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ENERGY MASTER PLAN INNOVATIVE TECHNOLOGY WORKING GROUP	)

Transcript of proceedings taken at the Rutgers Eco Complex, 1200 Florence-Columbus Road, Bordentown, New Jersey, on November 7, 2011, commencing at 10:00 a.m..

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I N D E X

PRESIDENT SOLOMON: Good morning, everybody. Sorry I'm late. Thanks for being here today. Just by way of background, I think you all know this, this is your third hearing that you've been to, the Master Plan the draft was released in June by the Governor, and we hosted a

series of public hearings in July and August. As a result we did receive, and I think I've used this number about 300 times, we've received more than 300 comments, oral and written, which are being reviewed now and are part of the record.

We also recognize the need to solicit some more specific comments and recommendations on the specific issues raised by the Energy Master Plan, and to accomplish this we put together four Working Groups. These were comprised of subject matter experts, people we felt were experts, but could speak in a language that even I would understand, from various industries, academia and membership organizations in order to provide the Board with specific recommendations on Clean

Energy Funding, Alternatively Fueled Vehicles, Innovative Technologies, which will be the subject of today's report, and Biomass.

We provided each group with a series of questions to address, those questions are answered in detail in the recommendations and reports prepared by each group, which should be available to you.

They all worked independently over the

summer, which was a lot to ask, not a lot of beach time in the summer.

The recommendations were submitted to the BPU, and they have been posted on the website. I'm hoping all of you have taken a look at it by now.

Our goal is to provide you with an opportunity to hear about the recommendations and provide comments to us. We have a court reporter present, as you can see, so that there will be a formal record of our discussions. There will also be an opportunity to submit written comments on this report within two weeks of

today, that would make it the 21st.

All of the comments received through this effort, as well as the general EMP hearings, we will review all of them as we begin the process to finalize the Energy Master Plan. Our goal is to do that by the end of the year.

And all of the transcripts, all of the written comments, all of the verbal comments as memorialized, and all of the reports will be reviewed by all of the Commissioners and the Governor's office.

We held hearings on the Clean Energy Funding Working Group, Alternatively Fueled

Vehicles Group, and received their recommendations already. We have one hearing remaining, which will be on the 10th, that's Thursday. Today is Monday, all day. Don't forget to vote tomorrow, by the way, early and often. November 10th at 9:30 to 12:30, same time, I will try to be on time next time, but I make no promises. That will be for the Biomass Work Group.

And now we are going to hear from John Cusack who is chair of the Work Group.

And, John, the floor is all yourself.

MR. CUSACK: Thank you, I appreciate it. We will get ourselves setup here with a little bit of a PowerPoint presentation and summarize what we did.

Again, thank you, Lee. It's been a fascinating event trying to get everybody together in the Working Group. What's the phrase about whenever you have a group of professionals together it's sort of like herding cats. And then on top of that we had sort of minor glitches, like we had one of our members of our Committee of our Working Group whose house ended up under about six feet of water from Irene, so he had to withdraw from the Committee, and other things like that that have happened. But it's been fascinating.

Before I get started I just want to make one quick point that's not in the report or not in the PowerPoint, and that is that there's a great report that people should look at called the Green Transition Scorecard that talks about that net globally about 2.4 trillion dollars has

been spent in the last four years on subjects like renewable energy, smart grid, energy efficiency. And of that 2.4 trillion about 1.5 of that was on renewable energy. So there's a lot of money being spent on this. And I think part of the goal of what the Energy Master Plan should be looking at from the innovative technologies standpoint is how can we get some of that money, which ranges from research, to development, to commercialization, all happen in New Jersey and create some jobs here in New Jersey?

So with that preface I am going to continue. As I mentioned, we have a group of experts, and I won't go through each of them, but we have groups like Stevens Institute, Rutgers, New Jersey Technology Counsel, property developers, people from some of the utilities in the state, and some entrepreneurs, which I include myself

in part of that category as well, Stockton College as well, Atlantic City Electric and people in the power business, and also Montclair was involved until poor Mike's

house went under water. And I have been chairman of this group and trying to put it all together.

BPU asked us basically four questions as part of the commitment and commission to Working Group. And I will mention these very quickly, and again they're summarized in the report. But the four questions were given New Jersey's entrepreneurial and academic prominence what technology areas do you see our state focussing on related to energy efficiency, generation and storage? We added the word distribution to that as well as part of our definition, by the way.

And can you provide recommendations regarding the near term viability of the following technologies and how they contribute to the infrastructure?

And this is an important point, because there's a lot of great technologies out there, but some of them might still be 5 or 10 years away from commercialization. And so part of our goal is try to identify not only what is environmentally friendly,

that's very energy efficient, but also what can be installed very quickly and have an immediate impact. Because we don't have a lot of time to waste if we're going to solve the greenhouse gas emission problem and also the problem of energy waste in New Jersey. So I think that's something to keep in mind.

The other two questions were related to technology development because they address the issue of what can a business incubator network do to facilitate development of these technologies, and how should it be structured? And there is a network in New Jersey of about 12 incubators that are funded by the state plus the number of college universities have other incubators that are not funded by the state so that we have about 15 almost 20 incubators around the state that are trying to create new jobs, and a lot of them do focus or have a part of their focus being on green technologies. I think about 25 percent of the companies up at New Jersey Institute of Technology are related

to green and energy companies. And we see that happening in a loft these incubators, it's getting to be a very popular subject.

And there are some good models to look at, we don't have to go far to see what other states are doing. New York State has a network of 41 incubators, including four now that are totally developed to green technology. So I think this is something that we can work on. There is a global group called the Green Technology Cluster that has about 41 business incubators around the world in about eight different countries that are working on this, and unfortunately none of the New Jersey incubators are a member of that network, I think that's something that should be corrected.

And then we were asked the last question about what are the regulatory or legislative barriers to develop innovative energy technologies? And there that's one of those questions that we could probably speak for about 12 days on, if you asked 100 people what their opinions are you get

101 different opinions about what the barriers are. But we tried to summarize it as best we could.

Going back, BPU had actually asked us

to talk about five areas specifically, one was fuel cells; one was tidal power; one was energy storage, which means everything from pumped hydro to thermal storage, compressed air, flywheels; smart grid technologies; and smart metering technologies.

And the Working Group was invited to add other technologies, which we promptly did, and we came up with a list of over 20 technologies that we thought we should look at. And we summarized these into I think it's four categories, as I recall, energy efficiency technologies. There's about nine areas that we had here, and this included things like advanced metering; advanced building controls; energy monitoring systems and management systems in general; grid integrated switching for distributed generation, one of the problems is that much like when you add a thousand

megawatt power plant you've got to figure out how you're going to transmit that to your grid, but also when you add 1,000 one megawatt systems or maybe 10,000 100 kilowatt system how do you integrate that in there? And that's an important issue from an operational standpoint for

utilities. Energy audits, that's a very cheap and very effective way to try to in the short-term get buildings to be more energy efficient. And again, if you can reduce energy use by 20 percent that saves you a lot of room to use energy for more economic growth. Demand response technology is extremely important. Monitoring base commissioning. It's amazing how many people still buy buildings from contractors and don't have the buildings commissioned to make sure they actually work the way they're suppose to, because they're saving money by not paying for that service. LED lighting, which is very energy efficient. And direct load control types situations are all considered under that category.

Under renewable energy technology the second category we looked at tidal power and micro hydro power. There's a lot of interesting companies, I was talking to someone this morning about there is a group across the river called the Energy Environmental Funders Forum that meets once a month and has new technologies explained, and they've had at least three micro hydro turbines come through. Their targets are things like golf courses, like planned

communities that have a golf course. And what do you want to have a golf course built around? A lake. When you have a lake that has a ten-foot dam on it where maybe you can generate enough power to power the golf course needs and the clubhouse and so on by using that small hydro power system.

Wind turbines, we are certainly doing a lot of work on that offshore. But we need to have more work about actually having those technologies here in New Jersey as opposed to importing them from China or Denmark or other places.

Solar PV is very interesting. But also interesting, and the State's been certainly recognized as a leader across the U.S., I'm very proud of the fact that we're second behind California in total number of sites, but we're actually first per capita. But with solar thermal is also very efficient, and we should also look at that as well.

Geothermal heat systems is a very important factor, and we've had some great expertise here in New Jersey down at Stockton, there is a lot of geothermal systems that have been put in New Jersey

schools as part of the rebuilding of our educational system in the last few years, and they've used that. But again, geothermal systems can be a little capital intensive. So if you don't do an energy efficiency process first to reduce your energy use by 20 or 40 percent you have to have a much larger geothermal system. So if you do your energy efficiency first and then combine it with a geothermal system you have much lower capital costs with a

geothermal.

Biomass waste-to-energy systems is an important topic. Bio-fuels, certainly DEP and certainly Dave and the group and here at the Eco-Complex are doing a lot of work on this on bio-fuels, both in terms of fuels that can actually be used to replace other fuels, but also using them as a biomass energy system.

Fuel cells, there's a lot of fuel cells in New Jersey, and I am familiar with that from my work at the New Jersey Higher Education Partnership Sustainability, where a couple years ago we had about five fuel cell systems installed in the state higher education facilities. They're wonderful when gas was, like, at $2 a therm as opposed to at $10, they are much more

useful. But also they've had maintenance problems with them, so we have to make sure that the fuel cell systems actually work the way they're promised to. My advice is if you buy a fuel cell plant make sure you get a darn good warranty on the process.

Hydrogen fuel cells, I think this is

one of the examples of a great promising technology, but it's probably not going to make an impact in the next two or three years, and so that's fell down near the bottom of our rating system.

Large scale cogeneration systems is part of the energy plan as a goal, I think that's important.

Nuclear, there's a lot of interesting new nuclear testing coming about. But the problem is who is going to pay for it and how do we know how much it is going to cost? So in the long term it's an interesting solution, and as an engineer I don't think we should get rid of what we have now, but it's still a very costly system and very controversial, especially after what happened in Japan and other countries recently.

Energy storage technologies, this is very important. Pumped hydro. I'm old

enough to remember 30 years ago when I did a study of Merrill Creek Power, at the time Public Service was looking to do a pump storage power plant in New Jersey that

would do two purposes, both store water to protect the intake valves along the Delaware River in times of drought but also can be used as a pump storage plant. So yes that's a possibility, but there's very few locations that can actually do that in New Jersey. Thermal storage is very common, especially if you match it up with the solar thermal systems. Compressed air, and PSE&G has it's own shares in the company that does that thermal absorption, very traditional approach. Chemical thermal system. Fly wheels, very promising. But Beacon Power one of the biggest proponents of it just went through a bankruptcy reorganization. I think they will survive that. Because unlike the little company out in California who spent like a billion dollars and then discovered that they couldn't actually make their solar technology work, I think Beacon has a good technology, it's just that they're a little bit overextended at the moment. And that can happen to any business when you have a recession like we've had over the

last three years. But again, interesting possibilities.

And the last two areas that we looked at was energy efficiency building technologies. One is mass wall building where you actually have by using things like aerated concrete you can actually store energy in the building wall or use it as insulation during the summer period. Weatherization, a very cheap way of doing this. Many of you have seen the famous McKenzie study about how do you reduce carbon emissions over the cheapest costs. In their curve weatherization is about $150 a ton negative cost, i.e. for every ton of carbon you reduce by using weatherization you're actually making a profit of $150 a ton.

Energy recovery ventilation, we're still blowing a lot of air through buildings that we don't have to. A friend of mine was the CFO of the Hartford Group up in Connecticut, they built all these buildings in 1950's when people smoked at their desk and they had these tremendous

air moving systems to move this air through the buildings, because they had to remove the smoke as well as keep buildings cool and warm. And they woke up about five years ago and realized, you know, we can actually use modern fans now that are much more energy efficient, we can make them variable-speed fans, and we don't have to move as much air around because now it's against the law to smoke in a public building in the State of Connecticut. So they were able to reduce their energy use by 40 to 50 percent by using both energy recovery techniques and changing their HVAC systems.

Other approaches that people came up with were threefold. One was certainly increase education awareness for both students in our schools and universities as they grow up and become citizens, but also our existing citizens to make them understand the importance of the Energy Master Plan and what we're trying to accomplish with that.

The second one was testing the

verification by independent third parties. And there I have to do a little disclaimer, I didn't vote on this part because I've been involved with the New Jersey

Corporation for Advanced Technology on doing that type of independent verification by a not-for-profit organization.

And the last one was market development by New Jersey government purchasing. There has been several systems setup to try to encourage this over the years, and none of them have practically worked, I think partly because people just weren't aware, A, that they existed, or in some cases they didn't know how to implement them. So I think we have to do more work when the state buys things it's kind of embarrassing to see the state buying whether it's an HVAC system that's not energy efficient at the same time we are telling people they should be buying energy efficient HVAC systems. So that needs a little bit of work and can help create a market for the very technologies we want to develop and implement and

commercialize and create jobs in New Jersey for.

We also wanted to highlight too the importance of what we call off-the-shelf technologies, that's going back to what can we actually implement in the next three or four years that can be done well. And it

turns out we're not going to be able to build a nuclear power plant, even if it was wonderful technology and it costs $0 to build, it would still take us probably eight to ten years to get it permitted. So that's not going to be in that list of three-years line.

So what are we looking at? Things that tend to be renewal energy, bio base, small scale and/or distribute applications. So as I said, trying to spread additional capacity around the state as opposed to trying to concentrate in one or two locations. And one of the problems with this is those tend to be very disruptive technologies. As somebody who earlier in my career worked for a utility, utilities don't necessarily get rewarded for doing

things like energy efficiency unless we have a good process for doing that. And so when you try to deregulate electricity and what's the purpose of utility, how do you make money if your goal is not to sell more electricity? And so an energy inefficient building as a businessman I say that's great for utility because they use more energy. How do you get people to think differently and figure out how a utility can still make money without having that be

their mind set is extremely important. So how do you have these new technologies come along that can be very disruptive and maybe reduce energy use in the state by 40 or 50 percent, and yet still have utilities that are there for backup when the sun is not shining, when the wind is not blowing and still being able to provide energy to the state. So we have to look at those issues very carefully. And by the way, we didn't solve all these problems, Lee.

PRESIDENT SOLOMON: I'm sorry to hear that.

MR. CUSACK: We're just coming out here and talking about what some of the solutions may be.

And finally, expensive R and D and new invention are again minimally useful in the short run. Typically new technologies take a long time to commercialize. I worked in this field for combustion engineering for several years, and we used to say very often from the time somebody invents something from the laboratory to the time it actually gets into commercial use it could be 5, 7, 10 years. Because they're not quite as quick as things like software or electronic games in terms of getting

things commercialized. So we have to figure out what can the state do to speed that up, and also what relevant clean technologies already exist that are already on the shelf, have already gone through the R and D stage, all they need is a little push to get it to move into commercialization, and that's what we tried to identify.

So what we did was we created a matrix of all these technologies and solutions,

and we also looked at their environmental impact, and sustainability impact from both environment and social standpoint sort of a high, medium and low. And timeliness, what's going to happen soon rather than later. When we looked to sustainability impacts we looked at economic impacts, we looked at environmental impacts, we looked at social impacts. But we also looked at operational impacts, how easy are these going to be implement in our systems from a utilities standpoint, from a user standpoint, etcetera. So we tried to combine all those into our matrix.

And the matrix the scores are actually in the report, and I think there is copies of it available on the desk outside. But I am just going to summarize it, I don't like

putting up matrix with tiny little numbers for you to look at. But here is the top ten technologies/solutions that came up as being important.

Well the first one, and I think a lot of this goes to the whole issue of you want to make sure you don't come up with a new

technology that causes more problems than your old technology. So you want to verify and test the technology, make sure it really works, whatever technology you're looking at in the state.

Energy monitoring systems are extremely important if people can't manage what they can't measure. So if you don't know what your building is using, again I was talking before the meeting started with a fellow about the fact that there are still college campuses in New Jersey only have one meter for their whole campus, and they only get their bill once a month. So when they noticed their bill went up it's, oh, gheez, what happened last month that caused our bill to go up? And they have to go back and start looking for it. That's not a good way to run a college, it's not a good way to run a building. And we have to have energy monitoring systems that can

give you a dashboard that in realtime, oops, your energy just spiked, let's go out and look outside and see are people leaving their windows open? Is there a steam leak?

What's going on?

Tidal power and micro hydro system, that came up rated pretty highly, and we were kind of impressed by some of the people that testified down in Stockton, as I recall, that were talking about if you only put in one tidal system that's not very useful because you have the same problem of wind and solar that is intermittent. But if you put in 20 of them along the coastline and there's enough difference there you actually have the equivalent of a baseline output as opposed to a intermittent output because of the difference in tidal variations through the state and the different timing.

Solar photovoltaic we think still requires emphasis in New Jersey. Advanced metering and working on this, and there's a lot of issues around that. But again, if you don't collect data on what's happening in people's homes and businesses it's hard for the grid to actually be able to be smart enough to use them if it doesn't have the information to use.

Number six, and this was an interesting tie between advanced building systems and controls, but also between the idea of create a market by actual purchasing not just by incentives if you do this we're going to give you a discount on your solar system or give you a solar REC, but also let's have a incentive from the government in what we're buying.

Increased education awareness and training came up number eight.

Number nine was wind turbines were felt to be important. One of the things that we identified was and unfortunately there's not very much sort of original R and D being done on energy systems in our state compared to places like Massachusetts or California, and that's something that we may have to look at. Because there should be more of this type of work going, especially if we can build offshore wind turbines off of Atlantic City and use them as test platforms for improvements that can be used not just here but in places like the North Sea and off the coast of the

United Kingdom and Baltic Sea, and all of the other places in the world that already have wind turbines offshore.

And again this mass wall building system popped up as something that was very interesting, as something that's a low-cost approach and could be implemented very quickly. In fact, this is an old technology that's been used for 40 years, but no one's ever verified what the exact numbers are. And we feel if you verify what the numbers are and make people aware of it, it's more likely to be used by contractors and developers.

I wanted to go back to the point BPU had asked us to talk about five specific technologies, and here is the average scores out of these ratings for these tidal smart metering, smart grid, fuel cells and storage. And ironically, as I said, even though energy storage is probably the most important issue I think you can address in the long term, in the short term it came near the bottom because we don't think the answers are quite there yet. And

especially if you can do small scale storage.

There was a great article in The Times this weekend about specific northwest has a

problem that they have a lot of hydro capacity and a lot of wind capacity, and they're actually paying people buying hot water heaters that have thermal storage bricks in their hot water heater, and so they actually can use the hot water heaters to store energy from wind things when they have too much wind blowing. And at this point when that happens they either give the electricity away free to local utilities, or they have to dump it, which doesn't make much sense. So it's kind of interesting, how can you combine individual storage? Certainly some of the car manufacturers are looking at can hybrid vehicles act as a form of storage? And that sometimes has a timing issue about when people use it.

Again tidal came up number one. Smart metering, smart grid very important. Fuel cells could be important, but again we have

to make sure that the reliability maintenance issue has been settled is the key thing we came up with there.

Going back to our third question that you had about the role of business incubators, we think the business incubators are extremely important, but

they can't just be done by academics. I say this as somebody who actually teaches a course in a business school, and so I've had my foot on that side of the academic world. But academics in general tend to be great, people understand in theory, but they don't necessarily understand how it happens in practice. And what the people you want working in incubators are people that are either retired entrepreneurs or have been in business and understand what the entrepreneur needs to get the technology commercialized, not the theory of how we should get commercialized. And some sometimes the incubators go out there and they say well we don't have much budget, so we are going to hire people who are about 22-years old, they just got their

MBA, or something like this, we're going to have them help a 40-year old run a business. That's not going to work. You have to really have experienced good people, and you also require a partnership between private and public sectors. The state should be involved in it, because a lot of these are in state universities, but you also have to incorporate the researchers that help come up with the idea, the venture capitalists that are

going to have to fund it, the support companies like the Deloitte's and KPMG's of the world to provide some of their expertise to the center. And then finally the most important part are the technology users. If people aren't going to use the technology, everything else you use in the incubator is useless. You have to have people that really have a good skill of identifying there's a market there. And even if there's no market now, Steve Jobs is a good example, nobody knew there was a market for iPad's before he came out with iPad's. That's why he never did focus

groups on iPad's, because what would you ask them? People wouldn't know what an iPad was. And I think there is technologies out there we have to look at and work at to try to go through incubation and get to be commercialized as quickly as possible. But again the staff have to be entrepreneurial thinking, at least themselves, and be qualified to help the companies grow. And we have a series of other more specific recommendations in the report.

Also on this too is we think that having incubators that are aiming

specifically at energy technology could be a very useful approach. We've seen this happen in other states, up in Syracuse there's a carrier actually sort of donated their R and D center to the local university to actually make it a green technology center. And they went from being an HVAC research center to being a green technology research center and have created several hundred jobs in the short-term there, but they've actually had

thousands of jobs created by companies that have graduated from incubators. And the important thing here is keeping track of not just of the people who are sitting at your desk now, but also the people that graduate, tracking them afterwards, making sure how many jobs are created, how much economic activity you have.

But I think something should be provided to some of these energy technology companies within the appropriate regulatory regulation funding sources that exist in New Jersey. And also as part of that, and this center right here the Eco-complex is a good example, you have to have some sort of formal arrangement so people can actually use a pilot location.

Back in the 80's when I was working

with EPA on their new technology program as an advisor we had what we call the catch 22 situation, you couldn't use a technology to clean up a hazardous waste site until you proved it worked. Well how do you prove it works? You have to use it to clean up a hazardous waste site. So you have this

catch 22, you could never get a technology proven because you don't have the regulatory authority to use it until it was proven.

Well the same way here, we have to be willing to admit that sometimes technologies don't always work, and we have to do pilot projects, we have to do testing and publish not just the ones that work, but also the ones that don't work so we can learn from them. And it's best if that's done by an independent-third party, because my investment banker friends say we don't believe anything that's done by the developer himself, because he obviously has an agenda to prove that his technology works, and he is not going to publish what doesn't work.

I talked earlier about there is more work to be done and how do you actually structure such a system. We think it would

be important, again the Working Group just does not have the time or manpower, woman power available to analyze this as a concept.

We also think that it would be useful not to reinvent the wheel. And while we're very proud of New Jersey and we would like to do this ourself, there is a good reason that we should maybe go and look and partner with other states and try to cooperate on this so we can all benefit from this. Because again, solving greenhouse gas problems is a global problem, not just a New Jersey problem. And so we think that's important. And there's a lot of good groups within a few hundred miles of here that we could work with.

And I mentioned the Green Tech Cluster Association, Connecticut setup what we believe is the first green infrastructure investment bank in the country where they've combined their energy and environmental departments, they've also combined their subsidies and they're running it like a bank, not like a grant organization. And they're taking equity stakes in companies as opposed to just giving people money to see if it works. So

I think that's a really interesting concept that we might work with the incubators to actually fund these organizations through commercialization. And that's part of the learning process we have.

The last question was barriers to innovation. Businessmen always complain about barriers. But my favorite philosopher is Pogo who said that we have met the enemy and he is us. And sometimes we create our own barriers. And people just assume that the state doesn't want to help them, or can't help them, or is going to cause them trouble. And in fact I found the State of New Jersey is very helpful of this, both in DEP and BPU, that they really do want to help. And we have to get that word out to people and realize that, yes, people are not going to do this unless they make money.

One of the craziest things that ever happened with the environmental movement was when they were first involved in the Kyota Protocol they said, well, we only want people to invest in greenhouse gas

production scheme that don't make money, because if they make money at it they should fund it anyway. Well that's crazy. If the goal is to reduce greenhouse gas emissions you shouldn't care whether they make money or not on it. And in fact, the more money they make, the more greenhouse gas emission they reduce. So we have to be careful of setting up regulatory structures that prevent us from trying to accomplish what we're trying to do.

So again utilities may have to be involved in smart grid work, but if the utilities can't get that, if they can't get paid or can't figure out how to incorporate it into their rates, what's the incentive for them to participate? And we don't want them to end up like Connecticut Light and Power to save money cut their tree trimming budget by 26 percent, and they still have 50,000 people without electricity from ten days ago. So we have to make sure that we allow people to make a reasonable rate of return on this.

And in order for energy technology to

really attract it's potential we have to look at this from a systems approach. And it's not just that we have to have grant programs here, or incentives over there, we

also have to invest in the infrastructure to support transmission distribution systems. Transportation efficiency, which is another group, but again they all play together, because if their recommendation is buy electric cars, what does that do to our electric grid? And we have to look at those interactions.

And certainly it is frightening when you think about it, that if Thomas Edison came around today he would look at distribution system of utilities, and they are not that much different than they were 100 years ago, to some extent. The technology making electricity has improved, the efficiency of power plants has improved, but we're still putting stuff through copper wires to get it into people's houses from great distances away, and we have to look at that model and see whether that still works.

One of the questions that did come up or recommendations was that we do need to try to reuse the time frame of current review processes, but not by sacrificing good review. So we want to have good review done, but don't have to have overkill review, as they say.

We certainly see the connections between BPU and DEP. It's interesting that Connecticut has done this, because New Jersey did this first. We've had several versions, there's been several times where New Jersey has had BPU and DEP be one department, at least once I know in my lifetime. But I think that's interesting, at least have them collaborate more. And support technologies, energy technologies that are not just efficient, but also are clean, and make sure they're clean by a good performance verification.

And again that we need consistent legislation, we shouldn't have the left hand saying you should do this and the right hand saying you shouldn't do this, and that's happened occasionally in the

past as well, and we ought to make sure we have incentive that actually create incentives to do good business rather than not to do business at all.

So that's my summary. If you have any questions, now I am going to turn it over to Lee.

PRESIDENT SOLOMON: No, John, stay there, because we have our other commissioners are here, and I am going to ask them if they have any questions,

Commissioners Asselta, Fiordaliso and Fox. But before I do, I was looking at your response to question one and the top ten solutions that you rank.

MR. CUSACK: Right.

PRESIDENT SOLOMON: Could you explain a little bit of the difference between energy monitoring systems and advanced building systems and controls, which seems to be somewhat, I mean, tied into advanced metering. But what would be the difference?

MR. CUSACK: The energy monitoring systems are a little bit more generic in

the sense that certainly building control systems are important, building are something I think 36, 35 percent or something of the emissions I think in the state, or something, or at least nationwide that's average for the U.S. I know. So a lot of it relates it's not just buildings, it's also process equipment and manufacturer facilities as well. So you have buildings aimed at more commercial and residential buildings, so that's what the building control systems are.

But we also need work looking at the manufacturing side, which although

everybody thinks manufacturing has disappeared from New Jersey, that's not correct, and there is a lot of work that can be done in providing incentives for people to be energy efficient and having good energy monitoring systems within their manufacturing processes.

So energy monitoring systems are a little bit broader in scope in a league, the other one is a little bit more narrower in scope, that's the best way, I think, to

define the difference between the two.

PRESIDENT SOLOMON: Do the other Commissioners have any questions? Commissioner Asselta. Do you mind answering a few questions?

MR. CUSACK: No, go ahead. I like talking.

COMMISSIONER ASSELTA: John, dig a little deeper on the title technology what the Committee's opinion was of it. You just kind of breezed over it real quick. How deep did you drill down in that technology?

MR. CUSACK: Well a couple things. First of all, one is, remember, this was a volunteer group that didn't get paid for their time, and we came up with a very simple matrix and sort of asked people to

put a number in this box and go through that. And so when we did that we did not have time to go into great detail.

But we did look at tidal issues. There have been issues with tidal power, for example, by what's the impact on fish? What's the impact on local diversity in

natural systems, whether it's a stream or estuary, for example, type setting. And we actually had a expert in tidal technology from Stevens, Washington Braida, it was one of the people that was part of our committee. But he was just one of the 12, 13 people in here. So it was interesting is the other people, even the non-tidal experts, thought this is an interesting technology.

It's not a gigantic win, because you're probably looking at something that's on the order of maybe hundreds of megawatts, not thousands of megawatts. But we think it is something that could be easily done, because we have a lot of tides, there's a lot of motion of the ocean in New Jersey that we could take advantage of without necessarily impacting the natural environment. So that was the feeling was it's relatively low impact, if

you do it right, it should be easy to connect into the grid. And you can hide these things under bridges, it's not like they have to be out in the middle of a

river or a tidal inlet. You don't want to interfere, you don't want to build a dam like they did in Britney and so on, you don't want to cut off boating access as well. So it's really looking at using the flow through tidal systems is what we really had envisioned there.

COMMISSIONER ASSELTA: So it got your stamp of approval.

MR. CUSACK: Remember, you get what you pay for. So the stamp of approval is only good to how much money you put into the effort of doing it. We put a lot of time and effort of the experts in looking at this. But again all these areas need more work, but that's something for BPU and DEP to work on.

COMMISSIONER ASSELTA: Thank you.

PRESIDENT SOLOMON: Any of the other Commissioners? Commissioner Fox.

COMMISSIONER FOX: Well I have questions, but I accidentally left my copy with all my questions sitting on my dining room table, I think.

My major issue is the storage issue,

and it didn't have a lot in storage, you had a little bit. What do you think the state could do in specifically utilities?

MR. CUSACK: There's two things. One is I think there could be some incentives to try to move some of these technologies along at the utility level. I think there could be a form of just a very useful combination with we already have developed the solar capacity, and you have more solar REC's, i.e. more solar being generated if there was a way to store that.

And there's two ways to do that. I was reading somewhere about General Motors is already working with some of the car manufacturers of taking the batteries that are using electric cars, like Prius's, that still have about 80 percent of their recharge capacity after the ten-year life of a car, and taking those batteries and making them into regional, when I say regional, neighborhood level storage capacities that you could store solar energy in.

So looking at those type of approaches

where you could have maybe not a gigantic storage system like a pump storage system that could put out 500 megawatts during the day because they pump water up during the night, but those type of regional distributed storage systems could be a great place to put money. But we still think there's a lot of work that have to have to perfect those, both from the technology itself, but also from the utility standpoint of how do you integrate these into the grid? And that requires some effort on their part.

Now I think one of the big problems with deregulation that happened in the United States was people stopped having EPRI fund money on research, which is the way utilities traditionally did this, they mailed checks to do research for them, and then they got deregulated and now all the sudden they're competing with each other for those technologies. So very few utilities have jumped in and spent a lot of money to work on that issue because it wasn't part of their rate base yet. So I

think we have to look at how do we fund that R and D that needs to be done. And I think it's something everyone in New Jersey can become a leader in because of our

relative compactness as a state it could be really useful.

COMMISSIONER FOX: On the car battery thing, I think the stimulus money that DOE gave out had one, specifically I think it was Detroit Edison, but I am not sure, that actually took the car batteries at the 80 percent and put them in the small residential size units around neighborhoods. So we should have some results back on that soon. That's a local neighborhood thing. Same thing as the hot water heater that you mentioned in the northwest that they're doing.

MR. CUSACK: Right.

COMMISSIONER FOX: That's something to deal with the wind issue.

MR. CUSACK: Right.

COMMISSIONER FOX: Because you have the wind issue where there's too much wind in the northwest so they have to store it

someplace instead of paying somebody to take their electricity, which is the negative pricing. Increasing people's hot water heaters and they actually can store the energy, I think it lasts maybe for a day of residential.

MR. CUSACK: They're looking at like

36 hours maybe they get storage out of it.

COMMISSIONER FOX: So that type of thing is really interesting, and they are doing a pilot on that. The question is though, who pays for those hot water heaters? Is it the wind industry out there who's causing the issue, or is it the utility or whatever?

MR. CUSACK: That's your job.

PRESIDENT SOLOMON: That's why we get paid the big bucks.

MR. CUSACK: That's not always a technology issue. But seriously, there is a lot of other systems out there that people are looking at in terms of thermal systems, I mean you see the solar there's been a lot of advances that have gone on around the world in the solar thermo, we're

using molten salts to store energy.

And what I'm saying is I think we should try to encourage all levels of this, maybe trying to figure out some way to get more researchers working in New Jersey on those issues and universities, to get more people looking at how do you actually commercialize what exists out there in the rest of the world. Because again, these things tend not to be always linear processes, it's a very sort of left, right,

going three step forwards, two sideways, one back type process. And so let's see what the Israel's and the Spanish have done on molten salts, or the people out in California and Nevada have done and Arizona, what can we use that to try to use that as a storage system for New Jersey, how do we adopt that here?

And the question is, do you take a gigantic one and put it next to a wind turbine substation so that when the wind isn't blowing offshore that you can supply it out of there, or when it is blowing it can go into that? Or do you try to do it

in the neighborhood and have local solar provide that?

So again, as I said, for every 100 questions you ask there is 101 solutions. But we have to start working on it somewhere, and we have to set some of the priorities. And as I said, I just think that type of storage is something that's long term very important, not going to help us in the next 12 months.

COMMISSIONER FOX: One other question.

PRESIDENT SOLOMON: Sure.

COMMISSIONER FOX: That I remembered. The geothermal, like what Stockton has had

for 20 years.

MR. CUSACK: Right.

COMMISSIONER FOX: I was talking to a guy who was the head of that program at DOE when they did it 20 years ago. DOE has basically stopped that program, he is now working on storage. But his position was he thinks that's something that's very useful, he doesn't understand why more of it isn't being done, it's fairly cost effective, and even in a state like New

Jersey. So what do you think about the geothermal and what makes sense?

MR. CUSACK: I'm trying to look around to see if the folks from Concord, are they here? Mike Facetti? I don't see Mike. I understand the data from a lot of elementary and high schools that were renovated as part of the school's authority that put geothermal systems in I understand they're working very well.

COMMISSIONER FOX: They're very cost effective.

MR. CUSACK: Very cost effective system. And the question is why? And I think it's probably an issue of education. The second one is I think we've got to go back to square one, which is you have to reduce your energy use as much as possible

so that you can minimize your capital cost of the geothermal system. Because you don't want to go out there in a building that has it's windows open all the time, either because they're lousy windows or because they actually are open, you don't want to do that with a geothermal system,

because you are going to have to have a much larger capital cost.

But I think they're very effective in places like urban areas where you can put them under a parking lot and so on, and you don't have to worry about contaminating groundwater, that was one of the issues, or raising the temperature of groundwater under downtown Newark like you do where Stockton was located.

COMMISSIONER FOX: Right.

MR. CUSACK: So it helps with some of the environmental issues that they've had. And again, there's been a lot of improvements in things like heat pumps and so on are so much more effective. So, yes, the scale of the system has gotten down, and we should jump on that bandwagon and push that forward. I am a fan of the geothermal side.

COMMISSIONER FOX: Thank you.

PRESIDENT SOLOMON: Are there any questions? Will you entertain some from the public, if they have?

MR. CUSACK: Sure.

PRESIDENT SOLOMON: Yes, sir. Just make sure you introduce yourself so the court reporter can get your name.

MICHAEL TRACHTENBERG: Michael Trachtenberg, Greenhouse Gas Industries and in association with Rutgers University. I'd like to address three items, which some of which were very nicely detailed in your report, congratulations.

MR. CUSACK: Thank you.

MICHAEL TRACHTENBERG: Well done. First is ease of implementation, which you alluded to. I noticed interestingly that LED's came out as 271 on the overall ranking. May I suggest that one potential means of implementation is to provide a negative efficiency incentive. In other words, the state can impose taxes on inefficient devices of all kinds and create a statewide based efficiency matrix so as to compensate the cost in order to overcome the CapEx/OpEx differential that prevents initial purchase at the individual level of energy efficiency devices.

Second, whereas the state does have a

building code each and every one of the townships implements variations on those codes that make the cost of construction high and do not necessarily favor efficient construction, particularly factory-built construction, some of which can become quite exciting with today's capabilities. I would suggest the state look at generating an overall overarching and dominating high efficiency building code so as to present a uniformity of opportunity.

Third, I think that what is needed, another item that might be needed is an integrated best practices database so that one cannot allow-- I'm sorry, to discourage, let me put it that way, to discourage individual decision making where each and every provider believes his or her company is an expert in a given area where, in fact, they're often very siloed in their information base. Thank you.

MR. CUSACK: I would be glad to address those three questions pretty quickly. But the third one is actually interesting. I spent some time running as

a part time executive director in New Jersey Higher Education Partnership for Sustainability, we had went from about 35 to about 47 colleges that joined that group. And one of the reasons was we actually published I think it's on it's third edition, it hasn't been updated since I left two years ago, but they published high performance building guidelines for colleges and universities. And it was different from LEED, it wasn't like you get a point for this or a point from that, it was more here is the best practices, we have 30 facilities people, some architects involved, planners, and engineers looking at this thing, and here is the best practices that appear to work and what you should be using. And it was put in a form that they could understand the structure of it. And I think we need more things like that that get people what is the state of the art. Those are very cheap to write up once. The hard part in those is how do you maintain those and keep them up-to-date? So you really have to have either somebody

willing to pay for that to keep that best practices to be reevaluated and renewed at least maybe every 12 to 18 months, otherwise you are going to be out of date

and it is not going to work and it's going to become useless. So that's the third question.

It actually leads into the second question of the building codes. I think building codes, and I say this for someone who actually served for about ten years on a zoning board-- for planning board for a town, for a village I should say. Our code system is horrific for trying to accomplish what we're trying to accomplish in terms of energy efficiency. I worked in Europe quite a bit, and I am much more a fan of the European system, which is more performance base. Here's how many kilowatts per square meter you are allowed to use for your building, and that's it, we don't care whether you use passive system, whatever. But the system of saying we are going to use R19 walls and then you don't seal the doorways is totally useless

because your R19 insulation disappeared down the tubes.

So I think my personal feeling is you should go to a performance-base building code, that is going to be hard for BPU to try to get that across with the municipalities, because again it goes back

to a lot of these issues are not technical issues, it's business, and we've always done it this way, why should we change issues. And so how do you get people to change the way they are doing things? What is the definition of insanity? Is doing the old same thing over and over again expecting different results. We have to get people to think differently about land use, which New Jersey has done a good job of. We also have to get a better way of people looking at let's come up and make a performance-based system for buildings as opposed to assuming that if you put 10 components in there that all have individual performance statistics that it is actually going to create a great building for you.

And the first things on taxes, I don't think it's going to happen in my lifetime. For two reasons. One is tax is a dirty word today. But more importantly it's very bureaucratic and paperwork consuming, I think, to try to do that approach. I think you're better off creating a performance-based system in the building code and let the people do whatever technology works, and I don't care whether it's having 15-inch walls or whether it's a

great HVAC system, whatever works; as opposed to telling people you shouldn't use this technology, or you should use that one. I don't think you want to be in the business of actually telling people which technologies to use. And again, it's the same problem about keeping the best practices book up-to-date. Technologies change. So what is a great practice or a great technology this year may not be a great one next year. Not because it got worse, but because better technologies have come along.

PRESIDENT SOLOMON: Any other

questions?

STEVE NANOS: My name is Steve Nanos with Claris Energy. I just had some comments on the storage aspects.

PRESIDENT SOLOMON: Are these comments or questions?

STEVE NANOS: Questions about storage. Thank you.

PRESIDENT SOLOMON: Okay.

STEVE NANOS: I noticed that it had storage listed as not near term, where there's been significant applications of thermal storage for schools and industrial sites here, ice is one of the typical

applications. There was a significant component in SmartStart to support that. However, in 2010 it was revised and basically eliminated that, and since then there really hasn't been any thermal storage here in New Jersey of large scale since then.

So I'm wondering about one is application of incentives to regenerate that benefit of not only the load leveling, but also is there consideration of having

thermal storage listed in the energy efficiency component same as demand response, which is not there right now, it has the same benefits of efficiency, more efficient source energy and of course the environmental impact.

PRESIDENT SOLOMON: That's probably better directed at me than John. Go ahead.

MR. CUSACK: One quick point, we didn't really mention that specifically because we thought it was part of generic energy efficiency. It is a proven technology. Ocean County's Performing Art Center has had it for years, there's other facilities around that have had it. Credit Swiss did it in their building on Madison Avenue in New York City where they went down four stories where they used to store

old insurance policies when it was owned by New York Life, and they put in thermal storage systems down their and made their building 30 percent more energy efficient. So to me that's a proven technology, so that's why we didn't have it out as a specific item. But do you want to talk

about the regulatory side?

PRESIDENT SOLOMON: No. I mean, in terms of the incentives provided for storage versus demand response, that's an issue that's going to have to be dealt with with PJM and try to move them forward so that you get the same kind of compensation and incentive for all different kinds of technologies, which have the same impact potentially as demand response, that is levels out the grid, reduces demand at peak time. I will let you start that battle with PJM, I am having enough trouble getting them to change the interconnection process. But that clearly is something that is being talked about, but it will have to change the incentives that they provide for different sources.

But on thermal storage it is out there, technology is out there, it is becoming more and more cost effective, and

eventually it is going to be simply a business opportunity how to save energy by adopting thermal storage technologies which are out there, they're commercially

marketed, and they are fairly cost effective.

MR. CUSACK: Yes.

PRESIDENT SOLOMON: The last thing is decisions are going to have to be made, and these are long-term decisions that are going to go on for a long time, how we subsidize different technologies. Right now we subsidize certain renewable's, and minimally, if at all, subsidize others. And one of the discussions that takes place internally all the time is are they taking out of the market monies that could have been made available for other technologies by putting so much into certain technologies?

Right now there's very little out there for thermal, there's very little out there for anything other than some solar and, you know, that's about it, whatever we come up with in the new Clean Energy Budget, there is some energy efficiency. So until we get to the point where we essentially say there's going to be an equal subsidy, and by the way I'm talking

off the top of my head, this is a long way away, and it's probably not going to occur until they become somewhat balanced and competitive, you get a REC, or you get a subsidy, or you get a benefit if you save or defer a kilowatt, and it doesn't matter how you do it, and let the market decide who wins and who loses. You could do that today, but there's a lot of technology today that in ten years is going to provide much bigger opportunities, so if we don't provide an incentive today we're losing that opportunity down the road. How that balances and when we actually get to that point where it's an equal subsidy, equal benefit, let the marketplace decide, I don't know. You know, there are people a lot smarter than me that are working on that right now, and thank God they are a lot smarter than I am. Just my thoughts.

STEVE NANOS: I have one short follow up to that, if I may. FERC recently instituted demand response as a requirement for an avoided cost.

PRESIDENT SOLOMON: That's not a

requirement, they allow you to subsidize.

STEVE NANOS: It has to be reviewed by the ISO's.

PRESIDENT SOLOMON: It's like generation, it gets paid the same way, has the same benefit.

STEVE NANOS: Exactly. So I'm wondering if rather than demand response only if it was, for instance, storage generally as the market responds support government level to government level incorporating that as a thermal, you know, shifting, as you mentioned.

PRESIDENT SOLOMON: As I said with PJM, that's a battle that needs to be taken up with FERC. And in light of our success in battling FERC on a number of other important issues, I am going to leave that up to you.

STEVE NANOS: I was hoping you might have more success.

PRESIDENT SOLOMON: I can only take on 10 or 15 fights with FERC at one time. And we are doing pretty well so far. But I get you. And that is certainly something that

needs to be taken up. My guess is it's going to start out within the PJM stakeholder process, and eventually there is going to be a filing with FERC by PJM or

another regional transmission operator to request that opportunity.

STEVE NANOS: Okay.

PRESIDENT SOLOMON: There is a lot of competing interests, there is a lot of entities that will be adversely affected by that. But if we are going to balance degree, equalize degree, bring it down during highest peak demand then those kind of opportunities are going to have to be out there. But I welcome you to take on FERC as we speak.

STEVE NANOS: Thank you.

PRESIDENT SOLOMON: Anything else before I call on the other speakers? Yes, sir.

SCOTT SCHULTZ: Quick question. Scott Schultz, Advanced Solar Products. My question comes from another hat that I wear, which is I serve on the Sustainable Somerset Committee, which is part of the

Somerset Business Partnership which is a county wide chamber of commerce.

MR. CUSACK: Right.

SCOTT SCHULTZ: And we're in the process of implementing a best practices newsletter with the vertical orientation with different markets within the town.

Could you mention again that document, the best practices document?

MR. CUSACK: It was called the-- let me make sure I have this right. If you go to njheps.org you should be able to find the document on there, I believe you can download it as a searchable PDF. But it's called the higher education high performance building, I'm trying to remember what the last word in there was, guidelines I believe is the phrase that we used. Because, again, it wasn't meant to be "a standard", like LEED standard, it was just some sort of a best practice update. And as I said, I think the last I heard they were talking about updating it again now through a guy named Bill Bobenhausen who was the editor of the last two

versions. But I think it's about 18 months, 2 years ago that the last version was published. But it is a good starting point, because a lot of what applies to colleges and universities applies to business in general, because they have office buildings, residential halls, etcetera.

SCOTT SCHULTZ: Thank you.

MR. CUSACK: But again, you should be able to download that from njheps.org. And

if not, get a hold of me.

PRESIDENT SOLOMON: Thanks, John. I appreciate all your help, well done.

MR. CUSACK: Good.

PRESIDENT SOLOMON: Why don't we take a five-minute break, because I am going to call on the speakers next. Tim Maurer, are you here? Scott Schultz just spoke. Are you speaking again?

SCOTT SCHULTZ: No.

PRESIDENT SOLOMON: You're done, that's it?

SCOTT SCHULTZ: It was more education, now I'm done.

PRESIDENT SOLOMON: Mike Davies? Michael Davies? Not here. Paul Kydd I saw. Mike Trachtenberg.

MICHAEL TRACHTENBERG: I spoke, thank you.

PRESIDENT SOLOMON: You just spoke, are you done?

MICHAEL TRACHTENBERG: Yes.

PRESIDENT SOLOMON: Okay. Well we only have two, so why don't I call on them now.

ROGER BASON: I submitted a card.

PRESIDENT SOLOMON: Your name?

ROGER BASON: Roger Bason, Natural

Currents.

PRESIDENT SOLOMON: Roger Bason. I don't have it, but I will call on you.

ROGER BASON: Thank you.

PRESIDENT SOLOMON: All right. Tim Maurer.

TIM MAURER: Thank you, President Solomon, Commissioners. John and the Working Group, we applaud what you're doing. My name is Tim Maurer from PERI Software Solutions in Newark. And I really

want to encourage everybody to look in the matrix of two, five and six as being an integrated solution that can provide energy optimization, no longer just looking at energy efficiency but the combination through single platform that's available off the shelf now to deliver energy efficiency demand response and even provisions for critical peak pricing or dynamic pricing to manage capacity constraints and capacity costs and really truly give the participating commercial building or municipal building or multifamily complex the ability to optimize their energy budgets immediately in a rather rapid payback. Devices that exist today that really make some of the older systems obsolete, if you don't start

looking at the combination of efficiency demand response and critical peak under one platform current HVAC control systems, for example, that aren't addressable will soon be obsolete. So you need to have an integrated approach, and we think that the matrix recommendation on two, five and six

does that.

I sit on the U.S. Chamber of Commerce Energy and Environmental Committee, and they made testimony to Congress showing that monitoring and control systems can produce a payback as quickly as two years versus perhaps many times that for other technologies.

And one of the big things that we also saw in a conference was a Chevron presentation on energy savings performance contracts that showed that the contributions to those savings came 58 percent from monitoring and controls, 19 percent from lighting retrofits, and 18 percent-- or 20 percent rather from mechanical change outs. So the vast majority of the savings and it's performance contract can come from monitoring and controls. And that really testifies to the need to bring all of that

together under one system that affords a participant demand response income, price avoidance and the energy efficiency.

In California while they deployed a

tremendous number of smart meters in the smart grid they have yet to fully integrate this, although there are pockets. And what's happening across the country is you've got pockets of efficiency demand response and smart grid and dynamic pricing all being looked at separately. We need to effect an integrated solution, that's people processing technology and funding holistically, and to encourage that. For example, energy efficiency audits that can address after you do the efficiency change out how much of the net load is addressable for demand response and critical price avoidance would be key. And then being able to install devices that are provisioned with what owners want, which are set-and-forget strategies to execute automatically some of the demand response or price signals that has to be provisioned when I install the lighting that's addressable or the HVAC against cost issues, against price strategies.

So the holistic way of looking at this is really needed, we need an ecosystem as

well as just the technology of auditors and installers that understand this. And it's also a great thing to bring to the new jobs arena, and as John had said encourage students to look at now as we move from a digital-- or analog utilities to digital utilities there's an opportunity to establish some really great new jobs in analytics and in controls as opposed to just Angry Birds in a mobile handset, and getting students to see displays in universities and municipalities and the like that show the exciting nature of new technology. It really reinstates essentially where Newark had been the Westinghouse manufacturer the real value for meter and meter data coming from Newark. And that this type of technology has been looked at by three top leaders in municipalities here in the state and commercial buildings and also in multifamily housing, all of which want this new kind of technology now.

So I encourage the Commission to pursue what was done in this matrix really

from that standpoint of integrating people process funding so we have a real way of bringing rapid ROI to the rate base today, capacity management, real green jobs in leadership in this technology field. Thank you.

COMMISSIONER ASSELTA: Any questions for our speaker? Thank you.

TIM MAURER: Thank you.

COMMISSIONER ASSELTA: Mr. Paul Kydd, Partnerships 1, Incorporated.

PAUL KYDD: We build the conversions for pickup trucks to convert them to plug hybrid electric vehicles.

And I'd like to pick up on the storage issue. And you mentioned that there's consideration of using the batteries in electric vehicles after they've been used in the vehicles to provide storage. But the technology exists right now to use those batteries while they're still in the vehicles and connect them in a distributed grid and provide distributed storage.

And it's a lot of storage. A small penetration by electric vehicles represents

a major contribution to the electric utility industry. I mean, about ten percent of electric vehicles can provide power equivalent to the entire installed

capacity of generation system in a state or in the United States.

And that's going to happen fairly soon. I mean there are vehicles being sold right today commercially, and there are going to be a lot more of them. So this is a near term opportunity, and it can have a big, big impact.

In fact, well for one thing, it's a lot of money to be made here by somebody, the value of the storage per vehicle is roughly $5,000 per year, per vehicle. That's a pile of money that's sitting there right now that can be realized if we tie them all together in a system and utilize that storage.

And you have to do that if you're going to have something like 30 percent renewable's, because renewable power is not controllable, the sun doesn't always shine, the wind doesn't always blow, you've got to

take what you can get. Somebody mentioned the situation up in Washington, that's going to be a general situation if we get up to high levels of renewals. So any utility system that has a high level of renewable energy is going to have to have a high level of storage to flatten out the

peaks and valleys, and the vehicles can provide that.

I mentioned the technology for this exists right now and right near here. The University of Delaware has been working on this for ten years, they have a bunch of vehicles, a small bunch of vehicles, five or eight, connected to PJM right now that are providing regulation service. They've tied up with a local headquarters of a utility NRG up in Princeton to take their technology and implement it. It's probably going to be implemented in Texas before anywhere else.

But there's an opportunity for New Jersey to participate in this and be a leader as we are in solar technology, to pave the way for a 21st century utility

system. And I strongly recommend that this be a part of the Master Plan. And I'm willing to volunteer to help in any way that I can do. And in fact, I've got a truck out there with a big lithium battery we can use as a test vehicle. So I just want to put this on your agenda and mention again that this is a major technical advance that's here today. Thank you.

PRESIDENT SOLOMON: Thank you, sir. Roger Bason.

ROGER BASON: President Solomon, Commissioners, and everyone here, I thank you for the opportunity to speak. My name is Roger Bason, I have a background in energy engineering, geology and oceanography. And for the past ten years my company Natural Currents has engaged in the development of equipment to provide and produce electricity from the lateral movement of the tides.

We've also engaged the industry as site developers. We have 15 sites permitted in the United States with FERC, ten of them in New Jersey. And as John had

previously mentioned, we've testified before at Stockton, Pamona.

We have eight sites in the four southern counties in New Jersey that can provide a installed capacity of ten megawatts with 8.1 megawatts of constant power generation because of the phase change of the tide, the time of sequencing of the tide changes along the southern coast provide for a continual movement of the main power of the tide along the coastline which can provide a flat base load renewable power for the state.

We have turbines that are complete,

we've gone through seven levels of testing and we're ready to install them. We have, as I mentioned before, the obstacles include excessive requirements for baseline fish studies, $100,000 per site. To be honest with you, the world community laughs at the United States, these would be considered, you know, not show stoppers in countries throughout the world, Asia and Europe. This scale of operation is environmentally friendly, EPRI the Electric

Power Research Institute has identified tidal power as the most environmental friendly, you know, the least disruptive to the environment way to produce electric power.

So just to review quickly here, I mentioned three points of our plan and proposal for the Energy Master Plan, ten megawatt demonstration project in the four southern counties in New Jersey, we have engaged TREC's with initial stages with the regulatory process which we feel should be priced around 300 to $350 per megawatt hour, and we've also requested that the BPU support our FERC agenda in streamlining in advocacy according to it's regulatory function.

When we last spoke I mentioned that

the feeder lines and location of feeder lines was also an obstacle in terms of how the siting of tidal power can fit into the grid. You recommended that we contact PJM and HAE Atlantic City to streamline that process, we did. We have a follow-up meeting scheduled for next week including

BPU commissioners and these two groups, as well as an expert team from Innovative Engineering out of Brick to work on the grid intertie requirements. So thank you very much for that suggestion.

PRESIDENT SOLOMON: You're welcome.

ROGER BASON: And we took your advice and have made some progress. So we appreciate that.

A couple quick points in closing. Let me just update you on how quickly the tidal field is changing. About three weeks ago in Canada and Nova Scotia a feed-in tariff for tidal power was established that set the rate at $624 per megawatt hour for tidal power. We submitted and responded our interest to it, we were contacted a week later with a group that wants to work with us up there. They had 67 companies respond within ten days to that initiative. So this is what happened, the lesson with

solar in the State of New Jersey, global leadership. I have spoken in Brazil, Europe, everywhere. New Jersey is a shining example. The solar program has

it's issues with SREC's right now establishing a floor, etcetera, but it is very successful. And you can see that in Canada they've sort of followed suit with an incentive program that has immediately attracted global attention.

In the UK last week that rate for they call them ROC's a REC in the UK at $450 per megawatt hour. And so you see that there's areas of the world that will take this incentive, and those will be the first ones to develop.

So I hope that New Jersey can be aggressive and follow suit in areas where it has been successful in the past. And, you know, we're very interested in working with you to define the key issues and requirements.

And if there was one ask or need I could add to this, you know, we see in terms of the area where support is required for this industry to grow and to attract other companies here is in the area of support for these environmental requirements where federal agencies require

extensive testing twice a month to establish baseline, and FERC requires five years of ongoing monitoring of many different parameters. This is the area that's an obstacle, because in planning this is often an area where you don't figure some agency is going to require 100,000 here, 100,000 there, etcetera. So if the BPU could address that issue, we would be very pleased.

But thank you very much for your attention.

PRESIDENT SOLOMON: Thank you. All right, so I've got a couple more fights to pick with FERC, it's okay, we've got a bunch of them going on.

Any other comments, anybody else from the public who would like to speak? No. Well, John, thank you, well done.

That brings us to an early end. Our last meeting or hearing will be on Thursday the 10th, and we will start at the same time, 9:30, and I will be closer to on time at the next one, I promise.

For any comments you have a couple

weeks to submit written comments. We will be reviewing the transcripts and the written comments, and any other submissions given to us in a reasonably timely fashion.

But thank you very much, John. I appreciate you all being here. Good morning, and see you soon.

(Adjourned at 12:20 p.m.)

C E R T I F I C A T I O N

I, Barbara L. Neuman, being a Certified Court Reporter, Registered Professional Reporter, and Notary Public within and for the

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