FERC Chairman Jon Wellinghoff
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I'm just going to spend a few moments talking about what I see as the energy future here, based upon not only my experience at FERC, but also my experience in 35 years of energy law and practice.

You had Steve Ballmer last night. That's quite an act to follow. So I'm going to try to project here but I don't think I can do quite the job that Steve did. But I do want to one-up him here. I've got the iPhone here. I want you to see that. My 18 year made me do that. He's an Apple fan. Not only do I have an iPhone here but I have an iPhone showing Tendril's dashboard that can show consumers how to use energy better and more efficiently. Because as Steve Ballmer told us last night, that is not a phone anymore. That in fact is a device that is a portal for the consumer to be able to use to ultimately reach their energy uses and have control of them in ways they never had before.

But that's not the only thing that's happening in the energy field. I do want to say I did go to energy innovator pioneer breakfast. It was a great event. It was a great event, and all the innovators who presented there are the ones who are going to be transformational in the industry over time.

So this next picture is not a car. This is in fact a Tesla. Those of you know, the Tesla is an electric car, all electric, it has a 230 mile range. That's me sitting in it. No I don't own it, I wish I did. It's about a $105,000 car. But the point is, that Tesla, look right behind the Tesla, right here, right behind it you can see a Scion E-box. That also is not a traditional Toyota Scion. That car has been converted to an all-electric vehicle that goes about 110 miles on a charge, lithium ion battery and electric motor.

But the point is, these devices are more than cars. And I'm going to show you why. But the reason this is important is because we have now major manufacturers going to electric cars. There's the Chevy Volt. I know that Terry Boston I think is in the audience here, Terry's got a Chevy Volt, he was telling me how much he loves it, the head of PJM. I was at Jim Woolsey's house the other night. He's got a Volt, the former head of the CIA. The Volt, I think, is going to be a transformational car. But one of the reasons it's going to be transformational is not because you can go and can get 75-cent a gallon equivalent energy by plugging in, and you can – that's the equivalence of electricity to gasoline. But you can do a lot more with it. And the things that you can do with it can actually pay you money.

One of the things that you can do is you can provide regulation service to the grid. So, it is no longer a just "car," it is now an asset for the consumer, a grid asset that provides the consumer payment back to them and at the same time provides the grid with a service at a lower cost than you can get otherwise.

So this squiggly line here that you see, is actually three lines on this graph, the green line, first of all, is power in kilowatts on the Y axis. The X axis is time over a six-hour period at 10 p.m. to 4 a.m. in the morning, when the car is charging. The green line is the car charging from zero charge up to, finally at 4 in the morning, 100 percent. So the car is fully charged. At the same time, however, that the car charging, it's receiving from Terry Boston's people at PJM a regulation signal, because it has a little box in it that's been put in the car by some people at the University of Delaware in a group called the Magic Consortium, that provides to that car a signal that is the same as an AGC automatic generator control signal that a combustion turbine receives to provide regulation service to the grid.

So that blue signal comes into the car, and the car matches it with that red signal. So it puts little increments of energy in and out as that signal comes in and out to it, and it does that in a way that provides regulation service not just like a generator, but better than a generator. It can do it faster, it can do it in milliseconds. A generator takes literally tenths or minutes to respond, where a battery in essence can do it in milliseconds.

And it does it in such a way that it's not depleting the battery in a deep charge. So it's not deep-cycling the battery, so it's not depleting the life cycle of that battery for that owner. And here's the bottom line. The bottom line is the owners of these cars, in this case there are seven of them at the University of Delaware that are being used for this demonstration, this is an initial demonstration, are getting paid $7 to $10 per day per car to do this.

And why is this transformational? Here's why: Because this is a result from a monetary standpoint, if you look at a comparison between three or four different kinds of cars. I call it the cashback car: regulation service and the cashback car. So if we talk about purchasing a conventional gasoline car, a $20,000 Ford Focus – walk in, give them $20,000 – and you use it over a period of time, in 10 years, that car, just the gasoline alone is going to cost you $30,000 plus. And that's at $3 a gallon, I did this calculation. This was like six months ago. We'd probably have to up this to $3.50, or $3.75, maybe $4 by now.

So then let's look at, you know, a Prius. It's not a plug in, but costs a little more than a conventional car, but has better gas mileage. Eventually at some point it's going to overtake that conventional car in cost-benefit because it is getting better gas mileage by the bigger battery in it and using the car in the electric mode while stopped and to start out.

But let's look at two cars that are now on the market if they had, and they don't now have, but they could be, in the next generation, very easily have the same type of controls that these scion E-boxes have at the University of Delaware. What would happen if they were paid the payments that are being paid now to these E-boxes?

Here’s a Chevy Volt, at $40,000, you can see that in less than seven years this car is better from an economic standpoint than the conventional gasoline car. And let’s look at a Nissan Leaf for example, it’s even better because its initial cost is about $32,000. And notice, I’m not throwing in any tax credits in here, were not putting in the $7,500 tax credit. I’m talking about the full manufacturers suggested retail price of these automobiles. You can see that car ultimately surpasses the gasoline car at less than five years, closer to four years.

So, roll this in to financing a car over 36 months, or 60 months, talking about $200 to $300 per month per car in payments, if you put those two together, the monthly payment for these electric cars, certainly the Nissan leaf, could be less than you pay for a conventional gasoline car. So, with this technology, with the use of this, and the introduction of this in the organized wholesale markets under tariffs that FERC approves to provide these services, we can in fact make electric cars cost effective today. Today.

So, let’s look at something else here. Let’s look at another structure, or infrastructure… This looks like an office building, I know. But it’s not an office building. It’s a grid asset. This is called The Hive. This is a complex outside of Paris, Schneider Electric’s headquarters. Some of you probably have heard of Schneider Electric. This facility has in it the most advanced, sophisticated technology from a standpoint of building control of any building in the world.

They have in this building – first of all, the employees in the building, just like most employees, have badges, and the badges have embedded in them an RF chip and that chip can signal to, and does signal to, every control system in the building – to the lighting, to the HVAC, everything. So when an employee walks into his office, his or her office, everything adjusts to the level that the employee has preset or predetermined. The lights come to the level they want, HVAC, heating-cooling comes to the level they want. When they leave, it turns off. The building knows who the employees are and knows how they are operating the building so that the building can operate in concert with employees.

In Europe, the average use in buildings today is 400 kilowatt hours per square meter per year. The European Union goal is to get down to 50 kilowatt hours per square meter per year. This building uses 65, and they believe they can get down to 50. But what’s more important is this building also is going to have the ability to start interacting out with the grid, and doing what they call demand response, wherein at the point the grid operator can signal to the building, it can change the usages in this building to modify it in ways that can make the grid operate more efficiently. And let me show you that.

Here’s a real-life example that occurred in August of 2006, which was the peak time for PJM over the last couple of years. That in this first week in Aug they had a very high peak, that their locational marginal prices, which is the Y axis here, were going as you can see, as high as $750 a megawatt hour. So, they needed to do something to lower those peaks. The actual peaks they achieved are the black lines. The red lines are the peaks that they would have experienced but for the fact that PJM called their demand response resources and asked them to come in and lower those peaks.

And so buildings responded, industrial customers responded, many entities that were on their system, part of their demand response program – and they now have over 10,000 megawatts in last demand response capacity auction – that can be used as grid assets to lower costs. The result was, over a one week period, this lowered costs by more than $200 million. They did a study that showed if they just did this in five states, they could lower costs by $280 million annually. And then a wider study was done by the Brattle group that shows that a 5 percent peak reduction, using demand response, using buildings as a resource, could ultimately save as much as $3 billion annually, with a net present value of more than $30 billion, $31 billion, over 20 years.

So I saw a group this morning, CUE, here, which is one of your innovators. I think it stands for Clean Utility Energy. They're using office buildings in blocs and groups as batteries, as storage in essence, and they're doing the same thing. It's going to happen all over the country. It's going to be a new paradigm for the electric industry.

So let's move on next to something that's a little bit closer to home. Here's a home. This actually is a model home outside the Museum of Science and Industry in Chicago. It has all the high-tech innovations you could imagine. You can see a wind turbine to the side, it has solar energy included in. But it also has all the control bells and whistles that allow the occupants of this structure to interact with that in ways and control all of that energy internally but also to control it externally potentially in ways that could benefit the grid.

So, you know, this is a model. But let me show you about what can be done now, what actually can be done now. This is one of my favorite slides. This is a slide of a dashboard of a system that I have installed in my house. And what this shows you is in real time – and I get this on my iPhone, I can get this in real time, minute by minute – the uses broken down by subsystems on my panel. And I've got my mains, which is the red line, which is all the power collectively, total, in kilowatts. And then I've got my refrigerator, my family room, my dishwasher, I've got laundry, I've got my air conditioning and furnace downstairs, I've got my air conditioning and furnace upstairs, and the air handlers for both upstairs and downstairs, and my sump pump.

This is showing you that consumption. The red line on top is the total amount used. The green line that is going across like this straight, and then drops right off, that's my family room. That's my lights in the family room, my TV set, and all of my DVR and other equipment that runs the family entertainment system. And you can see that I went to bed at 10:50 that night. Because I turned it off. The green bumps here that you see, that goes up and down like this, that is my downstairs air handler providing heat into the house, with the air handler going on and off. And it goes on and off so much, I probably need to get a different kind of furnace and I probably need to get better air handler as well. So that showed me something really clearly.

And then also the blue line at the very bottom, down here, these blue lines that go up and down, that's my refrigerator compressor, or icemaker or something else in my refrigerator that I don't have disaggregated, but it's something in the refrigerator going on and off. And then finally, we got my sump pump, which is this puple line. Unfortunately I live in an area right near the Potomac River that I get water that I've got to pump out of a well area under the basement all the time.

So what? I guess you all say. Who would want this except some energy geek like Wellinghoff? Who would want to have that kind of stuff? Well, who would want to have this is hopefully some third party that I would give it to who could be able to look at it and say, 'How can I save this person money, and how can I save millions of people money by doing things that will save the grid money?'

And one thing you could do is start disaggregating when these different loads come on. Why should the sump pump come on, the same time the refrigerator comes on, the same time that the blower comes on my furnace? There's no reason for it to. All you got to do is pump the water out, but it doesn't have to be pumped out at the same time. Why does your refrigerator compressor have to come on at the same time? It doesn't. It can be moved over as well. Why, for example, do you have to make ice during the peak of the utility's peak load? It doesn't. It could be made up at night. It doesn't need to be made at the same time. Again, there's ways to disaggregate these loads to drop the total load in that facility. And by doing that you could ultimately help the grid do things like not have to put a combustion turbine peaker on to use energy needlessly, put emissions out needlessly, and put costs out needlessly, and pay consumers to do this. If the consumer doesn't want to do it, they don't have to do it. But if they want to get paid to do it, they can choose to do it.

So this is the kind of thing that's happening in the grid.

So finally here, to wrap up as to how this all goes together, I pulled something out that Google did a couple years ago. This was in 2008, I'll talk about the other competitor to Steve Ballmer. Google is looking very much into energy as you know, as is Microsoft. They're looking at energy futures. This was one future that Google was projecting in 2008. And a lot of people were very critical of this, saying this will never happen. Because their future, if you look at it, starting out in 2008, says really that energy really doesn't grow that much as far as usage, or usage does grow, but ultimately, that energy usage is in fact supplanted by efficiency. That's what this yellow wedge is.

A lot of people said that much efficiency was unachievable. I say today, with all the things that I've shown you, all the efficiency that's out there on the utility side of the meter and all the efficiency that's there on the customer side of the meter, I think this is feasible. I think this is possible.

And I think it is possible in the sense that ultimately, we can have a future where largely we can utilize efficiency, natural gas and wind to move forward and ultimately, have those be competitive, because all those resources now are extremely competitive. Efficiency is competitive at 3 to 4 cents. Wind is becoming now competitive at 4 cents, I find out which was actually a surprise to me. I visited a wind company this morning and one yesterday. And then ultimately gas, as you've all been hearing here, we've got so much gas in the Marcellus shale and this new shale there and the new shale here, that those resources, when you take them together, ultimately I think can knit together a future that will be a very competitive future that will provide for our resources in a low-cost, efficient way that can be done.

And that’s what FERC is trying to do is enable those in the wholesale markets in ways that all these resources can compete competitively. Now, does that say we’re not going to have coal? Does that say we’re not going to have nuclear? No. It simply says let’s make them all competitive. Let’s put them together in a competitive market in a way to see who’s going to sort out. And let’s make sure we don’t forget about the demand side, and we don’t forget all those things I showed you about cars and houses and buildings that can also compete. Let them compete. Take down the barriers. FERC is trying to take down the barriers and make them all work together so we can lower costs for everybody. Thank you.