very bandwidth-intensive applications around video security, where the private infrastructure networks are at capacity in some cases there. And they're limited by the frequency availability and the limitations that the SEC has put on the manufacturers.

One of the things that is very important with the communications build-out is the cost-effectiveness for wireless communications.

If you haven't had the opportunity, United Telecom Council had published a document back in January, earlier this year, that called for the critical need for spectrum for our utility space, and one that I would encourage each of you to read. There's spectrum availability but it's coming at a high

cost, and a cost that is only available to the commercial networks out there.

What we need from our policy makers and from D.C. is to recognize that this limited spectrum availability, ones that are protected, be recognized and support the efforts of members, like UTC, to find spectrum availability specific to our utilities.

One that we really ought to take note of and look at, and understand a wide success is moving forward is Industry Canada. Industry Canada is very close to finalizing plans for a 1.8 gigahertz dedicated spectrum for the utilities across Canada. And one that GE Communications, as well as UTC is a very big proponent of is trying to look at what the feasibility is for supporting that same bandwidth in the United States, supporting it across the entire organizations there.

So addressing additional communications needs is the cyber security. We can't stress enough the parameters set by the NERC-CIP requirements, understanding what those cyber assets are.

To reiterate, the need for frequency spectrum, supporting of the 1.8 band for example, and support of UTC and, again, the open standards. The importance of this is the legacy support for our systems that exist and for the future.

Thank you.

COMMISSIONER BYRON: Thank you. I note GE's well-represented on that panel. But, you know, I think we all owe a certain debt of gratitude to General Electric, and I'm sure you've all seen your Smart Grid ads, you know, "if I only had a brain." I think it's really raised public awareness around this issue and maybe expectations have been raised, too. So thank you. Go right ahead, Ron.

MR. HOFFMAN: So our next speaker is Eric Hsieh, from NEMA. And you don't have any slides?

MR. HSIEH: Do I speak from here?

MR. HOFFMAN: Yeah.

MR. HSIEH: So my name is Eric Hsieh, I'm the Energy Policy Infrastructure Manager for the National Electrical Manufacturers Association. We are a trade association that represents over 400 manufacturers and we are also an ANSI-accredited standards development organization. We have over – we have several dozen ANSI-approved power equipment standards, including the NCC 12.9 and 12.22 metering standards.

So I echo the sentiments that the earlier speakers have made on the need for a national approach and the need to follow up on standards. And so given that those points have been made for me, I'd like to

concentrate on one particular question, which is how do we avoid the problems of deregulation?

The policies and market rules need to reflect physical laws and financial innovations. I'm certain market failures in the late 1990s, in California, were facilitated by rules that prioritized societal goals above engineering and market realities. So, for example, rate caps for consumers co-existing with market-based wholesale prices, and the lack of pricing opening up arbitrage opportunities.

The regulators couldn't think to outlaw every questionable behavior in advance so you saw a lot of gaming that took place before those things were shut down.

So let's walk through a hypothetical example at the end-user level, and I would rephrase the question as what if end-users were as crafty as an Enron trader? All right, so let's say there's an opt-in mechanism, as discussed this morning, where individuals can choose to receive a rebate of, let's say, a dollar a kilowatt hour for reductions below a baseline during a critical peak period. I can play games with the baseline, but the much more basic arbitrage mechanism is an extension cord.

So let's walk through the payback. Okay, so

let's say I get a $1 per kilowatt hour rebate for turning off my AC unit when instructed. My neighbor chose to opt-out of the program and he pays a flat 20 cent per kilowatt hour rate. So when instructed to reduce, I simply switch over my AC's power to my neighbor's power supply during the peak time, so the utility will sell low to my neighbor, for 20 cents, and buys high for a dollar from me, for the same amount of energy. The neighbor and I now have 80 cents to share in profit, even though the total energy consumption remained the same.

Okay, does that make sense?

COMMISSIONER BYRON: I'm taking notes.

MR. HSIEH: Now, lest you think –

COMMISSIONER BYRON: Who said that? Who said that?

MR. HSIEH: In case you're wondering why our lab is coming up with these interesting scenarios, perhaps I'm doing this on behalf of my extension cord manufacturers. But actually, back in 2005, there was an instance of suspected market manipulation at the CAISO borders, where market rules provided big or better payments for energy.

So there was this very large market participant submitting massive amounts of offsetting increment and

decrement bids at the CAISO interfaces. They were both clear and the entity would essentially run a virtual extension cord around the interfaces around California, and be paid for not supplying much energy.

In case you want to read more about these strategies, the docket number at FERC is IN05-8. You're looking for the staff reports dated September 2005. While I'm the Government Relations Manager for NEMO, I used to be known as "staff familiar with the issue."

So how does California prevent such manipulations with a Smart Grid deployment? Oh, I would say ensure that rates reflect engineering reality and beware of any kind of artificial construct designed to protect certain classes of players. And now, I know there's an equity issue here and I'll address that.

So in this example, I was on the critical peak pricing program while the neighbor was on a fixed rate. So the opt-in and out policy in this case is assigning different values to electrons in very close electrical proximity. But physical congestion at the neighborhood level is unlikely so there's no real engineering or economic justification for pricing these electrons differently.

Now, if their policy goal is avoiding burdening

people with generating too many rates, that's fine. It's fine for a policy concern to override electrical realities and it's fine. But the policy makers need to decide this, conscious that there is a risk of arbitrage. So remove arbitrage, everyone needs to see the rate structure.

So how would you, moving onto one of the other questions, how would you make the Smart Grid a reality while keeping these principles in mind?

I would say push the technologies to accomplish the policy goals, which California has already done with the efficiency standard. So if your goal is peak load reduction, demand response rolled out, coupled with dynamic rates is warranted.

If you want to protect certain classes of ratepayers, don't artificially insulate them from prices. Instead, help them purchase new technologies, like thermo or electric storage that give them a physical hedge. This approach would accomplish three things at once. First, all ratepayers reduce peak load, even the ones with the storage devices. But the ones with the storage devices see what would essentially be the equivalent of an opt-out rate.

The approach also removes gaming opportunities and this policy would spur a new market for storage

devices.

So a secondary concern, uniformity will help lower costs. To the extent that California can pick out and enforce standards for good devices, that are usable nationwide, Californians would see faster deployment and greater competition in the device markets. That's my mandatory standard statement.

And also something to take into account are operational and performance standards. Just last week there was a call between NEMA and the utilities on the issue of certain Smart Meters tripping certain AFCIs and GFCIs during their installation process. So there was a joint utility call last week, sorry, this interference problem may require new standards. And that's one of these examples of this ongoing need to examine unintended interactions between technologies, and the standards processes will evolve as we find new reasons to come up with them.

So in conclusion, I'd say be wary of any type of artificial rates, be mindful of electrical and profit-maximizing realities when you create a policy, and look for out-of-the-box ways to incorporate off-the-shelf components that will get the Smart Grid built faster. Thanks.

COMMISSIONER BYRON: So we've gone to "if I only

had a brain" to "if I only had a heart."

MR. HSIEH: Got you.

COMMISSIONER BYRON: Okay, interesting. Thank you, Mr. Hsieh.

MR. HOFFMAN: Thank you, Eric. Our next speaker is Eric. Old friend,

Eric Dresselhuys. And I don't think you have any slides, either?

MR. DRESSELHUYS: No, I don't have any slides. I'll try to speak to courage, it feels like it. It's an appropriate topic. And it's great to go late after a number of people have addressed the same questions because you have the benefit of just, you know, piggy-backing from what other smart and clever people have said.

So I'd just like to reference all of you to Richard Schomberg's slides, because I think he hit a lot of the great things. I don't see him in the room.

But just to address some of the five questions, I guess, that were really asked, the first on the policy makers and what can policy makers do?

Obviously, a lot of the folks, especially the utility panelists, had a number of comments to that. But I would say, having lived through some of the early working groups around the original Smart Metering

program back, seemingly, a hundred years ago, and seeing how that's evolved, I would say that the most important thing for the regulators to do in California, CEC and CPUC, is to get the scope of the projects and the scope of the problem we're to solve clearly on the table.

Having, both here in California and a number of projects our company's been involved in, in other states, the biggest hiccup tends to be in the rate recovery process of saying, well, what am I buying?

And as was mentioned in one of the earlier panels, consumer groups, we all can stand up and say, hey, I think I'm over-buying, I'm paying too much. And didn't I just want a car, and you just pulled up in a Mercedes, and I don't think I need to buy a Mercedes. But when it comes to technology, and particularly the telecommunications and high-tech technologies that make up the underlying part of the Smart Grid you have to have a time horizon in mind for what you're trying to address.

One could argue that two tin cans and a piece of string is a communications network. It's not a terribly good one, but it's a communications network.

And so we have to decide what the problem we're trying to solve is. If the market is there, the R&D

will happen.

And so there were some questions and I certainly think, at least as a technologist, when I hear R&D, I think about people and the webs really inventing stuff. And I think that that's used here in the context of having some leeway on the part of utilities to implement and figure out what works, get some experimentation out with the customers.

But the hardcore R&D I would say there's plenty of money in the venture capital world, and elsewhere, coming into the space to fund true R&D. And the hesitation in getting the sufficient R&D into the market is only limited by the fact that whether it's venture capitalists or corporate American investing in R&D budgets they're not sure if that investment will ever payout because they won't know if there's a market on the backside.

So to keep it simple, I would propose that the most important thing that the State and Federal authorities, with various pockets of money, can do is do things that ensure that there is a market. If we define the problem and we ensure that there will be a market, I will guarantee, based on the thing that was said before, we're in America and we're filled with entrepreneurs, we will solve the problem.

Is California moving away from a national grid? I didn't know we had a national grid, so I guess I don't have a comment to say there. We have a little bit of a kluged together thing at a regional level. But, invariably, we'll move closer to a national grid on the backside of this, even if we don't try.

Are the policies too aggressive? I don't think they are too aggressive. I would say that if anything, in California, they should be more aggressive than anywhere else because the single greatest center of innovation on the planet happens to be here. It's surprising to me that there was only passing reference in the earlier session this morning, and in the session from the utilities, that nobody mentioned that the last four great infrastructure transformations that have happened in the world started and were executed out of California, and that's the telecom, IT, and cable industries, which have a shocking amount of overlap with maybe some more complexity here, in the electric industry.

But the Silicon Valley is where all of that innovation has come from and California ought to exploit it.

I love Richard's idea of the Disneyland of the Smart Grid. I can't imagine that that wouldn't happen

in San Jose or someplace like that.

How do you avoid the issues with the deregulation? I would put it simply that I think this is the information and control system that can be the single greatest tool in the avoidance of a deregulation gaming scheme, as Eric pointed out. Part of it is the lack of timely information, you don't know what's happening, and you get what you measure. So if you don't measure it, you won't know.

Finally, what do we need from regulators? Well, I think the last thing I would throw out is that I think we need to, from a regulatory, rate-making and approval process, recognize that what we're doing here is fundamentally different than most of the technology and most of the funding requests that are addressed by the CPUC or other bodies. We are not buying a thing.

As I got here, into Sacramento, I grabbed the Yellow Pages and I looked throughout the whole thing and I never found the Smart Grid store, where you go in and buy a Smart Grid.

COMMISSIONER BYRON: Nobody looks at the Yellow Pages anymore.

MR. DRESSELHUYS: You can Google it, too. And so, you know, I think the challenge that we see and this is in -- I think they've been going through

regulatory reprocesses in 11 or 12 states on Smart Grid, is that there's a paradigm that says you can define very narrowly what it is. And then once we define what it is, we go with a lowest cost, highest use mentality to figure out what an appropriate rate case for recovery is.

That doesn't work with the Smart Grid, in my opinion.

For most of you, and this looks like a reasonably salty and seasoned crowd, when you got your first connection to the Internet it probably looked like a pipe and e-mail, a data pipe that got you out and e-mail for sending messages. You didn't know what a browser was and the world-wide web was somewhere off in your future.

Yet, we've taken that same basic architecture and we have evolved it over time. If you would have been a utility trying to get rate recovery for the internet in the early 1990s, somebody would have asked you, but what about twitter, how is that going to work? Because if I don't know all of everything, if I don't know about Facebook and I don't know about all the applications I met ever run on it, how do I know what I'm paying for.

And so we're in a real quandary within the

regulatory environment, where if we don't give a little bit of leeway to the utilities to build a little beyond the most narrow scope of what we would normally define as, you know, fair in a used and useful context, we're going to end up with two tin cans and a piece of string that aren't going to have the legs to carry us forward. Thanks.

COMMISSIONER BYRON: It's interesting, you mentioned twittering. I really mean it when I say we're fortunate to have Commissioner Chong, she's the only Commissioner in here that tweets.

MR. HOFFMAN: Thanks, Eric. Let's see, I think David Kreiss is next.

MR. KREISS: Thank you, Ron, thank you, Commissioner, and the Smart Grid community.

This is our theme park, so this is what's happening in Boulder, Colorado. And, no, that's not a picture of Boulder. I think that's a picture of Denver.

But that is our theme park. We're developing a theme park, we're creating rides and we're not sure how they're going to end. We're learning as we go along. We're learning a lot about the consumer, we're learning a lot about the T&D system. We've got some really good partners, Accenture, Schweitzer, Ventex, and Xcel is

just doing a marvelous job of moving us along and putting in the resources.

So it's a fun ride. We're learning things like Boulder is built on a boulder, so running fiber underground is a challenge. And we're coming up with a lot of interesting things, like what are the impact of a lot of solar voltaics on the distribution grid, and making those measurements and seeing the impact. So there will be more as we're going along, it's an ongoing process but we're learning a lot, and it's very exciting.

I wanted to focus on one question and that is -- because we have a lot of good answers already and I think a lot's been covered. The one question is, is the policy aggressive? Because there's a lot of concern, are we doing things too fast?

I'm going to make two points during the talk. One point that I want to make first is solid engineering solutions are available, they just haven't been deployed. They've been deployed in transmission. A lot of them haven't been deployed in distribution.

For example, voltage control, voltage control can save -- people are using numbers like five percent, six percent of energy on the distribution grid can be saved right across the board by voltage control.

Now, a lot of work has been done by a couple of Southern California , or excuse me, California utilities have shown work to show when you drop the voltage by one percent, you're getting almost a corresponding drop in KW within the band. Voltage control can save numbers like that. It's been tried before, it's solid engineering, and it benefits all consumers out of the box. You don't have to put something into somebody's house for them to get a value in things like voltage control, and significant numbers, good engineering.

Phase balancing. All the i-squared losses by having unbalanced phases. Yeah, sometimes we're going to have to run a couple of feeders over because somebody mentioned before, I think Terry mentioned it a little bit, there's big radio systems. Yeah, we're going to have to run some extra wires. But the idea of phase balancing, just three-phase balancing as well, you can reduce kinds of numbers up to like a half percent of total energy by properly balancing.

Load control. We've talked about demand response being, you know, essential in load control. Doing all kinds of things, even when the transformer's having a problem, not only with high prices, but how about combining it with voltage control and DR into a

combination, it's available, done.

And real-time asset analysis, we can do it, we can monitor the transformers and the breakers. We're putting in incredible amounts of Schweitzer and all kinds of devices, and making measurements and nobody's using them. And the idea is in monitoring the assets in this grid, where you know the assets are just getting very, very old.

So the first point I want to make is solid engineering solutions are available, they're reasonably priced and they benefit the consumer right away out of the gate.

The second thing I want to talk about, interoperability. Now, we've talked about interoperability and we're deploying a system through the pain and suffering, with the help of Accenture at Xcel and its Smart Grid. Interoperability isn't a database that has an API. Interoperability means a communication system where you can do DR and trip a breaker on the feeder; you're not having three, four, five different communication systems.

Interoperability means if you get a Schweitzer device, or some edge device like we're putting in, you're not just using it for voltage control, but that edge device can be used for vegetation incursion. You

can start fires. You can use the Schweitzer device to understand the fault, but you can also diagnose a problem with the breaker. The idea of devices again being interoperable with different IT systems, it's not happening today.

The third interoperability, again, is with the data and the IT systems. And I'm working with utilities, you know, across the country, and we're looking at projects where there are more silo projects. And I want to bring this point up that, you know, some of these projects that are going be funded under the Stimulus are silos, they're going to go in, but they truly won't be interoperable.

You know, so we have to look at interoperable from communications, from devices, and from the IT platform, exposing all data, regardless of where the data is in the databases, how they're stored in the data, allow it to be surfaced through applications and all utility departments to get real value out of it.

So these are the two things that I wanted to bring up that, you know, we can be aggressive, you know, there is good engineering, the notion of interoperability is a philosophy in architecture, it's available today and will really make this stuff work, I think so. Thanks very much.

MR. HOFFMAN: Thank you, David.

Our next speaker is Tim Simon, CEO of Radio Thermostat Company of America.

MR. SIMON: Thank you, Ron. I'm certainly going to be the lowest tech speaker here. What we do is we have three roles, I guess I have three hats that I wear in three different companies. One is Radio Thermostat Company of America, which I'll address in a second.

I also am a founder of a company called Golden Power, which is a manufacturer in Mainland China, of thermostats. And we make literally millions of thermostats a year, sold through a great many different channels.

The last part is the U-SNAP Alliance, which I'll talk about in a moment.

We started as a thermostat manufacturer. About four years ago we were contacted numerous times by different metering companies and utilities, saying that they'd seen our thermostats, and what we knew about demand response and so forth. We didn't know anything about this, you know, we make thermostats.

And we were asked if we could help develop a thermostat that would work with this industry for the purposes that you're all aware of. And as it started it became clear that the idea of manufacturing a

specific thermostat to solve a specific need was not the way to go, because we'd end up with many different thermostats, and the marketing and the manufacturing would be extremely difficult.

So we took a path of saying we want to make a thermostat that is the same price as any thermostat available today, so it would be a simple swap out at our current distribution system, that if a thermostat sells for 19.95 today, when it has the radio capability -- I say capability, not the radio, itself, but when it has the radio capability it will still be 19.95. If it's $50.00, it will still be $50.00. If it's a hundred, it will be a hundred. It's not going to change because it has the capability of using radios. The variant will be the radio, which we'll address in a minute, but the thermostat will always be the same.

And that these radios will snap in and out, so that we'll have a thermostat which is available nationwide from day one, which is what we're doing right now. So you'll be able to go to any channel you normally buy your thermostat on and you'll have a thermostat which can be adapted by plugging in a simple radio module, and then it will be able to work with the Smart Grid.

In doing that, the second part of this idea is

because it is this simple we don't have to worry about what the indecision is. So those of you in the audience that make this decision, whether you decide you want to use Zigbee, Z-wave, RDS, Flex Net, whatever you choose to use it doesn't matter, Wi-Fi, it doesn't matter, our thermostat is sitting there ready on the shelf, ready to go and take that. And we build all those different radios and a little module like this. And that module just snaps into the thermostat and now that thermostat is enabled for whatever the technology.

And if you change the technology, all you do is you change the radio module, you don't change the thermostat. And the thermostat is one that maybe a customer will have had in his home for several years before he upgrades it by putting a radio module in.

And if he decides down the road that he wants to upgrade the thermostat for whatever purpose, he gets a new HVAC system which was three heat and two cool, instead of two heat and two cool he started with, he doesn't replace everything, he replaces the thermostat and plugs the radio module in. And again, it doesn't matter, is it Wi-Fi, is it Zigbee, is it Z-wave, is it RDS, is if Flex Net, it makes no difference, all of these are interchangeable.

And that's what we set out to do at Golden Power, to help do that we started Radio Thermostat Company of America, which is the company I own the interfaces with, with those in the room that we work with.

And then, finally, we decided that this module had a use beyond our borders, so to speak, so we started an organization called the U-SNAP Alliance. And this is the name of this is the U-SNAP module, and it fits into things other than into our thermostat. So you could take a GE appliance and have a socket that you could drop your U-SNAP into. You could have a pool pump, from a pool pump manufacturer, that could adjust.

So now if someone in the industry says I want to get involved with this, I want to make load shed devices, they don't have to develop this whole technology. All they have to do is have a serial interface on their product. They make a slight modification, perhaps no modification, and their product can now take the U-SNAP module, and then we've done the work to develop the Zigbee, the Z-wave, the Wi-Fi, the RDS, the Flex Net, whatever radio system we're talking about, so that it just drops into whatever device there is, and now that device can communicate with the thermostat, or with the meter, or

whatever else is set up.

So the concept being is that by the end of this year, as a company, we will no longer make any thermostats that do not take the U-SNAP module. And today I think we make 63 different thermostats, we sell to eight different companies. We're in the retail market, we're in the wholesale market, we're in the direct-to-consumer market. We have specialty markets. And all of these are handling this product by definition, because every thermostat we sell will take this module.

So our goal is to be able to say to you today, with all the decisions you have to make, all the thinking you have to do, you can know that there is a thermostat out there that's ready, willing, and able to handle whatever decision you make.

And if you pick a new technology that we haven't heard of yet, other than some of the things I mentioned, Wi-Fi, Zigbee, Z-wave, RDS, Flex Net and so forth, it may take a short time to develop the radio in this module, but I think you're probably going to choose something along the lines of what we're already doing.

So we're saying the consumer has a place to go to buy this product, the user has a way of getting this

and being able to adapt this, so my goal is that you'll leave here with the idea that, in spite of everything that may be discussed, there is a thermostat, actually millions of thermostats out there. As I said, in the next 12 months we'll ship millions of thermostats that take this U-SNAP module and most, or probably all of those at the beginning, are being bought by people that don't know anything about demand response, haven't thought about it, they're buying this for an entirely different purpose. Just the simple idea that they can take and now control their thermostat from their i-Phone, or from their computer, and the thermostat, even the $19.00 thermostat will provide them with data logging.

So they buy the $19.95 thermostat at Home Depot, buy the appropriate module, plug into it and they can download onto their computer what use, their air conditioner was on for 221 minutes yesterday, as opposed to 241 minutes the day before, and they can see they had a ten percent savings in energy.

Now, when the utilities and everyone gets together and puts in place the technology we're here to talk about, then it will just be a simple addition to be able to use that thermostat, they may already have, to handle that need.

So my goal is you leave here knowing there is a thermostat out there available in many different ways, from many different people, under many different names that in today's world, today, can do this. And we're shipping those thermostats now, right now.

It's not a futuristic product, it's not hoping we'll see it in the next three months, or six months or a year, it's something we're actually shipping today.

Thank you, Ron.

MR. HOFFMAN: Thanks Tim.

Dave McCalpin.

MR. MC CALPIN: So I'm Dave McCalpin and I represent the other half of the GE tag team here. And as the Chief Marketing Officer for GE Appliances, I bring the consumer goods side of the house perspective to this discussion.

And, you know, the Smart Grid, obviously, offers a really unique opportunity to align the interests of policy makers, utilities, manufacturers, like us, and consumers to solve one of the big challenges facing our country and more specifically, today, the State of California.

You know, while residential energy consumption continues to grow, utilities strain to meet the needs of the demands, particularly during peak periods, while

their assets go under-utilized during other, nontraditional peaks.

But we can unleash great amounts of capacity if we can just shift traditional patterns of consumption, and therein lies the challenge, how to bring about this change.

The Smart Grid has the potential to enable such change, but that potential will be frustratingly under-realized without the proper framework of standards and incentives.

As policy makers and regulators you have the opportunity to serve as catalysts to accelerate this change and to align these interests.

Utilities, obviously, want to be able to consent consumers to change consumption patterns, and we certainly anticipate the time-of-use pricing will become commonplace over time.

Consumers, on the other hand, want to live their high lives with a minimum of inconvenience and added costs.

As a consumer goods maker, we believe there's an opportunity to serve these needs and to provide consumers with the tools they need to be able to live in this emerging world. And that's where the business opportunity lies for us.

At GE Consumer Industrial, which I'm a part of, we're committed to producing products that meet the anticipated consumer needs for demand responsive solutions.

Since last summer we have been testing a suite of demand response appliances in a 15-home test, with Louisville Gas and Electric, a unit of E.ON U.S. The results have been very promising. So promising, in fact, that this summer our first commercially available demand response-enabled appliances will be introduced, so we'll have a fleet of products ranging from a test pilot on some room air conditioning, but then commercially available products in refrigeration, dishwashers, clothes washer, dryers, that will enable consumers in a demand response, time-of-use world to be able to shift or shed loads with minimum of challenge that will default them into those kinds of capabilities.

We'll follow these products later this year with a truly breakthrough water heating product. And while I think California's, you know, gas water heaters are far more prevalent, I think it's instructive in the direction we're headed we have an electric water heater, a hybrid, a heat pump water heater that will allow consumers to reduce energy consumption by 50

percent over a standard electric water heater. And it's embedded demand response capability will reduce peak load by 80 percent or 3500 watts during use.

And we have a lot more of these types of products coming down the pipeline.

As time-of-use pricing becomes more widespread, consumers will seek these tools to help them reduce their energy costs.

From a policy perspective, our ability to provide affordable and durable solutions will be dependent upon adoption of standard communication platforms and open protocols.

We also believe consumers will need reason to trade up to these newer technologies. Energy Star rebates are a great example of demonstrating the power of incentives to accelerate the rate of adoption, and we believe there's a role to be played here as well.

As AMI solutions role out, we need to achieve a level of standardization. These manufacturers can't provide products to a thousand unique communication solutions, though we certainly are building in the flexibility. We're not waiting for a standard solution. And the products that we put out, we're also not designing them in a way that they're going to become obsolete over time, either. We are designing

them to be flexible and able to be adjusted to different platforms.

One thing that's unique about an appliance, as compared to a thermostat, is that sometimes consumers want to pick them up and move them somewhere else, and we want to be able to provide them the ability to do that should they choose to move somewhere, where they're using a different communication platform.

We recognize that there's not one solution that will meet the needs of every utility in every situation, but a common protocol will simplify the creation of products designed to work with all hardware solutions.

To that end we support a common signaling infrastructure, such as the Smart Energy profile, as a means of initiating those common platforms.

We stress the need for common, open protocols to create a level playing field in the market, a market where we can create demand responsive products that provide consumer benefit at a fair cost.

Proprietary communication solutions would drive consumer costs far beyond the benefits recognized and will create markets that no manufacturer is interested in pursuing.

With the proper infrastructure in place consumers

will need, in our opinion, incentive to upgrade their load-consuming devices. The use of rebates to drive sales of Energy Star products has been enormously successful. As I mentioned earlier, over 75 percent of all dishwashers sold in the United States, today, are now Energy Star qualified, 30 to 35 percent of all refrigerators, clothes washers, and room air conditioners also meet Energy Star requirements.

But the market penetration is highly dependent on the amount of support provided by state and local governments, as well as local utilities. In states where incentives exist, Energy Star penetration is much more pronounced.

In the case of, for instance, clothes washers and room air conditioners, states where there are incentives have nearly twice the rate of penetration as states where there's no incentives.

In the long run, consumers will embrace the market transformation here, but to achieve accelerated rates of adoption, we believe incentives are required.

We're very excited about the prospects for the new line of products we'll be offering beginning this year, and we hope we'll soon have the opportunity to engage in a meaningful demonstration to prove their ability to meet the needs of California consumers.

MR. HOFFMAN: Thanks, Dave.

Commissioner Byron?

COMMISSIONER BYRON: Well, I don't know that I'm going to ask a lot of questions, Mr. Hoffman. I took a lot of notes, I learned a lot. I definitely am interested in buying one of these Bluetooth thermostats. But I need the software that goes with it, right; I need the capability to control that?

Is that how these devices work? I guess I'm really asking the two gentlemen on the end.

MR. SIMON: When you buy the thermostat, it's a thermostat with the capability of taking a module. When you buy the module, on the popular ones, Wi-Fi, Zigbee, Z-wave, it comes with the software you need to operate it.

So you could by this, for example, Wi-Fi module today, take it home, plug it in, and take your i-Phone or your computer and talk to your thermostat instantly, you don't need anything else beyond that.

COMMISSIONER BYRON: And likewise for you, Mr. McCalpin, is that how GE's devices are going to –

MR. MC CALPIN: The appliances, the demand responsive appliances that we'll be introducing will be capable, within the controls of the product will be capable of recognizing a signal that tells them what

the rate structure is, or when the peak period is, and they will default when they see that signal into different forms of action.

For instance, the first action typically is to try to delay the cycle. If the consumer doesn't want to delay the cycle, then it will look for other opportunities to spread the cycle so that the amount of energy consumed during the peak is reduced.

COMMISSIONER BYRON: This is great. But neither of you are waiting for standards. If a utility adopts or if a public utility's commission in this State adopts a certain program, I mean, I don't mean incentives, let's say -- well, I don't know exactly what I mean, I was thinking rate structures. But can you adapt to that, does it matter that your devices may not be to a national standard?

MR. SIMON: Well, in the worst case scenario the customer would never have to change the thermostat but he might buy or upgrade, either buy a new module or upgrade the module, that would be the absolute worst case scenario, to adapt to whatever standard that we don't know about yet because it hasn't existed. But I don't see that as being an issue, but if it does, the worst case scenario is a replacement module.

MR. MC CALPIN: So similar in our situation,

obviously, the simpler, in our opinion, the simpler you make the rate structure, the easier it is for consumers to understand it and to realize and be smart about their energy consumption patterns, and to modify them in a way that they understand helps them save money.

MR. SIMON: Okay, I may have misunderstood your question slightly. The way I'm understanding, as I think about what you just said, you buy this thermostat today, some months now your local utility tells you that they've adopted this radio type, so you buy this module and you plug it in. The thermostat is like a TV. When you go to the store to buy a TV you don't say, now, will this TV show westerns? You know, it's a TV, it shows a picture that is sent to it.

This thermostat receives a radio signal that's being sent to it and it reacts to the commands that are there. It is possible that those commands may not exactly speak and there may have to be some slight change in the software and the module.

It is more likely because of the way we built this, though, that you'll have a red light, a yellow light, a green light, and the thermostat has those, and whoever's on the other end of that will be able to turn on the red light, yellow light, green light, set it

back how many degrees they want. Whatever you want to do is likely already handled. If not, a slight change in the software on the module is all that happens. The thermostat will never change.

COMMISSIONER BYRON: Okay.

MR. MC CALPIN: It's a question of how you translate the signal. You know, our products, within the control architecture or coding will have three or four states of operation and it's a question of how you interpret the signal to which one of those states of operation you move into. The states of operation will be well defined.

MR. SIMON: For example, on this, using this i-Phone, I just changed the temperature of our thermostat at home. And I could tell the red light to tell my wife don't get in an elevator because the red light's on, there could be a power problem. But this exists today is what we're talking about.

COMMISSIONER BYRON: Uh-hum. And I've looked for these devices. Not yours in particularly, but there's consumer catalogues that have smart home, and things like this, and they're quite expensive options right now for consumers. So I'm assuming these are much lower cost options.

MR. SIMON: You know, the thermostats start at

19.95 retail, plus the cost of the radio module, which depends on what radio it is, is how much the module is. But typically I'd say the radio modules are 20 to 49 dollars.

COMMISSIONER BYRON: Well, honestly, I've honed in on the subject I'm very interested in. Mr. Hoffman, I'm going to let you take over, but I do have to make one comment to Mr. Hsieh.

I don't know that gaming is really an indictment of a smarter grid. It may be an indictment of the incentive programs, and if we've got those rolling. But I don't think the access to information should really be indicted because people can misuse it.

MR. HSIEH: No, and I didn't mean to suggest that we should be holding onto technology that doesn't provide the opportunity for gaming, I'm simply pointing out, as was asked in the questions, you know, is there a possibility for a repeat of certain actions that we've seen before and, yes, there is a possibility.

COMMISSIONER BYRON: Okay, thank you.

MR. HOFFMAN: So one clarification that may help here, and Dave mentioned it, and it went by real fast and I just want to repeat it, and Dave can correct me if I'm wrong, but I think GE is looking towards what's called Smart Energy Profile 2.0 as being the standard

that will be an information model for pricing, load control, all the things that will make thermostats, appliances, and everything else understand how to talk to the utilities.

Is that what you were saying?

MR. MC CALPIN: That's correct.

MR. HOFFMAN: Okay. And the Commission supports that and we're doing research in that direction to try to support that, with open ADR. We're trying to, what's called, harmonize all of these information models so they're all the same. And we want them to be extensible, and scaleable, and all the other things so as we change our policies over time the thermostat and the appliance won't have to change, they'll be able to read the signal and be able to cull out of the signal whatever new information might exist there.

MR. MC CALPIN: Right.

MR. HOFFMAN: Again, if any of you disagree with that, you might comment on it.

COMMISSIONER BYRON: And I know there's a lot of work that goes on in the Energy Commission in this regard. I think, and I'll ask you to comment but, really, what I'm ultimately interested in is hearing if there's any specific recommendations that we need to be making, policy-wise, that will help improve or correct

the situation?

In other words, is the access to information acceptable at this time; is that going to be a problem going forward? Those kinds of things I'm interested in. So I headed down maybe a different path.

Were you looking for some specific comments back on this?

MR. HOFFMAN: Well, I was going to ask a couple more questions that I hope would help.

COMMISSIONER BYRON: Good.

MR. HOFFMAN: And I thought I would ask Eric Hsieh to comment, maybe for a moment, on the role that NEMA plays in standards, and I thought that might be useful if he could give us some insight as to what role NEMA might play in the Smart Grid standards that are going on at NIST?

MR. HSIEH: Sure. The role that NEMA plays in standards, just briefly, the historical role has been physical, interoperative standards. I mean, the wall outlet is a NEMA standard from several decades ago, WD-06.

And, you know, NEMA at this point in time has moved towards communication standards, as the manufacturers have decided that it's appropriate. We are an active participant as an association and with

our members in the NIST framework. We are trying to push NIST to formalize a process by which they would be deemed a standard to be in the national interest and interoperable. But that's still an ongoing process; we'll see what happens next week in D.C., at the next NIST workshop.

But I would encourage California to follow that process closely, you know, as soon as there's a usable product and process from NIST, I think that would do a lot to provide certainty for -- for example, certainty on the existence of a market or certainty on the types of protocols that manufacturers be dedicating R&D staff to.

MR. HOFFMAN: One other clarification that I thought maybe Eric Dresselhuys might make, or just reaffirm this, I think what Eric was saying in his message was that it's all about the network. Am I correct there?

MR. DRESSELHUYS: Well, I think it is --the network is the most important thing to get right.

MR. HOFFMAN: I meant network architecture, sorry.

MR. DRESSELHUYS: Yeah, architecturally, when we talk about architectures, it is about building a network architecture that will evolve and grow over

time.

And I think, yeah, that was the analogy I was trying to make with the internet is that, you know, the amazing thing about the internet is that it's open, it's standard, it's interoperable and it's never -- I've never heard anyone say that there's a standards approval constraint in the internet. And so there are models.

And I think the challenge that Secretary Chu's thrown out is an interesting one for an industry. As somebody said on one of the earlier panels, oh my gosh, we can't take standards, it takes ten years to do standards. That's a bit of the problem, isn't it?

The ITEF, which is the Internet Engineering Task Force, which is the driving standards body behind the internet, and it's not a perfect model for electricity, but it's a different model than the way we've done standards work, has shown us that you can have your cake and eat it, too, you can go fast and you can evolve as you go. And I think that's part of the learning that's coming in here.

MR. HOFFMAN: And then the last comment I had was a comment on what Kreiss said, which I would like to underscore and have him maybe comment some more, I'll just rephrase it. I think Dave is pointing out that

for the last 20 years there have been a lot of applications, like voltage conservation reduction, which used to be the old name for voltage control, and things like load balancing that may be enabled now by a Smart Grid and, therefore, help give you a better value proposition for the Smart Grid.

Am I taking that too far?

MR. KREISS: Perfect. Under Smart Grid, as my colleague says from EPRI, Smart Grid involves whether you use the meters or some edge sensors, you're going to have new measurement devices on the edge of the system. Under Smart Grid you're going to have communications. Under Smart Grid you're going to be able to share data.

That means that these technologies, given that platform, will work and they'll work efficiently, and it could be done with a high degree of reliability. And like I said, it just benefits the consumer right out the gate.

MR. HOFFMAN: So I haven't gotten any blue cards, are there any questions from the audience?

Yes, can you come up to the microphone? Can you come up to the microphone, please, and introduce yourself?

MR. TRALLI: Yeah, I'm Dave Tralli, from the Jet

Propulsion Laboratory in Pasadena. So I apologize, let me look down so I can read it, and my glasses only work –

COMMISSIONER BYRON: Mr. Tralli, speak very closely if you will.

MR. TRALLI: Is it on?

COMMISSIONER BYRON: Yeah.

MR. TRALLI: So I just want to offer a perspective from someone who's been in the audience all day, and I ask the question, when I read the title of that slide, how are we going to know? Okay, after everything we've heard today, how are we going to know if we're supporting or meeting California's energy policy goals?

And all day today there's two words I've never heard. Today I've never heard the word "requirement" and I've never heard the word "architecture."

And so my concern is, because this was raised by you, fellow Commissioners, and others that there is a lot of concern about the perspective of the ratepayer, or the ultimate energy consumer, will they pay, will they like it, will they thumb it down?

And so when I look at the perspectives from the technology and the utility side it seems that we're looking at what will be market-based solutions,

solutions that will be defined by the consumers, which is fine, but I guess my question is, is that going to be equated to a Smart Grid architecture? Will the Smart Grid architecture be equated with what comes out of the marketplace?

And if that's the case, is that going to be an optimal solution for a Smart Grid architecture? Where is the top-down network architecture that will ensure a long-term sustainable Smart Grid that supports these goals to 2020 and beyond?

And so rather what I see, perhaps, I guess just an observation, is something that looks more like an incremental evolution of the decades-old grid by just adding high-tech stuff to it, analogous to what somebody mentioned earlier today was the 30- or 40-year growth of the internet.

Now, if that's the case, earlier today we discussed about using recovery money to accelerate the process by which we can have a Smart Grid and maybe condense that down to five or seven years.

Well, I'm having a problem rationalizing that with the fact on something, to me, that looks like an evolutionary market-based high-tech sophistication of the current grid.

And so I don't see a top-down comprehensive

requirements flow down that will sustain these requirements in such a matter that will be met with the bottoms-up market-driven stuff that will play itself out in the marketplace.

So I just thought if anybody wanted to comment on that, or perhaps it will be things that we'll talk about tomorrow.

MR. DRESSELHUYS: I'll take a shot at it. No, I think it's exactly right and I think that was the point I was trying to make when we talked about network architectures a minute ago. I think you need to -- you can't buy products and just implement systems, I think you have to know what the -- and at least the point I was trying to make, maybe unsuccessfully, was what's the problem we're trying to solve and then how do we build it down from there.

And I think Richard mentioned, I think in the earlier conversation, that something that has happened, I think very positively here, is that through the process, starting with a group called Open AMI, and then it's expanded into a much, much, much bigger thing, took on a use-case-based approach to solving our very complex set of problems, and breaking them out into parts, and defining kind of optimal solutions.

Now, how we go about building those, and the

technologies, and the physical products we do that with is kind of the stage that we're moving into now. And I would say that from my stand point there is a general agreement around some high-level principles, but I don't think you'll get something that I think I heard you say, which is there is going to be an architecture, a top-down architecture and say this is what it is and I'm going to build that. I don't think that's coming and I don't know that it's desirable.

I think it's more of a framework around architectural principles that will be built and implemented at different time frames, in different pieces, at different places.

MR. KREISS: Just a note on that. I love the question. As a matter of fact, I think there could be a workshop just on Smart Grid architecture. As a matter of fact my title is VP Smart Grid Architecture. So, you know, that's what we've been doing.

If I was a utility, I'll take it a step to your question, if I was a utility, I would think about the Smart Grid architecture first, of laying down the platform, architecture of all the data throughout the system, the communication system, of the IT system and how things would integrate.

I would say that that would be top priority, if I

was a utility and saying I want to start and begin my Smart Grid project, I would actually even look to that first.

But the point is well taken; I think a whole workshop could be devoted to the notion of what is a utility architecture for Smart Grid.

MR. GRAVELY: I have to add one more comment to your question, and it will be discussed some tomorrow, but in more detail later, and that is we have, and I mentioned it in my presentation, we have a contract solicitation on the street today, or we're reviewing the proposals to do what we call defining the pathway to the Smart Grid 2020.

I don't think we have the top-down architecture and I think the process of Legislature, or the government, or how to be doing that is a difficult process. So what we are doing is we're getting in an area, performing research to help policies, as we are actually having utilities, a utility team and a manufacturing team define where we think the Smart Grid is in 2009-2010, where are we today, and then where will be in 2020, given in light of the policies we talked about for renewables, and efficiency, demand response and those things.

So, you know, define where we are in 2020 and

where we are today, and how we get there.

And in that process I think some of these requirements and systems approach, I'm expecting to see that type of an approach to the solution. But I don't think, coming from a military environment where those requirements are much easier to define in a war environment or whatever, it's a little easier than this environment.

But I do think it will probably be the first time, in my exposure to Smart Grid, that we will take that type of view and look at it. But again, from a perspective of a utility view and a manufacturing view, because our belief is the implementation process and the way they think is substantially different and we envision two different roadmaps, and so that's a part of it.

The goal of that is to provide information through – you know, it may not be available for the IEPR, but it will be available for the load management standard hearings, and PUC hearings and other things, that potentially the Legislature can made a decision.

And so I think it is a great question, but I do think it requires some decisions at the top level that haven't necessarily come down this far.

So what I'd like to do now, I've asked Ron, and I

see we have a few utility members left, but Tom and Terry, would you join us up here? And also, I see SCE has a representative left. Even though you didn't speak, you can come join us up here for SCE.

We'll take questions now. I've got a few questions that are left over from the morning.

Okay, Paul, thank you, I thought you left. Thanks.

So, unfortunately, one individual left that had some questions, but I wanted to ask a couple of questions for the whole panel, both panels all here today, and so and then any other questions, those of you who want to ask questions when I'm done with these from the WebEx, then feel free to come to the mike and ask questions of any of the participants here today.

And so I'll start with the first question. And it says, "what regulatory levers are there to require utilities to install Smart Meters that support vendor agnostic demand response?"

And basically they're asking can community-choice aggregators specify a particular Smart Meter to be installed within a jurisdiction.

And I actually don't know if we still have -- is there space? Fred, you might have some comment here on the public side. I don't know if we -- if you don't

mind speaking at the podium, I'll let you talk.

But we're talking about different ones. So the question would be across all utilities and the vendor, and the meter, what regulations is there to, I guess, to invent proprietary systems being installed that would not necessarily interoperable.

Oh, Ron's going to swap seats with you over there.

Anybody want to tackle that question? Go ahead, Paul.

MR. DE MARTINI: So if I understand the question right, if a community-choice aggregator wanted to put their own meter out there?

MR. GRAVELY: Uh-hum.

MR. DE MARTINI: So those rules were defined back during deregulation, in the '96-'97 time frame. So they do have the ability, under the existing regulatory structure, to be able to put their own meters.

In fact, Wal-Mart has their own meter system that they use, and customer-owned meters. So those rules were defined quite a while ago.

So, in fact, that was one of the questions that came up in our Smart Meter proceeding, from the ARM group that represents a lot of the energy service providers, about whether or not we were going to be

replacing their meters that are out there. And the question -- the answer is, no, we're not. I mean, if they want us to, we will, but that's at their choice.

So those rules are all sort of maintained and so there's no change to that.

MR. GRAVELY: Okay, any other comments? Okay, thank you. I hope David Erickson is still online, he was the one that asked that question.

And the other question I have here is -- I think we probably should have Commissioner Rosenfeld or Commissioner Chong answer this one. But the question is, "how do you expect customers to use price signals to be done or replacing, while at work or doing other daily chores, how much money a month can a customer save?"

So I think my comment to that, of course, is we did a quite a few studies and some may know here, from the statewide pricing pilots. Even Ron may be able to come speak to that a little bit.

There were some statewide pricing pilots where we actually performed different variations of these systems, and talked about different types of dynamic prices and how the customers accepted them.

So if you feel comfortable talking about that, feel free to just share a little bit.

Because the question really comes down to dynamic pricing and being home, and being able to adapt to it, and the value to the customer.

MR. HOFFMAN: I just have a couple of quick comments. Those people that are familiar with the statewide pricing pilot know that in that pilot there was a variety of tests that were done. Some were done with just manual – the signals were given and people only had the ability to manually change things, some people had a little automation, some people had a lot of automation.

And the answer to this, I think, is that automation proved to be the one item that people loved the most and it was the one that gave us the most demand response, and so it was a win/win. So I think automation was an answer.

MR. SIMON: Yeah, I was just going to say part of the built-in features of our higher-end thermostats are that if a pricing signal comes, there's a block window for that pricing signal. So the thermostat, you can do a simple program and you can say to it, if the price sends this level, then set back, and send a signal to another appliance that may be on an entirely different type radio and tell it, your pool pump, to shut off, or tell this other device to shut off.

So the thermostat can become the entry point into the house that allows other items to be controlled.

MR. MC CALPIN: Similarly, with regard to the appliances that we've designed, they're automated in their response. So they receive the signal and they automatically respond with a load-shedding solution.

MR. MOHN: There's one other concept that we've been working on. Because we've worked really hard up front in the deployment of our Smart Meter program and establishing certain standards of interoperability, the beauty of defining those standards was that innovation thrived, and we've seen a plethora of companies coming out with innovative ideas, like Tim Simon and his companies.

But also, we've seen companies come out with concepts around energy management platforms for the home consumer. And they're very cost-effective, they may even be built into the device, such as a cable set-up box, where you turn on your TV, you program it, it controls all your devices in your home. It sets, perhaps, your monthly budget allowance and it makes the decisions on behalf of all of the devices.

These are things that the utility didn't ask for, but innovators have come up with, and they've said we

think there's a market for it.

MR. GRAVELY: Okay, yeah, very good.

MR. FLETCHER: The other thing with regard to this automatic control is not only should you make it so you've got an automatic control on price signals, but you might want to do it with regard to carbon content and other parameters.

You might want to consider things with a feed-forward control system, as well as adaptive format.

So there's a value for the utility to have certain information and things like that available to the consumer on some basis.

MR. GRAVELY: Very good. All right, any questions from the audience that they would like to ask the panel, since we have all the representatives here?

Could you unmute the WebEx line just in case somebody -- there's still 37 or 36 people online, if anybody online has questions, I'll let them ask them now.

So I realize those of you on the WebEx have been muted most of the day. Anybody who -- you should be able to speak up now, anybody who wants to ask a question. We have several panel members here representing industry, the utilities, the policy side, and the research side, so if anybody has any questions

they would like to ask at the close of today's session, now is the time to do that.

MR. GRAVELY: Well, we'll mute this up. And so in summary I want to thank everybody, and I'll give Commissioner Byron a second to say thanks, also.

So tomorrow's agenda is primarily going to be on looking at the different projects and technology we discussed today and the status of them.

For example, the three white papers I discussed, there will be presentations on all three of those, as to where we are today. So those who are interested will hear the status of the information and will hear information on what will be expected to be in those white papers from that information.

And I would also – lately, I've been doing this, we've talked about the Economic Stimulus Package and we, in California, and Commissioner Byron and the other executives in our Commission have charted us to help the State participate as actively as possible and prepare as good of proposals as possible. And so when I have these workshops I do offer myself, and Pedro Gomez and his staff, because this is our area of expertise, so we have offered to individuals, who desire to participate, to be a partner in some of the Smart Grid proposals that will be submitted

competitively -- we, in the Commission, will not submit any proposals to Smart Grid directly, we are partnering with people.

We're trying to bring teams together, we have utility, and quite a few of the public utilities who are interested in participating, and we'd be interested in some of the vendors who may want to put together a demonstration project.

And so we are here in the next month or so to provide that partnering arrangement. We're here to provide expertise that we have in the research area.

And so I would offer again, our contact information is on the website, it's on the announcement, if you are interested feel free to contact us if you want to just discuss it.

We are very interested in California capturing as much of the DOE Stimulus money as we can get. We expect the announcement to come out in the middle of June and the proposals to be due at the end of July. That's the current schedule. It may slip a little bit, but that's the time frame we're talking along, so we're expecting it to happen in the next two months.

And we've been working with the utilities that are here and the vendors that are here. So for those who are online or are here, if you're interested, give

us a call, or e-mail, or come see us and we'll do what we can to partner you up and help you prepare a proposal.

Again, we're competing against other states, and so we don't want to compete against each other, but we want to do what we can to put the best quality proposals together.

Well, tomorrow you will status on a lot of the technologies that are being demonstrated through the Smart Grid, it's for the whole day, it's a technology day.

And I will give it over to Commissioner Byron to close us up.

COMMISSIONER BYRON: Thank you, Mr. Gravely. You are playing the role of a matchmaker and that's been very helpful, I think a number of folks have commented on that.

I'd like to thank you all for being here, this was very valuable, I've learned a great deal. We kind of devolved around the Smart Grid and -- I'm sorry, around Smart Meters to some extent, and the interface with the customer, this afternoon, and I was very pleased about that.

I'm reminded back, again, when I was at that software company and I called up my local utility about

12 years ago, and I asked them if I could get information about my energy usage, and it took a long time but we figured out they could give me a pulse, they could give me a relay pulse every time we clicked off a kilowatt hour that I could get that pulse.

And I said how much does that cost, and it was $5,000 to get that little device installed. But we went ahead and did it so that we could put it side-by-side with our real-time meters, and it was great, it confirmed that their meter was three percent more accurate than mine. Meaning it clicked off three percent more kilowatt hours than my meter did.

But I think we've come a long way. These customer, consumer interfaces, I'm really pleased to hear what's going on in the industry with regard to what's available and going to become available to consumers. I have a feeling we haven't heard it all because not all of the companies that we know are in this space are represented here today.

But we're very interested in this and we want to help get the policies right so that California can continue to be a leader, because we think these products will work well here, in California.

I'd like to again thank everybody for participating, and I think we're not too late. We're

going to be back here tomorrow, we're going to go into more detail on a number of specific projects and technologies, and I hope you'll join us.

What time are we starting, Mike?

MR. GRAVELY: Nine o'clock.

COMMISSIONER BYRON: Be back in this same room at nine o'clock tomorrow morning.

MR. GRAVELY: Nine o'clock tomorrow and we will provide – each speaker will have questions and answers on their technology, so we're envisioning it to be more of a technology interchange tomorrow, and we have a wide variety of discussions.

COMMISSIONER BYRON: Thank you. I plan to be here as well. We'll be adjourned.

MR. GRAVELY: Thank you.

(Applause.)

(Whereupon, at 4:45 p.m., the Workshop was adjourned,

to reconvene at 9:00 a.m., on Thursday, May 14, 2009.)

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TRANSCRIPTIONIST'S CERTIFICATION

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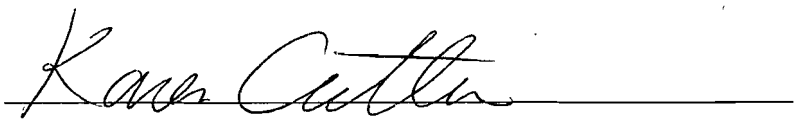

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