BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

DOCKET NO. UNDOCKETED

ELECTRIC VEHICLE CHARGING IN FLORIDA.
_____/

PROCEEDINGS: ROUNDTABLE DISCUSSION

COMMISSIONERS PARTICIPATING: CHAIRMAN JULIE I. BROWN
COMMISSIONER ART GRAHAM
COMMISSIONER RONALD A. BRISÉ
COMMISSIONER DONALD J. POLMANN
COMMISSIONER GARY F. CLARK

DATE: Tuesday, October 17, 2017

TIME: Commenced at 1:00 p.m.
Concluded at 4:29 p.m.

PLACE: Betty Easley Conference Center
Room 148
4075 Esplanade Way
Tallahassee, Florida

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I N D E X

P R O C E E D I N G S

CHAIRMAN BROWN: Good afternoon. Thank you so much for being here today. This is the electric vehicle charging roundtable discussion before the Florida Public Service Commission. Today is October 17th. The time is 1:00 o'clock. We have a full house of a variety of stakeholders here today.

I'm Julie Brown, and I want to again express my gratitude for all of your participation and presentations in advance. And we will begin this roundtable with Wesley Taylor reading the notice.

MR. TAYLOR: Good afternoon, everyone. We're here pursuant to the notice issued September 29th, 2017. This time and place is set for the Commission roundtable on electric vehicle charging. The purpose of the roundtable is set out within the notice.

CHAIRMAN BROWN: Thank you so much.

Commissioners, this is a topic of intense -- immense interest. I've been working on this with staff for about two years trying to get a roundtable discussion before us to consider. Back in 2012 the Commission had a staff workshop in which we heard a variety of presentations. It ultimately led to a report that the Commission gave to the Legislature at the end of 2012 that focused on the effects of vehicles on

energy consumption and the impact of the electric grid. It ultimately concluded that new challenges that EVs would pose to the electric grid were not likely to emerge until beyond the ten-year planning horizon with the exception of, possible exception of local challenges to the distribution system in areas of high EV.

So this -- again, like I said, this is an area of very -- of interest to me. I'm excited to have this be a Commission-led workshop, which we have not had before.

Today nearly every state in the union has some sort of incentives for electric vehicles on the books in order to promote the growth of EV adoption. The most common incentives are: Financial incentives for the purchase of plug-in vehicles or their charging equipment, access to high occupancy vehicle lanes or parking, and other related incentives to licensing or fleet use.

It won't come as a surprise to any of you in the audience that California has been the leader in electric vehicle incentives, and they have numerous incentives on the books. Approximately half of all EVs sold in the United States come from California, and they're supposed -- it's supposed to grow, expected to grow to about 1.5 million in 2025.

Other states have also aggressively targeted incentives for EVs as well. Colorado offers grants and rebates for purchasers of plug-ins. Massachusetts has numerous programs to encourage EV adoption. And here in Florida, regional offers have helped to defray the purchase price of plug-in EVs. For example, JEA has a rebate that ranges from 500 to 1,000 depending on the size of the EV's battery.

They're also -- EV drivers are also eligible to drive in high occupancy lanes. And just this past month Rocky Mountain Power got a DOE grant to develop electric highway corridors in Utah, Wyoming, and Idaho by installing DC Fast Chargers every 100 miles along the corridor and AC Level 2 chargers in every community in the region. And that grant is expected to encourage the -- grow the EV market twice the level it's at today.

So today we're going to take another look at the status of EVs and the necessary charging infrastructure in Florida, whether it's through pilot programs, appropriate incentives, or through other guidance. We, as regulators, I believe, should be well informed of the advancements in the technology, the appetite of the public, and the need for supporting infrastructure as we deal with some of these issues along the way.

We have presentations planned today from Edison Electric Institute, Drive Electric Florida. We also have two panels: The first representing the electric vehicle and charging station industry, and then a second panel representing electric utilities. And the idea here is -- we have a limited time today -- it's to get a perspective of each of these sectors on EV charging infrastructure in Florida. Granted, we could probably spend a day or two on a variety of topics, but since this is our first roundtable discussion on this as Commissioners, I thought this would be a nice diverse group to start out with. And then following the presentations, we will also have an opportunity for public comment.

I would like to remind all speakers that are here today that we are not here to discuss any matters that are pending or foreseeably pending before the Commission, and that is just -- in an open docket. We're just prohibited by law to discuss that right now.

So before we begin, I want to give a huge thanks and shout-out to our staff, specifically Cayce Hinton, who many of you have been in contact with, Mark Futrell, Braulio Baez, and Phillip Ellis. They've been -- like I said, they've been working on this in format for about two years. I think we have a nice

balance. And I appreciate my Commissioners' support on this. We promise we won't be here until dark, but I think we've got a nice group of information here today, and so we're going to go with that. And I apologize, I'm under the weather today, so -- but I'm excited to hear from you all.

Commissioners, this is kind of a, like I said, a roundtable format. I don't use the term "workshop," so if you have a question for a presenter, please feel free to just jump on in. Please don't take that as being rude. We want to kind of make it as informal of a formal process as possible.

So with that, we're going to start out with our -- the presentation. And we have books that have been presented to Commissioners with the presentations, but behind me, and I believe they'll be showing it as you speak, are the actual presentations for the public. And it's -- the topic is plug-in EV sales forecast through 2025 and the charging infrastructure required.

Mr. Kellen Schefter with EEI, thank you again for being here.

MR. SCHEFTER: Yes, thank you, Commissioner.

CHAIRMAN BROWN: Hit the button.

MR. SCHEFTER: Okay, great. Thank you so much for having me here. It is an honor to be here, so thank

you, Chairman Brown and all the Commissioners, for, first of all, having this roundtable. I think it is an exciting topic.

I'm Kellen Schefter. I'm with the Edison Electric Institute. Just for your knowledge, we are the trade association for all the investor-owned electric companies across the country.

For my presentation today I want to try to be brief. I think I have about 15 minutes. I'll try to get through it as quickly as I can, but I do encourage any sort of questions.

I want to hit three main topics just broadly around the benefits of electric transportation, why we're sort of talking about this. I do want to address that forecast that we put out there, so I'll go through a couple of those slides. And then I'll touch a little bit on the electric company role and what we sort of foresee that being. But, again, thank you for having this conversation. I think it's a great topic.

So big picture, what are we talking about? We are talking about transitioning the transportation sector to be powered by electricity. Right? And I do want to frame it that way, as a transition. We are in the very early days, I believe, of this transition. Right now petroleum powers electric -- or, sorry --

transportation in the US to the tune of about 90, 92 percent of the energy. Electricity's share of that is about 0.1 percent. We're not even in the full, you know, 1 percent range yet for, for electric share, so we are in the very early days.

But when we do that transition, there are a number of benefits we want to talk about. There's a customer benefit, those that directly benefit from it; there's a societal benefit, meaning everybody kind of benefits; and then there's a unique sort of grid benefit aspect to it. And I'll just touch on each of those really briefly to kind of kick this off.

On the customer benefit side, electric transportation is more efficient. Electric motors are inherently a more efficient way of converting energy to motion than internal combustion engines. And so that manifests itself in fuel cost savings.

So the one way I've depicted that here is looking at gasoline prices for the last 40 years or so, and then compared that to the equivalent electric mile-per-gallon price, if you will. And there's about a 2X cost savings right now. Obviously when gas prices are higher, there's a 3X cost savings. But this does really drive the total cost of ownership benefit for those users of electric transportation. This is why

we're seeing electric buses coming to prominence right now by transit agencies. They see this payback period.

There's a number of applications where there is a clear payback. Even though the cost of the technology upfront is higher, you save money on fuel over time; therefore, you save money long term. That's not necessarily how individual consumers buy cars today, always thinking of the total cost of ownership, but that is driving a lot of the customer benefits, and that's important to keep in mind.

From the societal benefit, there was an interesting inflection point in the last year or so where nationwide transportation emissions now surpass electric power emissions in terms of a CO2 perspective. It's a really interesting story here. There's a lot obviously playing into this. From the electric power side we're seeing a lot more natural gas, displaced coal. We're seeing an increase of renewables.

On the transportation side we're seeing vehicles increase in efficiency, but then what happens is when gas prices get lower, people tend to drive more, they make different choices about which type of car they own, and so that actually has been sort of a stickier problem, how to get emissions out of the transportation sector.

I think, again, big picture what we're talking about here is that if we plug the transportation system into the electric power system, it benefits from all the work that's going on in the power sector already in terms of reducing emissions. So if we can tie those two together, we think there's sort of this cross-sector benefit.

The last high-level benefit I'll touch on is sort of unique to the -- to our system, to the grid that we're talking about here. So big picture, again, the customer and the societal benefits are the big magnitude benefits we're talking about. But on the electric system, when we add this load to the system in a way that doesn't add a lot of cost, what you see is that actually has a net revenue that is a net benefit for customers.

This chart here is sort of a notional chart showing that the revenue can be greater than the cost to serve that load. But there's a number of studies I'm showing there that have gotten into the details in specific markets around what that looks like. But the bottom line here is that if we can add this load in a cost-efficient way, it actually does benefit all the consumers, the customers that pay into the grid, and that's something important to keep in mind.

Now I want to be careful. I'm not offering this as a cost benefit analysis. This doesn't get into the particulars of any program. But what it does say is just long term that when you add this load to the system in a cost-beneficial way, everybody in the system can benefit from it.

All right. So now transitioning here a little bit to talk about where we are in that forecast paper in particular. So over this -- this actually -- the slide is a little bit out of date now. There's over 700,000 EVs have been sold in the US so far. That's, that's awesome. An increase in electric vehicle models, a large increase in the number of automakers offering this product. So this has been showing really progress over the last few years.

You know, to put this in context, though, we're only about a little over 1 percent of new vehicle sales in the US being electric today, but, again, a good sign of progress.

So where are we headed? And this is kind of where this forecast came in.

CHAIRMAN BROWN: Kellen, if I could stop you.

MR. SCHEFTER: Absolutely.

CHAIRMAN BROWN: Going back to the last slide, are those all of the makers of vehicles that offer

electric?

MR. SCHEFTER: Yeah, right, exactly. So starting here, the GM and Nissan came out in December 2010 with the Volt and the Leaf respectively. So that's the blue and the red there.

But then what you see over time, those increase in more colors, it shows there's more automakers offering more product over time.

CHAIRMAN BROWN: Thank you.

MR. SCHEFTER: And they're taking more, more share of the market.

So in terms of where are we headed, right? That -- I mentioned we're a little over 1 percent of new car sales now. EEI and our foundation partner tried to look at a couple of different forecasts and just kind of draw a line and say does this -- what seems reasonable for a near term sort of look at where the market is headed?

We looked at a number of different forecasts -- Barclays, Navigant, the Energy Information Agency -- and they all had lines kind of going up and to the right, and we sort of did an average of them. We said, "Okay. By 2025, these are roughly saying we'll have 1.2 million vehicles, EVs sold in 2025. That'll represent a cumulative, about 7 million EVS on the road,

and that'll represent about 7 percent of new car share." So that, that's our kind of, just again, snapshot of where we think this market could be headed.

In terms of Florida's impact there, Florida currently has about 3.7 percent of all EVs sold. So if that ratio stays the same, this would represent about 260,000 EVs on the road in Florida by 2025.

CHAIRMAN BROWN: If I could interrupt you, Commissioner Brisé has a question for you.

MR. SCHEFTER: Oh, yeah.

COMMISSIONER BRISÉ: Thank you. Just a quick question in terms of what is the price point? What is the average price point for these vehicles? And would you say that the -- that right now we're in a place where the average American family can afford to purchase an EV vehicle?

MR. SCHEFTER: Yeah, that's a great question. I would say the average new car, not considering an electric car, the average transactional price for a new car I think is around $32,000. So that's important to keep in context. And that -- you've seen a number of automakers target that price; right? So the Bolt is out now at a $35,000 -- a thirty-seven five price point gets you down to 30 with the tax credit. The Model 3 is at that point, a similar point. The Nissan Leaf is a

little bit lower than that.

So those are -- when I go back to that chart, who has the most market share, it is the Bolt and the Leaf and some of those mainstream ones.

Now the average transactional price of all EVs sold, I'm not sure. I'm sure that's higher. Right? The Teslas transact at a higher point. But what we're seeing over time is as battery costs come down, you can target this more toward that mainstream audience, that 32,000 or so price point for an average new car.

CHAIRMAN BROWN: Thank you.

MR. SCHEFTER: So turning back to the forecast here, again, that was our -- we looked at some additional forecasts that were out there. Does that seem realistic? And the way I did that -- and we looked at is this a reasonable target to hit? So we looked at, okay, there's a number of car companies that have set some sort of sales target for -- oh, yeah.

CHAIRMAN BROWN: Sorry for interrupting you again --

MR. SCHEFTER: Absolutely.

CHAIRMAN BROWN: -- but a free-flowing discussion.

MR. SCHEFTER: Oh, yeah, yeah.

CHAIRMAN BROWN: Commissioner Polmann has a

question.

MR. SCHEFTER: Sure.

COMMISSIONER POLMANN: Thank you. Can we go back to Slide 7, please? Thank you.

What you're showing here are EV sales.

MR. SCHEFTER: Yes.

COMMISSIONER POLMANN: And annually and then cumulative. How does that compare to total car sales because --

MR. SCHEFTER: Yeah.

COMMISSIONER POLMANN: -- you know, what you had mentioned was percentage in the market. Does this suggest that EV sales will be a growing percentage of sales or a growing percentage of the total vehicles in place?

MR. SCHEFTER: Well, hopefully both, but this is showing the sales per year. Right? So today, 160,000 EVs sold in 2016. That's about 1 percent. There's about 16 to 17 million new cars sold in the US every year. By 2025, if we sell 1.2 million EVs, that would be about 7 percent of new car sales. So we see that share increasing over time of new car sales. Right? 7 percent by 2025.

If we look at the penetration of EVs into the total vehicle fleet, there's about 250 million cars on

the roads in the US; right? 700,000 EVs on the road is about 0.2 percent of all cars on the road. Right? So that share of total vehicles on the road obviously will be much less than the average new car sales percentage over time. But we do want that to increase over time as well. That's kind of what we're hoping will happen over time.

COMMISSIONER POLMANN: Thank you.

MR. SCHEFTER: Does that help?

CHAIRMAN BROWN: Thank you.

MR. SCHEFTER: Okay. Excellent. These are great questions.

So in terms of sort of -- we did a reality check here and we said, "Okay. Does 1.2 million EVs in 2025 seem realistic, given where the automakers are?" Right? So there's a number of car companies, particularly the premium brands, that have said, "We'll target 15 to 25 percent of our new cars will be electric in 2025." Tesla, obviously, is 100 percent electric, and they have goals out there.

So we said, "Okay. If we take all those premium brands, if they meet more or less their targets, we may have been a little conservative in our estimates, that represents about 520,000 EVs in 2025. If all the other car companies, which are the more mainstream

manufacturers, what would they have to sell in terms of their EV share to hit our forecast?" And they would only have to sell about 5 percent of their, of their cars being electric in 2025. So it adds up to about 1.2 million.

Again, this was just a reality check to say, "Okay, if these premium brands hit their targets and the rest of the car industry increases a reasonable amount as well, we think that 1.2 million number is realistic."

And we're given more confidence in that by the number of announcements that keep coming out. This slide is always out of date immediately after I put it together just because there's an endless string of new announcements.

CHAIRMAN BROWN: Have you heard of the Fisker EMotion car that's coming out in 2019?

MR. SCHEFTER: Yeah, I'm familiar with Fisker. I used to work there actually before EEI. I'm not particular with that product -- or not too familiar with that particular product, but --

CHAIRMAN BROWN: They have a battery -- it supposedly is going to have a battery that's able to charge 125 miles in nine minutes.

MR. SCHEFTER: Wow, that seems aggressive. But important to consider the electric company impacts

for that kind of charging. So that's a, that's a great point to make and one that's actually sort of -- I didn't touch on directly, but we are seeing an increase in sort of the power charging levels over time that car companies want to utilize for the cars, that being one example, and it has important impacts on the grid we should consider.

But just to pick that point up, I mean, we see -- again, I won't go through these, but there's just an endless kind of stream of new announcements from car companies, and at the end there's an increasing policy push in this direction. China has its own sort of ZEV mandate similar to what California has, but it's obviously across the whole country in China. France and Britain recently announced that they want to target banning internal combustion engines by the 2040 time frame. So long term we do see governments sort of making a strong signal that this is the direction we're headed.

All right. So now to make a transition here to talk about infrastructure. So, again, when we put these forecasts together, we found a lot of forecasts don't really consider charging infrastructure. They kind of assume it'll happen, and I think it's important to consider what does that actually mean and how are

these vehicles going to plug in and charge? Right?

So the first point here is that EVs have the benefit of being able to charge in lots of different places. Right? They can charge at home, at work, out in the public sphere. They don't have to operate like a gasoline vehicle where you get all your fuel in the week, you know, one visit to one location. Right?

So I think the first priority is charging at home should be easy. That's where most of the charging happens. That's where you have the longest time. The car is parked.

The second most frequent time the car is parked is at work, so we should make that easy and available.

The public sphere, there's a lot of different types of charging infrastructure that that could entail. You could look at charging at retailers for short-dwell locations. You could look at DC fast charging when you're trying to complete inner-city or longer trips. That's all in the public sphere. I think it's very important to note that that is a less -- a smaller share of the electricity that gets delivered to the vehicles will be from that public sphere. But it serves a lot of important roles. It can serve to help people top up on their battery capacity or charge when they're out in --

at stores and things like that. It can help enable longer distance travel for battery electric vehicles. And it can help provide a platform for car-sharing and ride-sharing and some of these other new platforms we see coming that want to use electric vehicles. So the public stuff is important; it's just a smaller share of the energy delivered.

And the last point is fleet. There's a whole realm of vehicles that could use these commercial fleets that we're not even really touching on here, but I just want to continue to point out that it's not just personal owned vehicles we're talking about. We're talking about the broader electric system. Sure.

CHAIRMAN BROWN: Commissioner Polmann. No? Okay.

MR. SCHEFTER: No question?

CHAIRMAN BROWN: No question.

MR. SCHEFTER: Okay. Sorry. Okay. So that's just a quick overshot. A lot of different types of charging infrastructure out there. All could potentially be considered within a state with an electric company. How do we make sure we're filling the gaps to meet all these potential use cases appropriately?

And so this chart is showing the second part

of our forecast that we did, and we said, "Okay. That forecast for EV sales is out there." We talked about that. Is there a way to potentially quantify how much charging infrastructure would you need to help meet that forecast? Again, we saw not a lot of these forecasts really address that point, so we took a stab at it. We said, "Are there some existing reports and things that are out there that could help us quantify this?" And there were two that we, that we used that have been used in policy cases before.

NREL has a model that they use in California to help quantify this. EPRI has a model that they use as well. And so we ran our forecast through those models and out came these sort of projections for how much infrastructure we would need to support that forecast.

A couple of, I think, points here to make. One is that we're not really offering this as the answer on how much infrastructure you need. Again, we sort of ran these through these existing models. And they are very different models. They come at this from very different points of view, so that's important to keep in mind.

But, nevertheless, the broad point here is that we need a lot more infrastructure than we have

today. The blue bars there are home charging, and this is just particularly a home Level 2 charging. So charges that typically would have a second installation in the home. That needs to scale with the market. So, again, if we're looking at ten times the EVs, we should probably see ten times the home chargers.

Workplace charging is a different one. It's hard to get a good sense for how much workplace charging there is out there today. Numbers have shown somewhere in the 20,000 or so ports approximately. In any case, that needs to scale a lot. These models were very biased, I think, toward workplace charging as an important way to serve the needs of EVs. That would have to scale on the fact -- in an order of, like, a hundred times what we have today to serve this forecast.

The public bit, again, is that -- I have it as purple today and then green in the out years. That's a little bit -- a much smaller share of the total number of charging stations, but, again, that's an important point to keep in mind. And that needs to scale as well, depending on the model that we're looking at here.

So I think the bottom line here, this is what we found in our forecast, there isn't an established way to calculate this perfectly. These are models. They will provide a gross high-level number. They don't

necessarily tell you spatially where the chargers should be. If this -- if I told you there are X numbers of charging stations in your state and that should be enough, that doesn't help you actually get to where you want to go. Right? So it's really important to look at, at a state level, how are we meeting the needs?

But this was our attempt at cutting at, okay, what is the high-level amount of infrastructure we need to meet that forecast? And it shows that we do need a lot more, and that kind of prompts the question: How are we going to pay for that? Who are the -- what are the roles of the different entities to help grow this?

Is there a question or --

CHAIRMAN BROWN: No.

MR. SCHEFTER: Okay. So setting aside the forecast, we do know that charging infrastructure is important, and we know that from surveys. And I'm just kind of showing two here. The one on the left was one that Nissan had used.

The top barriers when you asked drivers "Why are you not buying an EV?" are related to things that infrastructure could help fill. Right? The range isn't long enough. There isn't enough public charging stations. I'm concerned about my battery running out. Right? We know that's a big one.

Another way of looking at that is NREL did this survey and they said, "What kind of penalty do you perceive in terms of value for not having infrastructure?" And the high number there was if I can't drive my EV across country on an interstate, I don't have the charge infrastructure, that feels to me like a $9,000 penalty that I'm having to pay for. Right? So that's kind of an interesting way of framing it, but it kind of shows again that point that depending on, you know, how many infrastructure we need is one question, but we do know it's a barrier to widespread adoption.

So the last point, I'll go through this quickly, is just what is the electric company role here? And I think, you know, this is an important question to ask in this particular context. I sort of bucket it in three ways here, but there's a lot of different ways to slice this.

One is sort of grid integration. Right? We want this load to occur on the grid in a cost-beneficial way so we all benefit. Right? And there's particular things electric companies can do that are important. One is helping to manage charging either through rates or through education or through more sophisticated schemes, lots of different ways to do that, but making

sure that this load occurs off peak and that sort of thing. Right? That kind of gets into rate design.

Then there's the system level planning aspect. Right? All these charges popping up on our service territories. Right? All these showing up kind of randomly or driven by the market. Right? Are those going places that the grid has capacity to survey in a cost-effective way? That's something where I think electric companies could play a more assertive or proactive role in saying, "Let's actually plan this as a system. Let's overlay transportation with our grid and understand where cost-effectively it would make sense to place these things."

On the customer benefit side, I think there's an important role that we can play in terms of access and equity. Right? The chargers that are going out there today driven by Tesla, driven by potentially Electrify America, others, they're going to go where they want to -- they need to have the chargers to sell cars. Right?

I think there's an important role we can play thinking about how does everybody have access to these charging stations, to the technology. There's going to be gaps when you look at kind of these maps, and I think electric companies can help fill those in and make sure

everybody has access.

COMMISSIONER CLARK: Kellen, Commissioner Clark has a question.

MR. SCHEFTER: Oh, absolutely.

COMMISSIONER CLARK: Yeah. In terms of the integration with the utility, looking at this from a holistic perspective, has any evaluation or merit been given to actually using the, the EV system to then go back through an inverter to allow the utility to be able to take off some peak load by use of the batteries during this time period? Is that a way to integrate this into the utility system and be able to more justify the cost of the system?

MR. SCHEFTER: Absolutely. I think you're referring to sort of the vehicle-to-grid concept -- right? -- that it could, the vehicle could behave as a battery? I think that's absolutely on the roadmap that we're talking about here. Right? Long-term when there's millions of EVs, it could be a potentially huge resource to the grid to electric companies.

In the near-term, we're not seeing that in the next few years as a near-term driver for getting costs out of the system. The car companies haven't necessarily made that capability available. Likewise, the electric companies don't necessarily have ways to

monetize that necessarily. But we're seeing this happen in stationary storage as well. How do you pay for some of these services? I think in the near term stationary will kind of take the lead on that. We'll see the cars potentially play that role down the line.

CHAIRMAN BROWN: Kellen, and then just a different question. How does solar interplay with -- during off peak hours for charging? Have you done any analysis on that?

MR. SCHEFTER: We haven't directly looked, but it's a great question. And I think it is particularly in California and Hawaii where you're seeing a lot of solar generation midday and you're actually worried about over-generation to the extent that we don't have enough load to soak up all that solar.

That actually, in those instances, makes workplace charging really important. You want to get the cars where they're parked during the day and have them charge, encourage them to charge. Right? So off peak in California could look a lot like 10:00 a.m. to 2:00 and less like what we see, you know, after hours. Right? So that is an important thing to consider when we think about this infrastructure that we're trying to build. We want to make sure we have that capability built in.

CHAIRMAN BROWN: I guess you're calling it distributed technology.

MR. SCHEFTER: Yeah. You know, there's a lot of different words we've thrown around for that, but it's all important to think about. And we play a big role as integrators in all this.

I'm worried I'm going over my time a little bit, so I want to wrap --

CHAIRMAN BROWN: It's okay.

MR. SCHEFTER: Okay. It's your discretion obviously, but to just kind of finish up these, these points here. Again, I think there's an important role that we can play, electric companies, in terms of customer benefits. Right? There's -- I mentioned the access and equity argument, but also about reliability, availability.

If we're thinking about really transitioning our transportation sector to rely on electric power, these chargers need to work. They need to actually be relied on. Right? Especially for fleets and things. Right? So that's an important role I think we can play as well.

CHAIRMAN BROWN: Commissioner Polmann has a question.

MR. SCHEFTER: Sure.

COMMISSIONER POLMANN: Thank you. I don't have any feeling, and maybe we don't have the numbers, I don't have any feeling for the magnitude of the demand.

MR. SCHEFTER: Uh-huh.

COMMISSIONER POLMANN: You know, we're talking about grid integration and other issues here. But given the number of vehicles that you're forecasting compared to the capacity of the grid, what is the additional scale of the load?

MR. SCHEFTER: Yeah.

COMMISSIONER POLMANN: And, you know, what, what kind of impact are we talking about? I just don't have a feeling if, you know, there's a 1 percent increase or, you know, market of cars --

MR. SCHEFTER: Right.

COMMISSIONER POLMANN: -- what's the percentage of --

MR. SCHEFTER: It's a great question.

COMMISSIONER POLMANN: -- capacity captured on the electric grid.

MR. SCHEFTER: Yeah. And there's a number of slides that we could -- I could show that have kind of got at that, but a general rule of thumb that I've heard from our members is a 5 percent share of all vehicles on the road being electric would increase throughput on the

grid by about 1 percent. So if you scale to 100 percent of all cars, again, the 250 million cars in the US we're talking about, that would increase electric sales or throughput on the system by roughly 20 to 25 percent. We're not talking about doubling, you know, the grid here or tripling. Right? We're talking about increasing by a factor of 20 to 30 percent, somewhere in that range, the energy delivered through the system.

Now it doesn't necessarily mean we have to scale the capacity of the grid on that same scale. Right? What we're talking about here is that this load can actually help fill in the gaps where there's already excess capacity on the system. So we actually think you could serve a lot of those vehicles without necessarily needing to do major capacity upgrades to the grid. Right?

And in the near term, you asked the question before that out of the 250 or so million vehicles on the road in the US, we're about .2 percent. We are not really moving the needle in a big way yet at all in terms of electric sales. Right? You have to get to large scale to where this really starts to have an impact on, on throughput. So that hopefully helps you around an order of magnitude assessment there.

CHAIRMAN BROWN: Thank you.

MR. SCHEFTER: So the last point I'll mention here on the role for electric companies is we actually can play a role in accelerating this. Right? We can help bring these benefits forward in time, and the way we've sort of explored doing that is customer education and awareness and then helping to invest in charging infrastructure where it's needed to help grow the market.

CHAIRMAN BROWN: Commissioner Clark has a question for you.

MR. SCHEFTER: Sure.

COMMISSIONER CLARK: Yeah, I wanted to follow up on Commissioner Polmann's question related to the demand. What is the average demand per charging station? If you did a, just a typical residential single unit charging system, what's the average demand?

MR. SCHEFTER: In power or amperage?

COMMISSIONER CLARK: Power, KW.

MR. SCHEFTER: So a home charger, if you plug in your car in an outlet, would be about 1.1 to 1.4 kilowatts. Right? So it's kind of turning on a hair dryer and then a little bit more. If you do a Level 2 charger on sort of a 240-volt or 220, 240-volt circuit, you'd be maybe 6 or 7 kilowatts. And that is getting up there. Right? That's kind of almost maybe

what a house would draw.

When you look at higher power charging stations out in the public space -- right? -- a lot of these DC Fast Chargers are at 50 KW. We're looking at moving toward 150 KW, 350 KW. Those have large power impacts. But we're not looking at those in the homes. At the home it's generally about 7 KW. Teslas go a little bit higher, but I'll let them talk about that.

COMMISSIONER CLARK: Is there a diversified demand that's been calculated with that, diversified across the whole system? If you had -- if you've got this to market scale, what would you be looking at if you -- right now with the number of units out there is there a diversified demand that you could estimate that would be impacted?

MR. SCHEFTER: That's a great question. I would say in the near term the more immediate concern, rather than how much we have the capacity to deliver all this electricity, is more the question of are local circuits capable of handling some of these. If we're adding 6 KW to every house -- right? -- are we worried about circuit overload? That is a more near-term concern.

What we've seen in terms of at least the California experience, I try not to keep mentioning

California too much, but they have to report, those utilities there have to report every year how many upgrades to our local circuits are we doing due to EV load, and every year so far the last three years they've said its de minimis essentially. They're having to do a few, but it's on the order of about 1 percent.

But you could get clusters. Right? You could have neighborhoods where everybody gets a Tesla, and that would have some concerns. But overall, on the system overall, that's not a huge impact, I think, in cost in the near term.

COMMISSIONER CLARK: So to follow up on that, if you look at the utility's diversified demand and you look at winter peaking versus summer peak utilities, how does this play out when your charging stations are primarily operative at night?

MR. SCHEFTER: You know, that's, that's a great question. I don't think we've looked directly at those impacts. The -- I think the benefit from looking at this long-term is there are a lot of tools electric companies could use to help shift some of this load around. Right? So if you're worried about particular peaks, you'll have rate design that could do some of this. But you actually could have some more sophisticated ability to help shift some of this load

around. And it could be a matter of price signals. Right? It's cheaper to serve -- to charge during certain times of day, and we can build that into the system to help encourage that behavior.

COMMISSIONER CLARK: So it can be built to, say, shut off at 4:00 a.m. or 3:00 a.m. and not on a winter day or --

MR. SCHEFTER: Yeah. That's, that's all long-term capable of what we're talking about here. The chargers and the vehicles today I think are technically capable of that. It's more a question of what systems on the electric company's side and that these vendors are then implementing in their product that we can help make sure all those dots are connected. Right? That's a big question we have to answer.

Okay. So on, just on the point about electric companies can play a role in helping to invest or spur the market for charging infrastructure particularly, there's a few different models we've seen across the country where electric companies are starting to look at.

When we consider charging infrastructure, that first kind of line there, that business as usual, generally the electric company's role sort of stops at the meter, and then everything beyond that, if they want

to put in a charging station, it's kind of on the, on the customer. Right? They have to pay for all that.

We've seen a number of other models emerge. One is a "make ready" colloquially called where the electric company would invest in the infrastructure beyond what their traditional kind of meter demarcation is and help pay for some of the trenching conduit that would get to where the charger needs to be. So it's sort of thinking of the electric utility grid extending a little bit beyond to serve that particular charging station. We've seen a number of companies deploy this model. And, again, that helps reduce some of the costs to the customer.

Another model would be the electric company could either offer a rebate or own just the charger itself and then put that on a customer location and not worry about so much at that sort of "make ready", you know, intermediate infrastructure.

And then the last model would be sort of this full ownership model where the electric company would potentially pay for or own the full implementation of the full charging station and only thinking of all that as sort of an electric company asset.

And, again, a lot of different models here we could consider. There's tradeoffs between all of these.

From our perspective, we like that there are lots of different models to explore here. Some of these could be more beneficial for certain segments than others: DC fast charging versus multiunit dwelling, for example. So we like that there's, there's this growing proliferation of these types of models and we can help see what works for best segments.

CHAIRMAN BROWN: Kellen, are you aware of that Rocky Mountain Power recent announcement?

MR. SCHEFTER: Yeah, absolutely. And I wanted to touch on that in my last slide here, so I'm glad you mentioned that. That was an example where Rocky Mountain Power did get a DOE grant. What helped them actually get the grant was --

CHAIRMAN BROWN: It was only 4 million, though.

MR. SCHEFTER: $4 million, right. What helped on that side, though, was Utah actually passed a bill that allowed the electric company to offer $2 million a year for five years in EV incentives, for rebates for infrastructure. And so they're actually leveraging that authority they have to do rebates and matching that with a $4 million DOE grant, and they're helping -- that's actually helping to spur what they're able to do.

CHAIRMAN BROWN: Do you know what the cost

impact is going to be across the state to develop that type of network?

MR. SCHEFTER: You know, I don't. That's a great question. We can -- I'd let others maybe answer the question of how much does a DC Fast Charger cost. You know, the unit itself could be something like $150,000 each. So if you want to put dots across the map of Utah, like, you can kind of do some back-of-the-envelope math. But it's not an insignificant amount, but the $4 million grant I think will go a long way to help doing that base level capability.

CHAIRMAN BROWN: But it is across the three states too, the network.

MR. SCHEFTER: For Rocky Mountain Power? I'm not, I'm not too familiar with their program. I don't want to speak specifically about that. But I do know just the point here that they are able to help leverage some of their own authority and funding to help match that DOE grant and that's been helpful.

CHAIRMAN BROWN: Thank you.

MR. SCHEFTER: So the last point here is that we have seen this, this discussion around what the electric company role has played in a number of different states across the country. And I've sort of

bucketed them in three ways here just to kind of help explain this a little bit. But there are ZEV states out there -- right? -- ZEVs that have to meet a certain -- or states that have to meet a certain fraction of sales in their state have to be electric or zero-emission vehicle. California plus nine other states.

In those states, there's sort of a clear policy driver that an electric company might say, "Okay. We can help the governor meet that goal," for example. Right? And so we've seen a number of states kind of take that framing. California, Massachusetts, Maryland, and Rhode Island are looking at this question sort of in that context as well. Not the only consideration, but that is a big policy driver.

There's been enabling legislation passed, like we mentioned Utah already. Oregon, Washington, and California now all have in statute that transportation is one of the roles of an electric company. And then Nevada as well, similar to Utah, passed a law saying the electric company can help do incentives for infrastructure.

In this last sort of group of states here, there isn't necessarily a ZEV driver or a policy enabler, but the electric companies are putting forward proposals to do some level of infrastructure deployment.

I want to be careful to say this is not a slam dunk in every case. Right? We've seen wins. We've seen sort of losses, if I can frame it that way.

Kansas was pretty clear in rejecting KCP&L's cost recovery request on the charging stations themselves. Missouri said, "This is not the role for the electric company to play." We've seen other states come down in different ways on that question. Right? And so it opens up a lot of interesting policy questions that we obviously can get more into here at your discretion.

But questions around how, how do we pay for this? How do we make sure it's cost beneficial to everybody? How do we let the electric company spur investment while not kind of closing out other competitive companies that are doing their thing as well? Right? So there's always these balances to consider.

But it's -- I just want to note that a lot of states are taking up this question, so I'm really pleased that you guys are as well. Because these are some really rich, interesting questions that we can help answer and learn from what's gone before us.

CHAIRMAN BROWN: Thank you.

MR. SCHEFTER: And my last slide here, just,

you know, electric transportation is coming. I don't think it's a question of if but more about when and how quickly. A lot of different things will help accelerate this: Technology cost production, market awareness, and infrastructure access and availability.

And I think electric companies can help play an important role here not only in accelerating the market to the extent that that's appropriate, but also thinking about how we make sure this happens in a way that benefits the grid cost-effectively and that leads to positive outcomes to customers so everybody has access and can benefit.

CHAIRMAN BROWN: Excellent, Kellen. Thank you so much for your presentation. I really appreciate it. Enjoyed it too.

Commissioners, any further questions for Kellen before we move on?

(No response.)

Our next speaker is from Drive Electric Florida. He is chairman of Drive Electric Florida, Peter King. I want to thank you on behalf of the Commission for coming down here to Florida.

MR. KING: Thank you. Thank you, Commissioner or Chairman Brown, and to all the other Commissioners, for the opportunity to get in front of you and to

introduce to you an organization that is, I think and we think as members of it, quite unique here in the state of Florida, and that's Drive Electric Florida.

I am Peter King. I'm the chair of Drive Electric Florida. Formerly 13 years with the JEA in Jacksonville, the municipal utility, and recently, as of yesterday, accepted a position and will be filling the role as electric transportation project manager for Duke Energy of Florida. I'm very excited about that.

CHAIRMAN BROWN: Oh, that's good.

MR. KING: But, once again, thank you for the opportunity to talk about Drive Electric Florida. And we think -- we hope you'll see a -- maybe, if nothing else, a resource because of the wide diversity of stakeholders that are involved with the group that is available to all of the citizens of the state of Florida.

I'll start off with the group was formed about five years ago. It is a 501(3)(c), and I will tell you that it's all volunteer. There are no paid positions in Drive Electric Florida.

The mission is to advance energy, economic, and environmental security of the state of Florida by promoting the growth of electric vehicle ownership and accompanying infrastructure.

You can see our vision down there is engaging the public, educating the public, businesses, policy-makers, and I'll point out facilitate collaboration. I think that's really where some of the unique value of Drive Electric Florida is, is that we do have a diverse, unique group of stakeholders that are members.

And on the next slide, this will give you an idea of some of the categories of the diversity of the stakeholders that we have.

CHAIRMAN BROWN: Enthusiastic groups. What's that?

MR. KING: Enthusiast groups. That would be your -- and they are enthusiastic, believe me. So, for example, in the state of Florida is the Tesla Enthusiast Group that are members of Drive Electric Florida, and a lot of great input to our organization.

And, so, across all these groups, they all have their agendas and they all have their business drivers, but Drive Electric Florida is the one platform, the one forum where we can all come together and row together in the same direction for electric transportation in the state of Florida.

And I just -- this is just a slide to give you an idea of some of the, you know, really to put more of

a reality behind some of those member organizations. You can see the utilities, automakers, the Tesla enthusiasts there in the middle. And we've got some metro areas including cities and organizations that are all part of Drive Electric Florida and really led to some robust discussion when we have our meetings.

I wanted to give you a sample of some of the activities that we've engaged in, once again keeping in mind we are all volunteer. We have served as Florida embassador for the Department of Energy Workplace Charging Challenge, which is unfortunately no longer being driven by the Department of Energy. However, during the time, the few years, Florida and Drive Electric Florida served as a conduit to sign businesses and commercial customers up across the state of Florida, realizing that based on the DOE's research that if you have workplace charging, an employee is six times more likely to adopt an electric vehicle.

I can't remember how many we signed up over the course of the couple of years, but -- so one of the things we did. We've done a ride and drive event. And for those of you who haven't participated in a ride and drive event or seen a ride and drive event, they're quite unique and one of the most beneficial types of events you can do for electric vehicles because it gets

those folks out there who have never seen the car, know nothing about it, to come out and look at it and take it for a drive.

And it's interesting because you'll see someone go 180 degrees from never considering an electric vehicle to all the sudden understanding the technology of them, the power, the -- how smooth they are, all those kinds of things.

So, anyway, we did a ride and drive at the state capitol. Had a lot -- I think a lot of the power companies had a number of cars up here, and so it just gave the legislators a chance to, to try those cars out.

The third bullet, we have recently prepared a document for guidance on the VW Mitigation Trust Fund for the 15 percent carve out. We are hoping and, once the beneficiary is named, advocating for 15 percent towards the infrastructure. Now that's a call-by-call basis for every state whether they want to carve out the 15 percent. And we've just tried to be proactive and lend some guidance as to how we think that can best be done to integrate all the things that are being talked about with electric vehicles and make it work well for the consumer.

The final thing we did is this year, and we hope to make this an annual event, in February we did a

lobby day for all of our member lobbyists where we got together and explained to them what EVs were about, what are some of the policies and some of the headwinds out there facing EVs. So if they're faced with those in legislative session, they can certainly address them.

All right. That's really a background, a quick overview of Drive Electric Florida. And then I just wanted to give you a flavor of -- some of the things will be -- you've already seen Kellen talk about, and this is just what's going on in the state of Florida.

Now you'll see my slide says 560,000. So if anything tells you about the growth of EVs, you can see all of our slides are old because none of them are updated to what the new number is, which is almost 700,000. But the point here is that Florida is, as Kellen says, it's a top ten state. And the larger point being it's not a ZEV state and we also -- there are no state incentives in the state of Florida. So while it's good news relative to EVs, once again to that large number of vehicles out there on the road, it's really still a very, very, very tiny piece.

Kind of the same for sales. Florida is doing well in selling EVs. You can see there that they're number two. This is a slide from probably 2015, 2016,

so it's a year old.

This is a Florida forecast that we used from one of our stakeholders, Florida Power & Light. You can see the growth. And I think this talks -- speaks to what Kellen said. As you get towards those out years of '23, '24, there's significant ramp up in the number of EVs.

By the way, this forecast has been within, I think, 1, 1.50 percent every year. So a fairly accurate forecast. And, you know, it kind of speaks to some of the challenges there in those out years of the so-called power gap, for example, of what's going to be needed with EV infrastructure.

So to -- I'll just talk about the two benefits that we see, overarching benefits for electric vehicles. Economic benefits, we know that it's cheaper per mile to drive an electric vehicle and there's also lower maintenance. And so a study was conducted or paid for by Florida Power & Light to look into potential economic benefits, and this study found that about -- there's about a $1,400 benefit, net benefit per vehicle.

What I thought was interesting about that is there's a multiplier effect. So when you have those kinds of savings on the vehicles, you also have that money now that's discretionary and goes to other things,

to other goods and services within the state of Florida. You pay for those services. They also support sales tax. So there's this multiplier effect that ripples through the state of Florida from the savings on EVs.

Environmental benefits certainly clear the air. Lower or no tailpipe emissions. You know, one of the reasons I've put this up too is I've done a lot of EV outreach events. I started the program at JEA and we did a number of educational events, and one question we always got was, "Well, there's no -- it's not low emissions. You're plugging into a coal plant." And so this is to point out that really while we partially are, that's not really the case as much anymore and it's getting better all the time. There are more and more renewables. As you can see in Florida, 81 percent is generated without coal, and we know renewables are generated -- are growing rapidly.

CHAIRMAN BROWN: Commissioner -- pardon me for interrupting, Mr. King.

MR. KING: Sure.

CHAIRMAN BROWN: Commissioner Polmann has a question.

MR. KING: Sure.

COMMISSIONER POLMANN: Thank you, Madam Chairman.

Mr. King and also Mr. Schefter, we've heard comments that in terms of the costs, operating cost, fuel cost, that the EV is more economical, less costly to operate than traditional internal combustion, and I'm curious how that analysis is, is done. We understand that gasoline is a world commodity and has some volatility. So right now there's a, you know, kind of a general understanding of the price of gasoline. It has varied over time, I would expect to vary in the future. Is this a current comparison, you know, today's price comparison?

How do you estimate a future price comparison to that cost for electric power versus gasoline power?

MR. KING: So it is based on current in that economic study. They did look at low, medium, and high, and they do -- I think the gas price they looked at was $2.71 a gallon is what they were -- they also blended plug-in hybrids with all battery electrics and brought together a -- you know, agreed upon one number for all those.

I don't -- without looking at the study, and we could get that for you, they have looked at out years, though, and they've made assumptions on where the gas price is. I think mainly it looked like they were holding steady over the course of the next few years.

But there was a low, medium, and high look in that study, and the 1,400 number is in the middle.

COMMISSIONER POLMANN: You know, we've, we've all been aware of higher gasoline prices and, you know, moderately lower, but not, not like 67 cents when I first started driving or 25 cents when probably nobody in this room but me, maybe we remember --

MR. KING: I remember 34 cents a gallon.

COMMISSIONER POLMANN: Well, I do. Yeah. Some of us remember 25, seeing the signs. But I do remember my brother paying 25 cents because we had to scrounge for the change in the car. But, anyway, so be it.

But, for example, the cost of fuel, the source for electric power generation has been much higher in the past, so there's that balance. And I'm a little bit concerned of any analysis or conclusions that one would come to. I understand that that's important to people, but I just wanted to make that comment that I don't want to go too far without a qualifier.

MR. KING: Yeah. And --

COMMISSIONER POLMANN: That's just my comment, that there is some qualification around that. So thank you for, for that comparison, but --

MR. KING: And I'll just say this: Over the

course of last -- you know, when we were doing especially the lunch and learns and we had would throw up the price of gas when it was 3-something and it started to come down, we thought, "Well, this isn't going to be much fun of a lunch and learn." But what we've still seen are the numbers of EVs continue to hold and even increase. So while gas prices are certainly a large factor, we think other things are becoming, with EVs, even more compelling, and that's just the technology in the cars and the convenience of charging them at home and those kinds of things.

COMMISSIONER POLMANN: Yeah. The EV as a vehicle has many other benefits.

MR. KING: Absolutely.

CHAIRMAN BROWN: Thank you.

MR. KING: Okay.

CHAIRMAN BROWN: You're on environmental benefits.

MR. KING: I'm still here. Yeah.

CHAIRMAN BROWN: Yeah. You can, you can move it along, if you'd like.

MR. KING: No, that's okay.

So I did want to put up there, so once again we get the coal plant, like I said, comment. And I'll just direct you to a great study that's been done by the

Union of Concerned Scientists. You may have seen it. They published their original report in 2012 called ***State of Charge***, and they looked at 26 generating areas across the country and really looked at if you plug in in one of those generating areas, what does that look like compared to a gas engine car as far as greenhouse gas emissions? And the study was just updated and it's now called ***Cradle to Grave***, and they've included the manufacturing process as well. It still shows that over the lifetime, the useful life of the car, it's about 51 percent, I think, better for the EV.

But without taking that into account, you can see that the average across the country is plugging a car in is equal to a car, gas car that gets six -- an electric car or gas car that gets 68 miles per gallon. Here in the southeast it's 51. Up in the northwest where there's a lot of hydro renewables, it's about 91 miles per gallon.

So the last point once, I just -- you know, once again, thanks for the opportunity to introduce you to Drive Electric Florida. And I think the most important thing, we just want to let you know that we're a resource of a lot of different stakeholders from a lot of different viewpoints and that we are certainly -- welcome any collaboration with the Public Service

Commission or any other organizations across the state when it comes to advancing electric transportation in Florida.

CHAIRMAN BROWN: Thank you so much, Peter. And looking forward to your next legislative session. I guess you're going to do that same event or drive -- y'all are going to do that event at --

MR. KING: We're all volunteer, so if you have some volunteers and some resources, it's a lot of --

CHAIRMAN BROWN: Are you still going to be involved in Drive Electric in your new capacity?

MR. KING: Absolutely.

CHAIRMAN BROWN: Okay.

MR. KING: They won't let me go.

CHAIRMAN BROWN: They won't let -- well, thank you.

And, Britta, before we get to you, we do have a special guest in the audience. Representative Fischer is in the room. And I believe he has filed -- please come on up. I believe he has filed legislation regarding this issue, and he would like to just say a few words in advance.

REPRESENTATIVE FISCHER: Thank you, Madam Chair. First, I wanted to thank the Commission for being forward thinking. I -- there's very few of us

engineers in the legislature. In fact, I think there's only two of us. I happen to be an electrical engineer with a utilities background, and I work in transportation now.

So this, this year there's a couple of bills that will be filed that relate to electric vehicles. Today I filed the autonomous vehicle bill, which will, as you know, autonomous vehicles are going to come out as electric vehicles. So there will be some retrofits for the gas-powered ones. But autonomous vehicles will come out as electric, so that will, I think, enable and encourage their adoption.

There's also some legislation that I'll be filing for the Smart Cities Challenge. So there's a federal Smart Cities Challenge here in the state. I'll be working with Senator Brandes hopefully on this bill, and it will be to use state resources to encourage cities, counties, regional transportation agencies, utility companies even to do projects that are related to autonomous connected moving towards electric vehicles, setting up the infrastructure for that.

So I think what you guys are doing here today, I'm very appreciative of that as a policymaker. I came -- drove over from Jacksonville to hear what, what you guys said and what these presenters are going to put

forward because I want to make sure that the legislation that I put forward is going to be in line with where I think the industry is going, where our regulators are looking at. And my goal is just to encourage it and get us to embrace the future. Florida is the third largest state in the union, and this deployment needs to happen in Florida first.

CHAIRMAN BROWN: Thank you so much, Representative Fischer. And I actually concur. If I was a legislator, I would be doing the same thing. So I appreciate you taking the time to come up here. And, of course, we're in a different capacity as regulators, but I appreciate your efforts on pursuing this and look forward to your legislation and seeing where it ends up this session. And there's a lot of different stakeholders here today. This is just the first of many dialogues that we're going to have on the topic.

Commissioners, do you have any comments or questions for Representative Fisher?

(No response.)

Thank you for taking the time to come out here.

REPRESENTATIVE FISCHER: Thank you, Madam Chair.

CHAIRMAN BROWN: Thank you.

With that, Peter, thank you for your presentation.

We're going to move on to Britta, Britta Gross. She is the general manager of Advanced Vehicle Commercialization Policy. Britta, welcome.

MS. GROSS: Thank you, Madam Chair and Commissioners. Thank you very much for setting this up. Well, first of all, it's really, it's really, really important. I'm very glad to participate in the conversation here, so stop me any time you want. I'm going to try to breeze through this too because I know you have all the slides up there.

The next slide -- oh, I get to do it. So the next slide is just for anyone in the room who doesn't really understand the bandwidth of all the products out there that are "plug-inable" -- all right? -- plug-in electric vehicles. They cover sort of the spectrum from plug-in hybrid electric vehicles, all these things plug in. Those are more blended. If you hit the gas pedal pretty hard, you're probably going to get the gas engine to come on in addition to the battery pushing -- moving that vehicle.

You might have heard of the Prius Prime, the Toyota Prius Prime, the Ford C-MAX for fusion energy. These are examples of PHEVs. And typically maybe you

can get maybe 10 to 30 miles EV, electric out of that if, if you're driving at sort of careful speeds and so on and not doing too much load on the vehicle.

EREVs in the middle, extended range electric vehicles, these are vehicles -- to my knowledge, there's still only, like, the Chevy Volt and the Cadillac CT6. These are vehicles that are all battery until you run out of the battery on board and then it switches automatically over to a gas engine on the vehicle. So it's all battery until it's gone under all load conditions and then moves over to the, to the gas engine's backup, and that will take you across country, if you want, just like a regular gas vehicle. And those vehicles get somewhere between 40 and 60 miles all electric driving. It's important to understand sort of the frame here and what we're dealing with when you're thinking about infrastructure needs.

And then finally on the right-hand side, certainly a category that everyone easily understands, the battery electric vehicle category, BEVs. So these vehicles today, you see a lot of first generation battery electric vehicles that got about 80 miles of range, and now you're seeing, like, the Chevy Bolt and other vehicles in the 250 EV mile range. And so technology is getting really much improved in just a few

short years. But that's the bandwidth. That's sort of the space that plug-in vehicles operate. So quite a lot of options for consumers today in the marketplace.

The next slide I'm sure I showed five years ago when I was here again the last time because I use this all the time. Because it doesn't matter if you're driving a vehicle with 300 miles of battery charge or 200 miles or, or 50, 50 miles of battery range, the bottom line fact is that most Americans, 78 percent of Americans still commute to and from work less than 40 miles a day.

So 40 miles becomes this really important number and why it's important to offer workplace charging just to make sure we're offering that as even a way to top off a vehicle if you're sort of running out of, of electric range even if you have, like, a plug-in hybrid vehicle.

But -- so, so, so infrastructure, public infrastructure, it's a different issue if you're talking about trying to do a long trip beyond what you normally do every day. That's a whole different conversation. We're going to talk a little bit about that today too. But certainly just sort of what's the basic use of electric vehicles and any gasoline vehicle sitting in your driveway today, it's this 40 miles is really

important to make sure that we have solutions both home, workplace, and then also the public charging, public charging as well.

So where are we on the curve of adoption? We are still pretty early. The innovators are the folks that run out, they buy the vehicle at any cost, at any -- you know, given any inconvenience, it doesn't matter, they're going to buy these vehicles. And I'd still say that we sort of characterize the market today in the early adopter space. We still haven't hit the mainstream guys, the ones that are really trading off gas versus electric and so on. We're desperately trying to get the vehicles into that point in the market, which is why we're bringing vehicles that should appeal to the mainstream buyer today with the price points also right there in the middle of the spectrum.

But I would still characterize the market as the people that know about these vehicles are going out there and seeking the information, and that, in my mind, is really an early adopter and not really a mainstream buyer.

If I just quickly show you how much progress has been made from the automakers' side, the best way to do it is just show you a slide to just cast your eye down the two columns of numbers. The first -- the

left-hand side there is the first generation Volt that came out in December of 2010. The second generation Volt came out about a year and a half ago now. This is our second generation of technology. So in a short span of maybe five, six years you see what happened. And there's not a, there's not a performance spec on the second generation Volt, the Volt, that isn't actually outperforming the first generation Volt.

So we had 38 miles of electric range. Now we have 53 miles. 37 fuel economy on the gas side, 41 now. It was a four-seat -- a four-passenger capacity vehicle. Now it's a five-seat vehicle. Zero to 30. Zero to 60 is faster. More torque. Better charger onboard capacity, which means a faster charge, and just, therefore, better electric vehicle miles traveled further and further. So the technology has vastly improved over where it was before. We're very, very -- we feel very, very good about the battery technology itself. The batteries are holding up superbly actually out there in the marketplace. So a lot of really great things have happened with the technology.

Here's the lineup of the battery electric vehicles. Here we were with the Spark EV four years ago, our first generation EV technology, and now where we are with the brand new Chevy Bolt EV that just came

out in the last year. 82-mile range back four years ago, just four years ago, an 82-mile range vehicle, now 238 miles; four-seat, now it's a five-seater, same thing on the capacity, the passenger capacity, the volume space; speeds; the charger is now double the size of what it was before.

CHAIRMAN BROWN: Britta, do you have predictions of what it's going to look like over the next four or five years?

MS. GROSS: So I think that's a really interesting comment because, you know, you almost think, okay, maybe you're thinking I'm going to add another column here and now the numbers are going to get, you know, three times longer range and all that stuff. And I'm saying -- I'm actually going to say a little bit, something a little bit different.

If cost is the barrier for a lot of consumers in the marketplace, our primary objective is to get the price out of -- the cost out of these vehicles so we can offer it at a lower price to consumers. So if we think we've sort of reached the point where consumers say I won't buy an EV unless it's a 200, it has at least a 200-mile range, we think we've delivered that now. So now we're watching to see if that actually made the difference that we thought it would make in the

marketplace, and our focus has to remain on the price of these vehicles.

So will we deliver a vehicle next time that has a 600-mile range? I'm going to bet that we probably won't. It can be done, but why would we put that kind of price point on a vehicle? We're really aiming to bring this down to the point where mainstream -- all of us in this room can go out and buy one of these vehicles and love, love the price point that you purchased at.

CHAIRMAN BROWN: Commissioner Graham has a question for you.

COMMISSIONER GRAHAM: Well, you pretty much touched on it. When you were talking about where we were first generation, where we were second generation, the analogy that pops into my head is the flat screen that came out 15 years ago. Did you buy it 15 years ago when it was $4,000?

CHAIRMAN BROWN: 10,000.

COMMISSIONER GRAHAM: 10,000. Did you buy it, did you buy it five years ago when it was a thousand? Do you buy it now when it's 500? I mean, it's just like solar panels. I mean, it's constantly getting better and cheaper, so when do you pull the trigger?

MS. GROSS: So when do you pull a trigger? You mean, as a consumer?

COMMISSIONER GRAHAM: Yeah, I mean, you know --

MS. GROSS: I would say where are you on the spectrum of adoption? Are you an innovator? You already bought. Are you an early adopter? You're, like, at that point right now? If you're mainstream, you're still kind of waiting to make sure your economics at home make sense to you and the car you buy. And also it takes four years or five years or six years for folks to go out and buy a new car. They don't buy a vehicle every year.

So our time, our period of time for waiting for consumers to sort of be ready to enter the market is longer than buying the new -- the newest cell phone or a flat screen TV. It's a little bit different projection.

COMMISSIONER GRAHAM: I just got my flat screen last year.

MS. GROSS: I wasn't much ahead of you. I know where you are on the adoption curve.

So, so the very bottom line, though, where was our confidence with EVs? Well, the Spark EV we only offered in three states because of the lineup of the, of the specs there and what consumers were looking for. And now the Bolt EV is in 50 -- all 50 states now and already rolled out to all the Chevy dealers there. So a

lot of progress has been made.

If you ask, if you ask, if you ask consumers, though, and journalists how do they like these vehicles, the technology is phenomenal. Drive one of the vehicles. They're like spaceships on wheels. They're quiet, they're seamless, they've got a lot of torque instantaneously at the, at the red light when you're setting out to accelerate. The vehicles are phenomenal.

And these are not -- the awards of the Bolt EV, for example, is a very awesome mirror image of what the Volt won back in the 2010 time period, too. These are not green magazines. This is Motor Trend Car of the Year, this is North American Car of the Year. These are big awards that these vehicles meet -- get. And this is an example of what the industry is experiencing.

Consumers and writers and journalists and car fanatics love electric drive. So we know it's the future, and the question is only how much more can we -- how much quickly can we accelerate the adoption here?

This is the adoption curve. Kellen showed something a little bit similar. The good news is that we have had year over year increases in EV sales for the last 24 months. So 24 months in a row January of this year beat out January of last year and so on. And so we're on a good, we're on a good pace. We're improving

our sales. We're at about a 31 percent sales growth this year so far over last year. It's good growth. It's not exciting growth to some of us. It's good growth, though. It's solid. It's there. What do we do to really pop this thing and get to the next level?

The -- we've talked a little bit now about the individual benefits when you look at the specs on the vehicle and how far the technology has come. It's very clear what the benefits are to the individual. There are so many societal and utility grid benefits if we can get to scale on these vehicles.

I think a lot of -- you guys have touched on this. You've talked about V2G. We've talked about bi-directional power flow from the vehicle back to the grid, but there are a lot of things in between here and there, things like just stopping and starting charging or flowing electricity into a vehicle at 10:00 a.m. in the morning because there's a lot of solar on the California grid.

There are things that we can do that are really smart that are actually possible today. And Kellen was right; it's possible today. We have features in the car. OnStar is all set up. We are in the process now of just -- of commercializing these apps on the vehicle so that signals from utilities could then

just go right into OnStar and command their customers' vehicles to do whatever they've signed up to do probably for a little bit of pocket change and their willingness to cooperate with the utility and charge when they say it's good and not charge when it's not so good.

So these things are possible today. It's just we -- the industry is working on standards, the utilities have to get their apps ready, and so on. All of this is possible, but scale is really going to matter. All these benefits that we want matter when we get to scale.

If you ask consumers, though, why aren't they buying EVs today -- this is a study that came out last summer. This is Altman Vilandrie, who does a lot of customer survey stuff on high tech stuff. They found that, first of all, 60 percent didn't know anything or very little about EVs when they surveyed them last summer, 2,500 consumers across the country. So we already have a consumer awareness problem. That's very clear.

The second thing, though, is of the 27 percent that knew something about EVs, 85 percent said they wouldn't consider it because there's just not enough EV infrastructure.

CHAIRMAN BROWN: Well, can we -- can I ask you

a question on that? What is GM doing to address the charging -- lack of infrastructure?

MS. GROSS: So, number one, I'm here. That's one thing I do. And I know almost, I know almost everybody sitting at this table here because we spend a lot of time talking to public service commissions, with utilities. We've invested money in early infrastructure. We've certainly participated and led standardization efforts at SAE to develop the J1772 industry standard for charging. Those are the things that matter the most just because we are designing for 10, 20, 30 years down the road. This has to work.

We've been -- we purchased the first, I would say, a dozen DC Fast Chargers because when the standard first came out, who -- you know, we already had CHAdeMO, we had Tesla doing their thing. What's with this SAE standard that everyone else is signing up for? And it was very clear to me that we needed to sort of invest in a little bit of charging just to get utilities starting to grease the skids in the suppliers' factories, get the hardware out there and utilities install this hardware to learn and understand by doing what the impact is. So --

CHAIRMAN BROWN: And I'm going to ask that same question to the other manufacturers too here today.

MS. GROSS: Yeah. So, again, we, you know, we, in the -- I guess I would just say by virtue of history we have learned that -- our viewpoint is that on the EV program, we paid for all the infrastructure. We worked with about five or six utilities in California, Arizona, and Southern Company in Georgia, and we paid for the infrastructure. They installed it. We bought the hardware. And we learned that there was no end to how much you have to pump into this market, and it's not our area of expertise.

What we did learn in that, in that experience is how valuable the utilities were. They are experts. They understand site selection. They know where their loads are. They know where their transformers are. They understand that business. And so our mission has been for the last five years is to work with utilities to find the way forward to invest in infrastructure so that our market can grow. Because in the end at scale, this makes a big difference to the utility industry. This is a huge opportunity.

CHAIRMAN BROWN: Thank you.

Commissioner Clark has a question.

COMMISSIONER CLARK: I want a quick follow up on the charging system. I think that's one of the concerns that I realize there is -- there has been a

standard adopted. But are all of the current producers playing by the rules and following the standards, or are we going to end up with an Android/Apple issue here again?

MS. GROSS: So I think you can ask Tesla what they think about that, too. I think that -- not at all.

COMMISSIONER CLARK: I take it there might be an exception here.

MS. GROSS: Well, you know, look, necessity -- there are things that change over time as well. Tesla moved out fast with a DC infrastructure that was -- you know, they wanted to be a very leading player in the industry, and so they moved fast with something that just wasn't standardized. Nissan did the same thing. They pulled off the shelf some hardware that came out of Japan called CHAdeMO, and so that's what they used here because they wanted to go out before a standard was ready. Not a problem at all. It's just now what happens? So with the exception of Nissan and Mitsubishi really, who use the CHAdeMO, the entire rest of the industry is using the SAE standard and plans to use the SAE standard. So the German automakers, the North American automakers, and so on.

Tesla is a little bit different. They had moved out very fast, but also they have adapters that

they sell that make their hardware compatible with CHAdeMO systems. So, and I wonder also, it's a great question, you know, if, if there comes a time when there's enough SAE infrastructure out there that, in fact, everyone migrates with either adapters or with just converting charging systems. Those are minor issues in the big scheme of things once the standard has made itself available and it's prevalent across the country.

And I would also suggest that the VW settlement, and I know we don't have a lot of time to go into that stuff, but this VW settlement has two portions. One is the state portion that Peter alluded to that's very, very important for the state of Florida. I think there's about $166 million available to Florida in that thing, of which 15 percent can be used for EV charging infrastructure. But there's also a national plan through Electrify America. That is another $2 billion program, and that will be laying a national network of EV charging stations, DC compatible.

So, I mean, there's a lot happening, and a lot of the voices here at the table have helped provide voice to that conversation about national infrastructure, home, workplace. This whole thing is sort of building momentum of what needs to happen.

CHAIRMAN BROWN: Thank you.

MS. GROSS: All right. So it was very interesting to hear Representative Fischer talk about his new legislation. There you are. Thank you very much.

CHAIRMAN BROWN: Still here.

MS. GROSS: So, so what's really interesting now is that I know that Florida has made it very, very clear, especially Senator Brandes, very, very clear that Florida sees itself as a real leader in autonomous vehicles. And I've always been a little perplexed that we see ourselves as this leader in, in autonomous vehicles and we've somehow skipped over the part that says they're all going to be electric. So where's the infrastructure to support this autonomous future that we want?

We have to build infrastructure and it's got to feel like it's everywhere or automakers won't bring their autonomous vehicles down here. We have got to have a fully workable, usable, perceived wonderful infrastructure for charging vehicles.

This is an example -- this is a picture of our Bolt EV in San Francisco. We have a fleet of 180 self-driving vehicles now that are being tested in San Francisco; Scottsdale, Arizona; and the Detroit area,

and so it's very, very important.

Another thing that we are doing to raise consumer awareness for EVs is we have a very energized car-sharing and ride-sharing program at the company where we are now also, where there's enough infrastructure, introducing EVs like the Bolt EV into the fleet. So we've got Volts in some places. We've got Bolt EVs in some of the fleets as well.

What's really important here is what this can do for consumer awareness. So look at this next slide right here. And what you see is that this state -- this slide is also out of date, I might point out. We've -- at the bottom number down there, the 140,000 Bolt EV riders in just 180 vehicles since February of this year, it's actually 200,000, 200,000 passengers have ridden in a Bolt EV. So they're not asking about "What's the weather today?" to the driver. They're saying, "What is this we're driving? I haven't seen anything like this. I don't -- where's the noise?" And so the conversations are very different. It's a very exciting way to get these vehicles out there.

And the data from those vehicles is really phenomenal in how much infrastructure they need and how much vehicle -- infrastructure they're using. In fact, we count on being able to put an EV into these markets

only when there's about eight DC fast charging stations for every one vehicle we want to put in these fleets. We have to have DC charging infrastructure. These drivers are driving hundreds of miles a day taking people out to bars and clubs and dinners and movies, and they need a lot of DC fast charging infrastructure. That's very important.

We have a long-standing relationship with a lot of the utilities in here, certainly all the utilities here in Florida, because the role of the utility is so key in where we're trying to all head together.

If I look specifically at Florida, you can see there's a huge opportunity. So what I've got here is a map of where the SAE compatible DC Fast Chargers are. You can see there are 56 in the state of Florida, but you can see my problem. My problem is if I own a Bolt EV and I live in Orlando and I'm trying to come to Tallahassee for a meeting, I can't quite make it. And so we have a problem where there's just nothing up there in the whole Panhandle and coming down to Orlando, and we've got to deal with that issue. And even the confidence of driving from Orlando down to Miami, we just -- there's just a, just a vacuum of what's needed out there to support automakers and their vehicles.

I won't go into this. Kellen showed the same slide, but sort of horizontal instead of vertical, so I won't go into it. But guidelines on what kind of infrastructure is important: Home, for different reasons; workplace, because it helps sell vehicles; and then this perception of infrastructure has got to be a national and statewide network of charging, and especially important for autonomous vehicles as well.

And then why should utilities engage is my last slide. We need to see utilities engaging in all aspects of infrastructure. Home, because they have the relationship with all the consumers in their service territory. That is something that even a dealership cannot replicate. They don't have these kind of connections to consumers. They can explain the benefits and the opportunities of home charging.

Workplace charging, get active in working with your key customer clients and key corporate relationships there in workplace charging and because the opportunity during the daytime when vehicles are parked there also at least eight hours a day in a public space.

And then DC fast charging for all the obvious real and perceived issues of having a visible solution for fueling your vehicle.

And then maybe I'll just jump to No. 3, engaging actively in PEV, electric vehicle outreach and education. I know a lot of the utilities here in Florida, Florida Power & Light, TECO, OUC, very, very active in ride and drive events, always showing up with vehicles. A phenomenal job by actually the Florida utilities in getting the word out in those kinds of forums and adopting the vehicles themselves. So kudos to the utilities for doing that.

But we've got to do more in this area to recognize that this is a learning transition we're in. This is why we require the expertise of the utilities to engage. And then I believe we're in this, sort of this niche place in the market. The Bolt and Volt, they sell really like high-end sports cars. That's how the folks shop for them. That's how they seek them out. It's kind of the price points they're looking to pay. And until we get utilities and infrastructure way out there, I think we're a little bit stuck in niche. So we want to see the utilities and the regulators really join forces here and figure out how to change the landscape.

CHAIRMAN BROWN: Thank you, Britta. Commissioner Brisé has a question for you.

COMMISSIONER BRISÉ: Going back to, going back to your slide that you have showing the, the layout of

where the publicly available charging stations are, so on the slide it says, "Public nonproprietary chargers." So does that include if I go to Whole Foods and then there's a charging station there? Is that included in the public nonproprietary, or is that proprietary?

MS. GROSS: Yes, it would if I were showing Level 2. I don't, to my knowledge --

COMMISSIONER BRISÉ: Got you.

MS. GROSS: -- know if Whole Foods have Level -- have DC fast charging. These are just the DC Fast Chargers around the state. But, yes, public and nonproprietary would include Whole Foods as a compatible charger.

COMMISSIONER BRISÉ: And those types. Okay. Perfect. Thank you.

CHAIRMAN BROWN: Thank you, Britta, for your presentation.

MS. GROSS: You're welcome. Thank you.

CHAIRMAN BROWN: It's very interesting.

Patrick Bean, he is associate manager, Energy Policy and Business Development for Tesla. Hello. Thank you for coming.

MR. BEAN: Hi. Thank you, Madam Chair, and thank you, Commission, for the opportunity to speak with you today at this roundtable. My primary role in

Tesla's policy and business development team is to work with utilities and help them with their electric transportation initiatives. And as you heard the previous speakers, there are a lot of potential benefits to ratepayers of electric vehicles, and we've approached this as electric utilities can play roles in overcoming kind of three key barriers.

One is education and awareness of customers of EVs; two, infrastructure, working together to deploy infrastructure; and three is that total cost of ownership, which Kellen talked about, and that could be through rate design or other programs.

So through my presentation I'm just going to give you an overview of the Tesla vehicles, the charging infrastructure, and a little bit into the customer experience for Tesla.

So to begin, our company believes that at some point we must achieve a sustainable energy economy. So our products are designed to try to accelerate that. That's what we -- that's the core mission of our company.

So we've got three kind of main buckets of products, all electric vehicles. We have storage products, and this is a picture of a power wall which you can put on your home. We also have power packs

which are --

CHAIRMAN BROWN: How much is that power wall going for?

MR. BEAN: So it's about $7,000 per power wall installed.

CHAIRMAN BROWN: How many would, like, a 2,000 square foot home need?

MR. BEAN: It depends on -- so that, that product is 13.5 kilowatt-hours. So it really depends on how much you would want by how many hours and whether you'd want your entire home served.

CHAIRMAN BROWN: Powered.

MR. BEAN: Yeah.

CHAIRMAN BROWN: Thank you.

MR. BEAN: You're welcome. And we also have solar products. So those are the main three, and obviously I'm here to talk about the vehicles but would love to talk to you about the others after.

So basically Tesla was created -- the idea was to create vehicles that show that people don't have to compromise when they go to electric vehicles. So they should have a similar range. They should have better performance. So you shouldn't be sacrificing when you get an EV.

So part of the design of the company about ten

years ago was to create this low volume, pretty expensive sports car, and then take that money and experience and then develop a mid-volume more affordable vehicle, which is the Model S and X, and then take that money and experience and apply it to the mass market. So the secret master plan really isn't that complicated: basically to get these products to scale. So that's where we are now with Model 3.

CHAIRMAN BROWN: But like you said, Tesla is getting into the battery storage, solar power panels. So it seems to have gone off the --

MR. BEAN: We have two master plans. So the first master plan did include solar, and I'd say it's almost about a year ago that our CEO did release the secret master plan part deux, which includes how this is integrated as a company.

CHAIRMAN BROWN: I've got to look at that.

MR. BEAN: Yes, I can send it to you.

So just to give an overview of our, our vehicle lineup. So the Model S is a large sedan. It's the quickest four-door sedan ever built. So zero to 60 in as little as 2.5 seconds. It's got a pretty long range, so up to 335 miles per charge. All-wheel drive, so all-wheel drive in that there are two motors, one in the front and one in the back. And there are two,

currently there are two battery options, a 75 kilowatt-hour and a 100 kilowatt-hour battery.

These come equipped with auto pilot, which is an advanced driver assistance program that's designed to give customers still a hands-on experience but to be designed to provide more confidence when they're driving, increase their safety, and reduce the workload particularly with highway driving.

This is a large car, as I mentioned. It can seat up to seven. So when you purchase a car online, you can actually get jump seats in the back for children.

CHAIRMAN BROWN: Commissioner Brisé has a question for you.

MR. BEAN: Yes.

COMMISSIONER BRISÉ: A quick question on the sort of semi-autopilot function. How smart does the road have to be in order for that to be totally efficient and effective?

MR. BEAN: What we've said is any -- basically what would benefit regular drivers, the car -- the design of the roads will be good for autonomous vehicles in the future. So that means making sure that lane lines are clearly drawn so that the car knows where it is, and also making sure with construction zones that

all the requirements are met. So really it's whatever is good for drivers today will be good for autopilot and autonomous vehicles in the future.

COMMISSIONER BRISÉ: So, in essence, what you're saying, the onus is on Tesla, as a manufacturer, or any manufacturer that's trying to do the semi-autonomous or complete autonomous cars to, to react to the, to the infrastructure around it and not the other way around.

MR. BEAN: Right. That's what -- that's our -- what we're doing today.

And then the final point is the car has achieved the highest safety rating in America. So if you think about the car, you don't have a large engine block in the front because the motor is more compact; your battery back is on the bottom, so you have a low center of gravity, which allows you to have a larger crumple zone in the case of an accident.

CHAIRMAN BROWN: And how much is the Model S?

MR. BEAN: So this starts at 74,500.

The next one is the Model X. So this was released a couple of years ago now. So this is our SUV. This is the quickest and safest SUV on the market, up to 295 miles of range. Again, zero to 60 in as little as 2.9 seconds. Again, all-wheel drive, so utilizing dual

motors, and also with a 75 kilowatt-hour or 100 kilowatt-hour battery option. Also has autopilot equipped and seats up to seven passengers.

CHAIRMAN BROWN: How much is it?

MR. BEAN: 79,500.

CHAIRMAN BROWN: For every working mom. Yeah.

MR. BEAN: Okay. So --

CHAIRMAN BROWN: I'm sorry. I'm sorry. The commentary just popped out.

COMMISSIONER POLMANN: We test, we test drove one of these at SEARUC.

MR. BEAN: Okay. Great.

COMMISSIONER POLMANN: It was not the $79,000 one.

MR. BEAN: We're -- if you're going to be at NARUC in Baltimore, we're going to try to do some test drives there as well.

COMMISSIONER POLMANN: Are you going to bring the $79,000 version or the $156,000 version?

MR. BEAN: I'll see what, I'll see what I can do. But, yeah, you'll still get the same experience, just maybe not as nauseating, not as nauseating.

And the next -- the Model 3, so this is our kind of mass market sedan. So this began a production ramp in July. Designed to be zero to 60 in less than

5.1 or as little as 5.1 seconds. There are currently two size -- instead of battery packs, talk about range. So you've got a 220-mile version and a 310-mile version, a long range version. This also comes with -- or has an option for autopilot and starts at $35,000.

CHAIRMAN BROWN: Commissioner Brisé has a question.

COMMISSIONER BRISÉ: Does this model also have the, the option to remove the battery pack?

MR. BEAN: Not at this time.

COMMISSIONER BRISÉ: Okay. Thank you.

MR. BEAN: And this -- so our last, I think it was in August, we had 455,000 net orders. So people who put thousand dollar deposits on this vehicle.

So next I wanted to get into our charging. So Tesla believes that a critical component to the adoption of electric vehicles is making sure that customers have a convenient and seamless way for them to charge their vehicles. So to that end, we've got a supercharger and destination charger network, and we've also got some equipment for home charging.

CHAIRMAN BROWN: Thank you.

MR. BEAN: So first, for super charging, this is our DC fast charging network, so these are designed to get customers on the road, back on the road quickly.

So these --

CHAIRMAN BROWN: Do you own -- does Tesla own these supercharger stations here?

MR. BEAN: Yes.

CHAIRMAN BROWN: Okay. And how quickly are they?

MR. BEAN: So they're up to 120 kilowatts, so the rate actually declines as your battery gets fuller for -- to preserve the battery cells. So you can get, in about 30 minutes, about 170 miles of range, up to 170 miles of range.

CHAIRMAN BROWN: Wow.

MR. BEAN: So we're expanding this network pretty quickly. Right now we've got 1,000 stations and 7,000 superchargers globally, and by the end of this year our goal is to have 10,000 superchargers globally.

So here's just a map of where we are in Florida to show -- we've got about 20 stations currently, so those are the red ones. The gray ones are our planned expansion in 2018. So you can go on our website on Tesla.com/findus and you'll be able to see the general location of our feature expansion.

Currently we have about 20 stations with 150 or so superchargers. These are obviously located predominately along interstates. So you've got I-10,

I-4, 95, 75. And you'll see you're starting to get more clustering towards urban areas as we understand driving patterns and where our customers live.

CHAIRMAN BROWN: Do you partner with retail folks? Who do you partner with?

MR. BEAN: So we typically scout for locations that have restroom access, restaurants, and wi-fi. The idea being if you're going to be there for 10, 30 minutes, let's give the customer something to do. So you'll see these -- I think the one here in Tallahassee is at a Newk's.

CHAIRMAN BROWN: Fresh Market.

MR. BEAN: Yeah. So I haven't actually visited this one yet, so just based on our website. So it really depends. We try to find locations that are convenient to customers.

CHAIRMAN BROWN: Do you partner with the utility or do you partner with government? You said rest areas.

MR. BEAN: So we typically -- we do this ourselves, and obviously we have to work with the utilities on interconnection. So we will start early in the process, identify the site, go through design and engineering with the utilities before we obviously move dirt. So that's -- but typically the cost is on us.

CHAIRMAN BROWN: I think there's a lot of advantage to partnering with local governments too. I mean, I know that your focus seems to be on the corridors, the interstate, but there are local governments throughout the state that have an appetite for, for placing these on government-owned properties.

MR. BEAN: Yes, absolutely. And we've got a destination charger network, which I'll talk about next. And on our website, and I don't have the exact URL, but under charging we do have an area if people would like to let us know that they are interested in potentially hosting a supercharger or destination network, that they can submit information there and we'll follow up.

CHAIRMAN BROWN: Thank you.

MR. BEAN: You're welcome. Just to give a little bit about the customer experience and the supercharger, we talk about -- we hear about range anxiety. So when you're taking a road trip, say I'm going from Miami to Jacksonville, I'll plug in the location in Jacksonville. It'll say make a right, get on the on-ramp I-95, go north, turn-by-turn direction, but it'll also say you need to stop at this supercharger, we recommend you stop here. And when you get there, you will have, say, 25 percent battery left, so you know that you're not going to be, quote, running

on fumes when you get there, and then it'll give you an estimate of how long you'll actually have to spend. So it'll say 15 minutes to get you on your way.

So you put that in, you plug in your car, you go get a cup of coffee, you go to the restroom, and your app will notify you when the car is ready. So you'll, you know, you might be finishing up lunch and your car is sitting there going, like, I've got enough charge to get to the destination, let's go. So we tried to make this as convenient and seamless for customers.

CHAIRMAN BROWN: Thank you.

MR. BEAN: So the next one is our destination charger. This is a Level 2 charging network that we provide the first two chargers, wall connectors to hotels, resorts, and shopping centers. And this -- we're -- our goal is 15,000 destination chargers by the end of this year.

CHAIRMAN BROWN: Wow.

MR. BEAN: And then finally home charging. So every car comes with this mobile bundle on the bottom left. It's a 20-foot cord. Sorry.

CHAIRMAN BROWN: Who pays for it?

MR. BEAN: So the charging equipment, the first two come from us, and then the electricity is usually from the site host. So we market this on the

cars, on the website. If you're taking a road trip, you can say, "Well, I know the Four Points and Sheraton in Tallahassee has these wall connectors. I'm going to stay there."

CHAIRMAN BROWN: Right.

MR. BEAN: So it is a marketing benefit to the companies.

CHAIRMAN BROWN: Okay.

MR. BEAN: We've got -- for home charging, every vehicle comes with this mobile bundle on the bottom left, and that's a 20-foot cord that has an adapter so you can plug it into a standard three-prong 110-volt outlet. It also has a NEMA 1450 adapter, which is basically the receptacle you would use for an electric range or oven. And then an adapter for the J1772 public charging.

We also have this -- in the picture you'll see the wall connector. That's our hardware for wall connectors. That's what we also use for the destination charging network. And on the table to the right, going back to some of the questions, that wall connector can operate between 15 amps and 100 amps. So it's really just what kind of service are you bringing to your garage or parking space. And you'll see the third column over what the max draw in terms of KW is based on

that circuit breaker amp.

I will say that the vehicles, to operate above 60 amps, do need an upgrade to get charging. So the standard vehicles come with the capability of 60 amps. So 60 amps converts to about 35 miles per hour of charge for a Model S.

CHAIRMAN BROWN: Thank you, and thank you for your presentation. And I definitely don't want to shortchange any of our other presenters today. We've already been going for an hour and a half. My goal was to kind of do this within a 2.5-hour window. So let's -- if you could highlight -- we have a lot of material before us.

MR. BEAN: Yeah. And I'll just -- this is my last slide. The last one is multiunit dwellings providing customers a place to charge. We think that's an area that we need to try to find a solution for.

CHAIRMAN BROWN: Thank you.

MR. BEAN: Thank you.

CHAIRMAN BROWN: Appreciate that.

Our next presenter is David Schatz?

MR. SCHATZ: Sure.

CHAIRMAN BROWN: No, that's not right. Schatz?

MR. SCHATZ: It's a rough, it's a rough last

name. Schatz is fine.

CHAIRMAN BROWN: Schatz. He's director of public policy for ChargePoint. And appreciate you taking the time to be here today. Thank you.

MR. SCHATZ: Yes. Thank you, Madam Chair. And good afternoon. Again, my name is Dave Schatz. I'm director for public policy for ChargePoint. And, again, I want to thank the Commission for bringing together this roundtable. It's a really important time in our industry. Tremendous growth, as you've seen from previous presenters. And I want to give a kind of snapshot of the charging industry, a kind of 101 of what charging looks like, the benefits of smart charging, and then some lessons learned from the private sector's deployment here in the state, and offer some next steps, if I get to it.

So, first, I just want to introduce ChargePoint. And like a lot of presenters before me, this slide is a little out of date. We have 41,000 charging spots nationwide. We're the largest network of commercial electric vehicle charging stations in the world. Every single month we add another 600 to 800 ports to this network, and we have hundreds of thousands of drivers that have -- EV drivers that have an account with us.

When we -- we just turned ten years old. And when the company was founded in 2007, the US Department of Transportation wasn't even keeping track of how many EVs were on the roads. So we've been at this from the beginning. We have a lot of kind of lessons learned from deploying in every single state in the nation.

And our mission is pretty simple. We want to support mass EV adoption by providing a range of charging products everywhere drivers live, work, and play. So that means at home, around town, and between towns. And in our business model, a site host purchases our smart network charging equipment. They own that equipment. We don't own the equipment. And for a subscription we provide access to data and analytics tools that help, that help that host to optimize the charging that's going on onsite and provide some insights into what's going on with their charging assets.

A site host could be a big box retailer, a hotel, a car dealership, multiunit dwelling. The list goes on. And we can provide ongoing maintenance agreements with those site hosts and provide 24/7 support to drivers and site hosts alike.

The charging industry has experienced rapid growth. That's clear from a lot of the other

presentations. And I want to briefly provide the Commission with an overview of our technology. This is another interpretation of a lot of the information we've seen before, so I won't take too much time with it.

But I want to, I want to make sure that it's clear that we see that the conversation around charging starting at Level 2, you see 12 to 25 miles of range per charging per hour. That's really where we need to be as batteries are getting bigger, charging times are getting longer. We see that as really the start of the conversation moving away from Level 1. DC Fast is experiencing tremendous growth as well as we build out our corridors.

So, and I also wanted to mention the symbols, the alien symbols at the top of the chart there. Those are the standard plug types. We've talked about them before, but, you know, CHAdeMO, J1772, Combo, SA Combo, those are the ones going across the top. So there are standard plugs.

So what does a session actually look like at one of our stations? It's pretty simple. If you have a ChargePoint app, you pull it up. You can see where our stations are and if they're available in realtime. That's pretty important. If you're a driver, you want to know if it's available or not. You would pull into

that station; you'd pull out your ChargePoint card. It looks kind of like a loyalty card that you would have on your key chain for, say, PetSmart or your local grocery store. We also have technology now that you could charge by tapping your phone to the charger or even your Apple watch. We're exploring new opportunities to start a session.

Once you wave it in front of our stations, it connects that session to your account. You would start the charging session. And while you're on the go doing something else, you can receive notifications on where you are, where the charge is, where the session is, and get notifications when the charge is complete.

If there is a fee associated with the charging, it's taken care of on the back end, working kind of like an E-ZPass where you would preload your account and it would kind of tick down if there is a charge associated with it. A lot of site hosts decide, and in our model site hosts are empowered to decide how much charging actually costs onsite. A lot of times they, they allow it to be for free because you want to incent drivers to actually come there and stay, and while they're there, maybe take care of some shopping or just stay around the site. Maybe it's a workplace; it's a perk. But if there is a fee, it's taken care of on

the back end.

So what -- let me just skip ahead here. So --

CHAIRMAN BROWN: Thank you.

MR. SCHATZ: I think I, I think I skipped an -- this is an important slide. I didn't want you to miss it, so -- but I promise to be fast.

So what is smart charging? Well, it's where charging stations are connected to the cloud. They're data enabled. They collect data on the charging sessions. And that data includes some really important stuff like: How many kilowatt-hours are consumed, what the demand profile looks like, things that are really important for site hosts to know like how long people are staying at the site, how long are they charging for, what's the frequency of their visits? You can see how everybody kind of benefits from this kind of information.

So for EV drivers, for example, they can see realtime availability of a smart charging station. Not so if the station is not data capable. They have the seamless payment that I talked about.

For utilities, of course, the benefits have been mentioned of smart charging. You can see this load, it's a flexible load, it can be controlled from a distance, and you can -- you could see it on the grid

and it really helps you to manage your load. And this is the input that we get from utilities. And then site hosts --

CHAIRMAN BROWN: Sorry for interrupting. Commissioner Brisé has a question, if I could just --

MR. SCHATZ: Sure.

COMMISSIONER BRISÉ: So it piqued my curiosity when you said that currently most site hosts don't charge.

MR. SCHATZ: Sure.

COMMISSIONER BRISÉ: And maybe this is a broader question. Is there any conversation about the eventual standardization of what the rate is going to be and how we get there? And is it going to be connected to off peak and, and all those type of things, and how customers will know in advance of what the charges might be and so forth?

MR. SCHATZ: Sure. So there's, there's plenty of information available. When you first pull into a charging station, the pricing is very clear to a driver. But there is definitely a conversation around EV-only rates, specifically for residential applications. And shifting the load to later times in the evening and points of load utilization, that's going to maximize your grid benefit. So there certainly is.

Under, under Florida statute, charging station prices are not regulated, so a site host can charge by the kilowatt-hour. This means that the signals that you want to send, if you're looking at rate design, are going to be a site host, who would then decide what the best utilization is onsite. Every site host is going to have a different set of circumstances. They're going to have a different reason for investing in this charging technology. So keeping in mind the site host's preferences is vitally important. But I agree with you, that's -- the conversation surely is on rate design.

And then site hosts are a very -- are at the kind of center of this transaction. They're, they're kind of where the rubber meets the road. They have to ensure up time, and we provide that, we provide that capability and we support that capability. They get continuous upgrades to smart charging equipment, and there's limited administration from, from their perspective because data capable charging stations are going to provide those tools to be able to manage it from a distance.

So now I want to provide a sense of where charging, the charging market is here in Florida. Right from the start I want to make clear that Florida is one of the most active markets in the nation. That's clear

from other presentations. And it currently is extremely competitive among EV charging providers and vendors, and they continue to invest heavily here in the state.

So this is a map of all public ports in ChargePoint's network here in the state, ports versus stations. A station is one stand. Under, under industry definitions, a station is one charging stand. It could have multiple ports. It could have two ports on it.

So this is the number of ports. We have 1,300 ports here in the stations that are public -- here in the state that are public. All of these -- there are other ports on our network that are private. They have limited access. And that's another capability that site hosts have, is to make sure that access might be limited to -- say, if it's a workplace, they want their own employees to use it, not folks who are outside of the workplace.

Just in 2017 alone we have 200,000 ChargePoint sessions. That's a lot of data that we can draw from, and we should in looking at where deployments should be. And like other presenters have noted, the growth rate in EVs here is tremendous, one of the highest in the nation.

So here's some trends that we see in EV

charging across the state. Currently the ratio of EVs to public charging stations here is 12-to-1. As Kellen noted earlier, EPRI has put forward some modeling to suggest that a 4-to-1 ratio or 5-to-1 ratio might be more important or might be, might be a desirable outcome and result in the right kind -- the right deployment to meet the needs of drivers. So we definitely need more. I don't think there's a panelist up here who would disagree with that, that we need more charging stations.

Private investment in this, in this market has resulted in year over year growth of charging infrastructure in all Florida's metro areas. Workplace and retail have been bedrocks in, in this growth, and so I think we're going to continue to see the growth in those particular segments. But we need to target some other ones like multifamily -- excuse me -- corridor and government and fleets in our future deployments.

In our experience, rebate programs do work. Customers take advantage of them. They're aware of them. They're easy to implement. They're easy to take advantage of if you're a customer.

And, finally, we need to note, as other presenters have, have mentioned, that buses and trucks are being electrified very quickly, and that's going to introduce new applications of charging and new models,

new potential business models. This chart here is colorful and the text is small, but I will tell you that it notes our deployments here in the state. It represents our deployments here in the state and what segments they have served. You can see very clearly workplace, municipal, and retail have been huge growth areas for the state in terms of its deployments in our network. And fleet and multifamily, for example, are much more smaller deployments that we really need to focus on going forward.

So as we look toward, you know, the Commission's future action in this, in this area and engaging electrification, forums like this are really important, not only for the Commission to hear the trends in the market, but also to have an open and deliberative process for determining what the right way forward for the state might be. It will also give a lot of stakeholders regulatory assurance knowing where, where certain entities might be going with their deployments or with their investment. There would be some market assurance there.

In the case of Florida, we have 2,000 public charging stations here in the state. And that's -- that, that means that there's tremendous growth here, but there's -- also that the pilot has already kind of

occurred. We can learn from the deployments that have already taken place. As I said, we have 200,000 charging sessions this year alone to draw a lot of data from. So let's have a conversation about the trends and how to best deploy going forward.

And I will note, it was on one of Kellen's slides, but PC44 is taking place in Maryland right now. That's an open and deliberate stakeholder process with a lot of utilities at the table, charging infrastructure folks, enthusiasts, enthusiastic enthusiasts. So it's the right people to have the conversation, and I think that it's being run in a very open way.

So I want to leave the Commission with some key considerations, and I won't spend too much time here. But currently in this market customers have a choice among multiple vendors in making an investment. So it's really important to keep in mind that the customer choice makes a competitive market and keeps a competitive market in place. That's going to drive innovation going forward. It's going to drive prices down for consumers. And we should continue to leverage available private funding and make sure that site hosts continue to invest in this technology, even if they're incented to do so, because that's going to lead to the most effective deployment of charging stations. When

the site host is engaged in the process, that's when you're going to get a much better management of the charging assets and you're going to get higher utilization.

And, finally, site hosts being able to control access and pricing, that's something already in this market. We want to continue that here. That's just a consideration going forward because, again, that's going to lead to the right usage for each circumstance that a site host might have. And so I'm going to wrap up, and I appreciate your time and your questions, and I look forward to the continuing conversation.

CHAIRMAN BROWN: Thank you so much. I appreciate that. Again, appreciate all the speakers providing these presentations. They will be available online on the Commission's website shortly hereafter.

We do have somebody -- our next speaker who is going -- he was unable to make his flight in Tampa, and he's going to -- he'd like to participate by phone. I said it was okay. But I do want to just -- his name is Terry O'Day. He's vice president of EVgo.

Our speakers sometimes act up a little bit, so, Terry, if you could streamline your presentation for us, and then we'll take a short five-minute, ten-minute break before we get into the electricity providers. Are

you there?

MR. O'DAY: I am here. Thank you, Chairman Brown.

CHAIRMAN BROWN: All right. The floor is yours.

MR. O'DAY: Thank you, and thanks to the Commissioners, too, for inviting me to speak today. I made it 3,000 miles from Los Angeles, but I couldn't close the deal for the last 300 from Tampa.

CHAIRMAN BROWN: You tried.

MR. O'DAY: I tried. Well, I'm particularly pleased to talk with you today because our utility partners and their regulators are really indispensable to our access. And I hope that by describing our business strengths and challenges, we can work together to create a long-term financially sustainable cost structure to enable the substantial private investment that I think you heard other speakers identify is necessary in order to make EV charging fair and accessible to everyone.

To get there, let me begin by just giving you an understanding of the services offered by EVgo. On the next -- on Slide 2 you see our typical Freedom Station configuration. We call these Freedom Stations. They are -- they feature two 50-kilowatt chargers, those

other two pieces of equipment in the center of the photo, and a Level 2 charger off to the side.

They're typically in a retail, a grocery store or a shopping center, for example, and they have dedicated EV parking spaces. These locations are typically right off of the freeway with good accessibility to the freeway and are, and are well lit. In total this station you see here is about a $200,000 project in capital, and we have 36 of these across Florida today.

The next slide shows you our growth since inception, and it demonstrates both the total number of charges in blue, the total number of sites, which is that little sliver of red that actually turns into kind of the brown at the bottom because it blends somehow with the blue, and the total number of charging sessions that we have provided to drivers since inception, which is now approaching 1 million.

On the next slide you can get a sense for network utilization nationwide. This is not terribly useful except to note that the utilization in blue is sort of the lower end. And as you get more colorful, that shows higher utilization. And for the most part, that's happening in California today.

Our next slide, five, you can see the zoom in

on Florida in particular, and what you see is those little blue dots converted into average numbers of daily charging sessions that occurred in July, in the summer. And you can see that on average we're looking at utilization of our chargers in Florida of about one day.

This is really important to understand because a lot of us spend time talking about the chicken and egg dynamic as to whether to get chargers deployed or whether you'll see cars on the road first. But the utilization of the charge is the, is the other key question associated with the chicken and the egg.

And it's particularly important in this venue because, as slide -- as the next slide, Slide 6, which shows you demand charges. Here is an example of the Freedom Station in San Diego in the SDG&E territory. San Diego has high demand charges, so they're the example.

What you see on this graph is the hours of the day, and the bars represent each day of the month. And the height of the bar represents the peak electricity demanded by this station. And what you can see is a single peak right in the center of this graph that shows you a demand event where you have two cars charging at the same time at about 50 kilowatts. And that occurred just once in the entire month, and it cost about

$1,300 dollars to provide EV -- to provide -- it was a $1,300 impact, I should say, on our monthly utility bill, resulting in a cost per kilowatt of almost $2 that month per kilowatt-hour.

The next slide I'll show you is the very same slide for that same station one year later. And if you, if you look at Slide 7 now, you can see a lot greater density in the amount of charging that's occurring. In other words, those bars on the graph are much denser. So there's a lot more utilization, and you can see that's true because you have a side-by-side comparison on the table between June '16 and May '17 that shows you the total kilowatt-hours delivered almost doubled from 1,630 to 2,994. But there wasn't that single demand charge event that occurred a year prior. And so the demand charge for May 2017 was $1,000 less than the previous year, resulting between the utilization and that lower demand charge in a cost per kilowatt-hour of 87 cents.

So by presenting this data, I'm making the point that the demand charge creates essentially a fixed cost of business for us in many of the settings in which we operate. And it can be a significant challenge and barrier to growth of the infrastructure, which I think you heard all the speakers want to see.

CHAIRMAN BROWN: Yes.

MR. O'DAY: The next slide gives you a sense of the competitor here, which is gasoline. And versus gasoline, these costs on average, and let's be clear average is July, so I do want to get in some lower levels of data for you so that you can really understand the underlying drivers.

CHAIRMAN BROWN: Was this average --

MR. O'DAY: But on average --

CHAIRMAN BROWN: Was this average July 2016 or 2017?

MR. O'DAY: Well, this average is nationwide from the summer.

CHAIRMAN BROWN: Okay. Okay.

MR. O'DAY: I'm sorry. Not from the summer. From all of 2016.

CHAIRMAN BROWN: Okay.

MR. O'DAY: So, so we're just about a 35 percent higher cost. This is a cost structure just for the electricity versus gasoline.

And now what you heard, I think, from the earlier speakers that's important is that most drivers are charging at home. And so keep that in mind, that while charging in public at a Fast Charger is more expensive than gasoline, your residential charging is

lower. So this averages out to a lower total cost, a lower average cost for the typical driver. But, but who is the typical driver is the question that I think we'll see change over time as more, more people begin to buy EVs.

The next slide will show you a little bit more depth on this question by using the San Francisco Bay Area example on Slide 9. And here you see utilization that, that is really quite high in the urban areas. But the outer areas, and in particular the corridors which are not shown on this graph, are very low utilization. And those are two different types of charging stations.

The urban charging station that is highly frequented is very obviously important to EV drivers, as they're demonstrating, because they're using them clearly. But the corridor station, which is probably only used on Fridays and Sundays -- I don't know how many folks here have stopped at a gas station on a highway that wasn't on a Friday or a Saturday when they're doing a weekend drive or something, but that's why you see this kind of utilization difference, but they're still also very important.

As Britta pointed out in her presentation, getting to Tallahassee from Orlando in her Bolt requires having a charger on the highway, even though it might be

less utilized. And so the underlying cost structure with the, with the fixed cost of demand charges is an important question.

In some of our urban charging stations demand charges would -- they work perfectly fine. But in corridor stations in particular, which are equally important to the success of our EV transportation goals, they are -- demand charges present a very significant challenge for cost recovery of even just the electricity cost.

And you can see this better on Slide 10, which I have to point out has an error unfortunately. I'll probably have to resubmit the slides. But let me begin by describing the variable cost is the orange line, and that is your cost per kilowatt-hours on our average electric bills. And the light blue line represents the demand charge cost per kilowatt-hour delivered.

Along the x-axis you can see utilization. And as utilization grows, you can see that the fixed cost of the demand charges get spread over more drivers, and so the kilowatt-hour price comes down. And the blended cost, the blended effect of that essentially is in the white line at the top.

Importantly, an important question is where this cost is versus gasoline parity, and that's

unfortunately where the mistake lies. And I have this chart that you're looking at at 9 cents per kilowatt-hour, but the gasoline parity cost is at 29 cents per kilowatt-hour. So take that magenta line and shift it up to almost the 30 cents per kilowatt-hour line and you can see, consistent with that previous slide I showed you, our underlying electricity costs today are about 35 percent higher than gasoline parity.

On Slide 11 I look a little bit more closely at the electric bills that we are paying in Florida today for the stations that I identified earlier, and you can see, with Florida Power & Light, July 2017 prices per kilowatt-hour ranging from 45 cents up to over $2. And, again, those prices are based on the utilization of the individual station. I believe all of these stations are on the same tariff. And so the percentage of the bill represented by demand charges is in the right-hand column, and you can see that is a significant impact for us.

CHAIRMAN BROWN: Okay.

MR. O'DAY: The next slide shows the other Florida utilities. And notably Duke Energy here not -- in red does not have demand charges, and so those prices per kilowatt-hour are significantly lower.

CHAIRMAN BROWN: Okay.

MR. O'DAY: I want to give you some idea of where the market is headed, though, too. And on Slide 13 we can see that we did a study with Rocky Mountain Institute that shows the different load profiles for our stations. And what you see is that grocery and retail tend to perform very well; whereas, gas stations and hotels are typically not high-performing sites.

And what -- Britta described their work, General Motors' work on the brand Maven, and we've partnered with Maven to provide EV charging services to those drivers. About 97 percent of all the kilowatt-hours delivered are going through our network, and we've seen some really interesting results.

On Slide 14 you can see impacts in blue from adding Maven to a market, the charges that are serving Maven. And you begin to see this increase in utilization related to that, that can create sort of a baseload effect, if you will, in utility parlance.

And on Slide 15 the important time of use benefits from those professional drivers where the Maven drivers in blue are beginning to fill out the troughs in our utilization profile in red. So as ride-sharing services begin to proliferate as the EV charging is available for those drivers to use electric vehicles, we can see this sort of beneficial or symbiotic

relationship between the two.

And in my -- in Slide 16 you can see that electricity costs, which I've focused on so far, are really just 40 percent of our total cost because as an owner/operator model, we're responsible also to maintain and repair our stations, which is the pink color of 30 percent. And then, of course, other costs associated with operating the business not on the slide would be capital recovery to recover that $200,000 that we invested in the station.

CHAIRMAN BROWN: Thank you.

MR. O'DAY: And that, that's a good place to wrap. Thank you, Chairman.

CHAIRMAN BROWN: That's a great place to wrap up. Thank you. I appreciate you following us along on your journey and providing us a great source of -- resource of information for us to consider. Thank you again.

We are going to move on to our electricity providers, and we're going to take just a short five-minute break so you guys can stretch. It's 3:05 now. We'll be back here at 3:10. Thank you. We are in recess.

(Recess taken.)

We are back on the record. Thank you. And we

are -- our last group of panelists are the electricity providers. So we have with us today Brian Hanrahan.

MR. HANRAHAN: Sure.

CHAIRMAN BROWN: Awesome. He is director of in-home technologies with Florida Power & Light. Welcome, Brian.

MR. HANRAHAN: Thank you, Madam Chair. It's a pleasure to be here. A repeat from 2012, except I actually have the Commissioners this time. It's great.

I'm going to skip my executive summary. That's kind of a cultural thing. So we'll jump right into the primary slides here. I'm going to move very quickly on the first couple because some of that's been covered. I want to focus on the two areas you asked us to talk about. But I would like to, much like Britta, who was also here in 2012, kind of do a comparison of then and now really briefly.

So when -- in my dec in 2012 I listed some headwinds, and they were range, price, model availability, scale, lack of infrastructure. And where we're still short in a lot of those areas, we've made great progress. I think the vehicle areas have been covered.

I want to point out two things in the infrastructure area. You heard the number. We've had

about 2,000 charging stations here in Florida. That is the third most in the country. I think that's pretty good, given the fact that we haven't had some of the incentives and such from the other areas. So, you know, there's still a lot of good news there.

And also the Volkswagen emission settlement I think is a huge opportunity for us, for the state, and we'll talk a little bit more about that. And obviously we've seen this big push towards higher charging rates, and that's certainly a challenge for the utilities in some areas. Right?

Moving on to the next slide, I'm not going to mention much here other than, you know, home is still the primary place. When a person buys their first EV, they actually added a charging station to the, to the network, if you will. And work is just a growing opportunity for charging, and we're big proponents of that.

Happy to say that when we launched our program seven years ago, we --

CHAIRMAN BROWN: Brian, if I could interrupt you.

MR. HANRAHAN: Yes, sure.

CHAIRMAN BROWN: Commissioner Polmann has a question.

MR. HANRAHAN: Sure.

COMMISSIONER POLMANN: Back on your prior slide, sir, you had mentioned in-home, and I think there was some mention earlier about the, the draw on, on the home system. There was an upper limit in terms of amperage on the 240 volt. I forget what the number was, 50, 60 amps or something to that effect. Do you see an increase in that in the future at the home charging station, or is there currently an opportunity for a homeowner, an EV owner at home to have a higher amperage facility to increase their rate of charge?

MR. HANRAHAN: I would say it depends. So Tesla does have home charging at a higher rate. What you run into in a lot of cases, especially if you're going to get to critical mass, is you're going to start running into a lot of homes that don't have that capacity in the panel. Right now, the affluency factor probably allows for a bit more of larger homes being able to absorb that higher rate. I really don't see it becoming, let's say, just continuing to rise exceptionally high. For most people, it wouldn't be practical.

COMMISSIONER POLMANN: You know, I did some renovations in my home, and I had the panel changed to do an upgrade. I mean, that was not inexpensive, but

as, as a component of my other home improvements, it wasn't a big deal. But I understand what you're saying. That's not an insignificant cost.

MR. HANRAHAN: That's correct.

COMMISSIONER POLMANN: Thank you.

MR. HANRAHAN: You're welcome.

Back to the -- you know, when we launched the program seven years ago, we kind of hung our hat on three areas as part of our strategy. I'm happy to say those are still the three areas that we hang our hat on, so I think we hit the mark. Those really support the expansion of this market. It's really good for ratepayers and virtually everyone. So we, we do a lot of work to make sure that we're removing hurdles wherever we can, infrastructure installations, you know, just making sure that, that things go well and we're not part of an impediment. We also, you know, use EVs in our fleet when it makes sense, those types of things.

Also meeting customer expectations. Customers view us as a trusted source for this type of technology. And we have quantitative research where we've asked our customers, and actually the utility is the number two trusted source for EV information behind Consumer Reports. That's higher than DOE. That's higher than the automakers. That's higher than electricians.

It's -- you know, so we're a trusted source.

The third one is ensuring reliability. And as you know, that's table stakes. Right? We have to do that. It's one of the most important things to us. So we, we have baked in electric vehicle adoption into our planning for the last seven years. Right? So it's in there; it's part of our planning now.

Really briefly I'm happy to say that our -- we do a forecast and we embed it into our Ten-Year Site Plan and file that with the Commission every year. We start with a national number. Then we go to a state and an FPL number. Happy to say we're within 10 percent of EEI's number in 2025 without comparing notes. So that's good. The state number is close, 3.6 percent is what we have. And then we serve about 50 percent of the population in Florida, but we have about 64 percent of the vehicles. So obviously we have some very good areas for electric vehicles, and we've been doing a lot of work in this area for a while.

So there's already a modest amount of public charging in Florida, and this is where I'll spend a little more on these next three slides is, you know, we can all agree that we need more, but it's not that we don't have any. We work -- have worked with, you know, the Teslas, the EVgos, Electrify America over the last

few years to really, you know, make sure that this, this installation goes well. We are now getting into situations where we're installing banks of 1 to 3 megawatts of charging stations. Tesla is making a lot of investment in our areas. I mean, they know where their Model 3 reservations are, so I suspect that's a lot of the reason for their investment in certain areas with infrastructure.

We've met with Electrify America. Miami is the only metro area in Florida been identified as a Phase 1 implementation, along with the corridor within the Florida, state of Florida. So we're working with them. It's very important that we work with them early on. We can help them save money by identifying feeders and such that are not at capacity. And so getting, you know, with them early on can help the whole process as well as the economics for them.

We have advocated for the 15 percent cap of the mitigation trust with the state of Florida. You know, this is a huge opportunity. And I'm of the belief as a Leaf owner who gets a 120-mile range on my vehicle that with these investments that are on the horizon or the ones that are currently going on are going to go a long ways towards getting us to an acceptable level of infrastructure. You could argue whether it'll get us

all the way. Probably not as you go out into the years. But certainly in the near term this is a very positive thing coming our way, assuming, you know, these steps are taken.

CHAIRMAN BROWN: Did you contemplate driving the Leaf up to Tallahassee from Juno Beach?

MR. HANRAHAN: No. But let me tell you, we brought the Volt and we wanted to bring the Bolt. And the problem is if you look at that map, there is a gap as you get north, as we've talked about earlier, someone pointed out, when you get up around the I-10 area, we're a little short on some charging. This is the second time we've been up where we wanted to bring the Bolt and we haven't been able to. And we have personally got 241 miles on our Bolt with air conditioning and highway speed. So those numbers you saw on the Bolt, those are legitimate numbers. I think 238, we've actually beat that.

CHAIRMAN BROWN: Cool.

MR. HANRAHAN: So we're getting there. I mean, we're seeing a lot of positive signs. Right? That's, that's good.

Specific to your questions, you asked the utilities to, to address impacts on the grid and planning. Right? So, first of all, managing load

growth is a core competency to us. As long as we know what's coming, you know, it's something we do quite well.

I mentioned we added in our Ten-Year Site Plan. I had a really sharp analyst a couple of years also that created a model for me, and -- did you want me to wait?

CHAIRMAN BROWN: No.

MR. HANRAHAN: Oh, okay. Oh, I'm sorry, yes. There we go.

So a couple of years ago I had a really sharp analyst and he built a model for us. And basically what he's done here is he's taken our load profile, which is the purple shaded area, and he has layered on the number of electric vehicles in our service territory in 2030, and he's got a whole bunch of areas where we can change factors. We can change the type of vehicle, miles driven, the rate of charge, the time of charge during the day. And basically what you see with the pink is a half a million vehicles on our system. And let's be honest, we have a pretty large profile. Right? Some other utilities wouldn't necessarily see this. But, but it shows up, but it's fairly small. This is in 2030.

Now if you've changed the factors in the model to add more workplace charging, I could actually do a

lot better in the morning hours and even drive some of that -- this is unmanaged, so I could easily put in some rate to move that even a little later off the back of my peak there. So lots of flexibility there. Not a lot of concern for us in terms of long-term generation planning.

We also completed a grid reliability study in 2014. Had our, all our engineers involved in evaluating power quality because that's, that's something that's often overlooked. Right? But it's super important, especially as these large charger banks are going in in downtown Miami, let's say. You put in 1, 2, 3 megawatts, you better understand what kind of load and what kind of harmonics and such those chargers are putting out or you're going to start affecting other people. So, anyway, we've done a lot of work in that area.

I can tell you that the study came back very positive. We don't have a lot of concern about reliability. The one area of risk, and it's the very end, and it's the small transformer, the 25 kVA to 37.5 kVA, which we don't have many of those anymore actually. As the years have gone by, we've kind of engineered to a larger standard. And so if something was at risk, it would be those small transformers, generally not where

we're seeing EVs now.

I can tell you we don't know of a single EV-related outage in our territory since 2010 since we launched the program. So nobody has come home with their Tesla and their neighbor had a Tesla, plugged it in, and blew the transformer.

What we hear from our transformer people is it's not that load at the time. It's the life of the transformer can be compromised because of the heating, you know, that transformer being hot longer over the course of years. So instead of it lasting 30 years, maybe it lasts 25. The jury is still out on that. But that's, that's kind of the concern.

We're used to large load here. And when you hear stories about, you know, all the concern, a lot of times it's in a place where an EV can double or triple the house load right now, you know, with a 6 KW charger. That's generally not the case here in Florida. So it doesn't apply same story, same -- you know, every location. Okay?

Lastly, you asked us to comment on future regulatory considerations. There's two areas that always come up, and one is the EV rate. I can tell you I was under a lot of pressure when we first launched the program about having an EV rate. And so we -- yes, sir.

I'm bad at that.

COMMISSIONER POLMANN: You said it.

MR. HANRAHAN: Thank you, Commissioner.

So we did a lot of work around EV rates, and one of the concerns is we have a very low rate in Florida anyway. I mean, our rate is lower than super off peak EV rates in California. And so if I provide a lower rate, the delta I can provide between that rate and my current rate is not going to be huge. And in order to bill it, I need to separate meter it. A customer is going to have to put in a meter can, a weatherhead to the tune of $800 or something, and it's going to take them 30 years to get that back. Right? So there wasn't really, you know, a customer benefit. For us there wasn't a burning business platform because you saw my chart. I didn't have, like, major concerns about them charging on my peak hour. And so at this time, you know, we've not come forward with an EV rate.

Our answer -- customers ask us about it, and we say, you know, enjoy our super low rate. You can charge any time you want right now. Now if they do want something, we have the whole house time of use rate, but not many customers benefit from that.

CHAIRMAN BROWN: Right.

MR. HANRAHAN: So, so that's kind of where

we're at on the rate. We're always monitoring. We're willing to change, you know, if the need arises. But to just do it, you know, we have concerns with that.

CHAIRMAN BROWN: I'd be curious to hear from the other utilities, too, and see if it makes sense or not.

MR. HANRAHAN: Right. Sure. And then from an infrastructure standpoint, you know, right now we support it in our territory in existing construction practices and policies and, you know, like we would anything else. I will say that we, we work very hard to make sure that we're not causing delays and things like that because we want this market to succeed.

We're obviously monitoring the infrastructure activities of others throughout the country, like Kellen showed. We've done obviously our diligence in that area. And, you know, honestly we've had some economic, you know, hurdles there, and so we've not come forward with, with anything in that area as well. As I said on the rate, you know, we don't shut the door on any of this stuff. Things change and we continue to monitor it and will do whatever we can do to move the industry forward by good principles.

CHAIRMAN BROWN: Thank you, Brian. Thanks for your presentation and this overview.

Commissioners, any questions of Brian?

(No response.)

All right. Thanks.

MR. HANRAHAN: Thank you.

CHAIRMAN BROWN: We are going to move to our next speaker, who is Lang Reynolds. He's the electric transportation manager from Duke Energy Florida. Lang, welcome.

MR. REYNOLDS: Thank you, Madam Chair, and thank you to the Commission for bringing us together today to talk about EVs. As you can see, EV people can talk about this all day, so I'm going to try to skip to the good stuff here and get us out of here.

So the -- let's see. If we look at the electric transportation market, and I don't want to muddy the waters too much, but we are, we are looking a little bit broader than, than just EVs. So we're starting to see with the battery cost declines that there are a lot of different types of vehicles that are becoming economic and out on the market today, so -- including things like transit buses.

We have some -- a customer in St. Pete that's getting some electric transit buses next year. And school buses are also coming on the market, so a lot of, a lot of these types of vehicles.

CHAIRMAN BROWN: Tell us about the school buses.

MR. REYNOLDS: Sure.

CHAIRMAN BROWN: You say school buses are coming on the market. Electrified?

MR. REYNOLDS: Uh-huh, yeah. Fully electrified, battery/electric buses over 100 miles of range.

CHAIRMAN BROWN: Are you working with the counties to make that happen or --

MR. REYNOLDS: We're at the very early stages of looking into electric school buses. There's one company out of Canada that has a commercial product right now. Blue Bird out of Georgia announced some prototypes and they're getting some buses on the market next year. And we've heard rumors of some other manufacturers also bringing to market some of the buses. So we're, we're still exploring it. You know, we have -- we did actually an event with our friends at FPL earlier this year to, to bring some school district transportation managers to ride some of these buses and check them out.

CHAIRMAN BROWN: That's great.

MR. REYNOLDS: So there's other, you know, other fleet applications: delivery fleets, trucks.

We're seeing just a real proliferation of different types of vehicles, and so I think, you know, in the future we can, we can think not just about the light-duty market and passenger cars but about all of these different types of transportation.

Looking over the market, and we've talked a lot about this already, but the one point I would just emphasize, and I think one of my colleagues touched on it earlier, but as fuel prices have declined, we've really seen no, no real bump in the market except for, you know, kind of a flattening out in the 2015, 2014 time frame. And then here the last two years we've seen a return to really strong growth: 40 percent last year, in 2016, year over year, and this year tracking nationally around that 30 to 40 percent number of year-over-year growth. And that's really due to this increasing number of vehicles that we're seeing on the market from all of the different manufacturers.

Looking at Florida specifically and our service territory specifically, these are the numbers that we look at in terms of adoption. So if we look at cumulative sales since 2011, you know, for the state at the end of 2016 we were a little over 20,000. In our Duke Energy Florida service territory roughly 3,700 sales over that time period. So these -- this is

registration data.

It's a bit of an estimate when we break that down into our service territory exactly, but you can see we have, you know, less than, you know, less than a quarter of the total EVs in Florida, and that's just due to things like the geography and kind of demographics of our service territory.

Looking at the, the market share over time, if you -- so on the right side there, that's the US average if you strip out California, which is a bit of an outlier at this time, and then compared to Florida overall in the blue line, and then our DEF territory there on the bottom in the green line. So what we're seeing is, you know, still less than a half percent of market share of new light-duty vehicles. Florida, on average, is tracking closer to the US California -- ex-California average, and then our territory, we're still a little bit behind there in terms of market share.

CHAIRMAN BROWN: Isn't Senator Brandes in your district?

MR. REYNOLDS: Indeed, yes.

CHAIRMAN BROWN: Just an observation.

MR. REYNOLDS: So in looking forward to the future in our, in our current forecast, so this comes

from our forecasting group, and, you know, they do a lot of the analysis on this, and our current forecast is right around 150,000 EVs over the next 15 years, you know, to 2030. So if we think about what that means in terms of a peak impact, peak demand impact, we're estimating about 60 megawatts right now on the summer peak. So it's well within our reserve margin.

And I would caution that there's a lot of uncertainty around this number. This is definitely a moving target as we see the forecast shift and adoption patterns change. So predicting out to 2030 is, is pretty difficult, but this -- Commissioner Polmann, to your question earlier about order of magnitude, this is designed to get at that question about, you know, what does, what does it mean to have 150,000 vehicles on the system.

CHAIRMAN BROWN: Lang, what are you -- what is Duke doing to invest in EVs?

MR. REYNOLDS: So we're doing -- I'll get to that a little bit later, but I'll touch on a couple of -- we have, as the Commission is aware, we proposed a pilot which is in an open docket and will be discussed, I understand, at a later date. So we've got the pilot.

CHAIRMAN BROWN: Good.

MR. REYNOLDS: We've also got a --

CHAIRMAN BROWN: You did good on that.

MR. REYNOLDS: We've also got the -- our fleet, our own fleet cars that we purchased. So we're a signatory of the EEI fleet electrification commitment. And right now we're at 5 percent of total purchases. It would be a lot higher if there were trucks and bucket trucks and vans that were better options on the plug-in side. But we do have all of our -- you know, all of our new sedans that we're purchasing are all, all electric now.

CHAIRMAN BROWN: Do you foresee that being an option in the future?

MR. REYNOLDS: Uh-huh. On the truck side?

CHAIRMAN BROWN: Yeah.

MR. REYNOLDS: Yeah, definitely. There's a company out of our Ohio service territory actually that is called Workhorse, and they're making plug-in hybrid trucks with 80 miles of electric range. So those are coming on the market next year, and we're hoping that some of the other larger OEMs follow them.

CHAIRMAN BROWN: I think that's great.

Commissioner Brisé? No? Okay.

MR. REYNOLDS: Just one last point on this slide. So we are seeing this year just a huge increase in customer inquiries around EVs. We have a group that

monitors these, and so we've seen, you know, over a 100 percent increase year over year in customer inquiries around EVs.

As Brian mentioned, you know, the utility is really one of the first places that people go when they have questions about this, and so we're really trying to develop, you know, a strong, you know, a strong book of resources for them.

So looking at the question of future regulatory considerations, you know, we agree with our colleagues about the, the existing rates being well suited to EV charging. So we have kind of a broad variety of rates both on the commercial side. You know, we have our, our time of use rate and as well as a demand and a non-demand rate on the commercial side. So we've got really a wide variety of rates that we feel are currently well suited to EV charging. And we'll continue to study that as we see adoption pick up and, you know, really try to study if that needs to be changed in the future.

We're doing a lot of -- load management is really a big, you know, a big topic right now, thinking to the future. As we've seen today, you know, this question of what time the charging occurs has a big impact on the cost of charging to the system. So along

with the fact that it's also a very flexible load, you know, most people only need one or two hours of charge to refill what they've driven during the day, and that can occur over a 12- to 14-hour period of time when they're home overnight.

So there's a lot of ability to manage that load. And what that looks like exactly, you know, we definitely need to do some work around figuring that out. That's kind of a big -- one of the big topics in our mind. And it's certainly conceivable that existing mechanisms can accommodate those types of programs.

So, lastly, and to your point earlier just thinking about the market and the types of work that we're developing and analyzing and looking at bringing forward in the future, you know, we see the barriers really around awareness and infrastructure and cost. It really echos a lot of what we've heard today already. So this education outreach is really important, getting out there and getting those resources to our customers.

On the infrastructure side, of course, we have the pilot which I mentioned earlier. And then around the cost, you know, this year we worked -- offered the Nissan Leaf discount along with a lot of other utilities to extend that to our customers, which was, you know, really a good offer. I think FPL did it as well and a

name of other -- Gulf as well. So that --

CHAIRMAN BROWN: Are you going to continue that?

MR. REYNOLDS: It expired for us at the end of September. And we're continuing to talk with manufacturers. If there's the ability to provide those types of incentives or discounts in the future, it would be great. Most, most of the companies with these new vehicles, you know, they're not keen to discount a brand new car.

CHAIRMAN BROWN: Right. The Tesla $79,000 one?

MR. REYNOLDS: Yeah, yeah. Well, that would be nice.

CHAIRMAN BROWN: Let's do it. Let's do it. All right. Thank you, Lang, for your presentation.

MR. REYNOLDS: Thank you.

CHAIRMAN BROWN: Commissioners, any questions of Mr. Reynolds?

(No response.)

All right. We're going to move to Kenneth Hernandez, who's the program manager of Tampa Electric. Mr. Hernandez, welcome.

MR. HERNANDEZ: Thank you, Madam Chair and Commissioners. Thank you for inviting us today to, to

participate in the discussion. I was going to skip this slide, but it dawned on me today that it's interesting that this conversation for us is kind of coming back full circle to us as a company.

Tampa Electric started almost 120 years ago, and interestingly we were the service provider operating the electric streetcar system in Tampa. So it's, it's interesting that the conversation is coming back to us as a utility revolving around electric transportation. A bit of trivia.

CHAIRMAN BROWN: And the streetcar is still in existence.

MR. HERNANDEZ: It is still in operation, yes. It's operated by our local transit agency, so.

CHAIRMAN BROWN: Yes.

MR. HERNANDEZ: We got out of that business. We just, we just provide the service.

So a little bit about the current EV landscape. I'll talk about what we're doing as a utility, and then to touch on the questions really that, that I think are at the crux of this and its future considerations from a regulatory perspective.

The current EV landscape admittedly, and we can look at what the projections would have been when we were, when we were here in 2012, admittedly they're,

they're lower than what we had expected, but we've continued to see steady growth. Today we're over -- we're north of 2,000 vehicles in our service territory and quite a bit of public infrastructure to support that.

We think that the growth will continue to grow and maybe even at a faster rate as more and more vehicle manufacturers, as we've heard today, will continue to offer a broader range of vehicles for consumers to choose from.

From, from our own company perspective, you know, a lot of what we do is from an education and outreach standpoint. We've had to do some of that internally as well as externally. But we continue to work with our internal teams to, to look at ways to incorporate electric vehicles into our fleet. One thing that we're very excited about, and it's kind of been talked about a little bit, is we've got five new plug-in electric pickup trucks that are coming -- going to be coming into our fleet later this year. And as a utility fleet, that is more of a good fit for, for us from a fleet perspective. So we're excited to see that kind of, of offering into the market.

And then we've also installed our own internal network of charging stations at our facilities to

support not just that fleet but also its joint use for our employees that drive personal electric vehicles. It gives them an opportunity to register their vehicle and utilize those stations when they're not being used by our fleet vehicles.

CHAIRMAN BROWN: So this Commission, I think back in 2014, maybe 2015, approved a program with TECO to go out in the schools and educate students on EVs.

MR. HERNANDEZ: Yes.

CHAIRMAN BROWN: Can you give us -- it's not an open docket. Can you give us --

MR. HERNANDEZ: It's almost like you knew the next slide that was coming.

CHAIRMAN BROWN: Oh, it is?

MR. HERNANDEZ: So, so aside from what we're doing internally, externally there's a couple of things that we're really excited about. The first one that I'll touch on is, is an effort through our local transit agency, Hillsborough Area Regional Transit. They have worked with Tesla, TECO, and other business partners to expand a hyperlink. It's almost like a ride share app program that they have that takes their riders from either their home or their, their business to one of their transit centers or vice versa. So we've worked with them through funding to expand that program to

include Tesla electric vehicles and the charging infrastructure to support those vehicles. Those are operating today in what they call the Innovation District in Tampa. It's kind of a techy up and coming area. So it's very appropriate that those vehicles are there.

But I think it's kind of been touched on also that it's interesting to see how public transportation and transit agencies are looking for ways to adopt electric transportation. This is a great example. And then to what you were speaking about with regards to our energy education program, we've expanded that program to include hands-on electric vehicle driver training at local high schools through the driver's education program. And it includes funding that will provide one vehicle for each of five schools, along with an EV charger. We're preparing to launch at the first high school that's just outside of Tampa, Bloomingdale Senior High School, later this year, and then we'll be adding four others for the next school year.

We worked with the University of South Florida in developing the curriculum for that, for that program, so that's really exciting. And really the crux of that program is, you know, students, they're, they're exposed to ways to conserve energy at school and at home

throughout their lives in school. This is just another way that we can hopefully teach them that there's a way to actually conserve energy behind the wheel of a vehicle as well.

CHAIRMAN BROWN: Absolutely. I think it's an excellent program. You know, we at the Commission teach school -- students in schools about conservation and efforts like that, and that's a nice component to add to that discussion.

MR. HERNANDEZ: Yeah. We feel that it's a very appropriate fit.

And then moving on to grid impacts, in a nutshell what I would say is this: Is all the modeling that we've done, you know, looking at a high concentration of electric vehicles on our system, all of that modeling showed that really there would be very minimal negative impacts to our system. To date, and I think to mirror what Brian had mentioned for FPL, we're not aware of a single incident where an electric vehicle has really caused a reliability issue on our system.

Even though we've, we've done that modeling and feel comfortable with that, we have engaged with the Center for Urban Transportation Research housed out of the University of South Florida to expand on some of that, to really look at what the impacts would be on our

system for not just wide -- more widespread adoption of electric vehicles, but also DC fast charging and expanded workplace charging offerings. Because we see those as two areas that are going to continue to grow, so we want to better understand that. And we'll, we'll be interested to see what, what some of those studies show as we continue to work with them.

And then really I think to the crux of it all with regards to future regulatory considerations, I mean, I think in the end we can all say, I mean, nobody has a crystal ball. I mean, we don't know where it's going. But we do feel that a lot of the discussion about the regulatory considerations are going to revolve around the evolution of this smart grid and everything that it's going to entail.

So to just touch on a couple of things. I mean, as a utility, we're going to continue to monitor the expansion of, of the -- of our market to really understand what kind of investments might be necessary with regards to our, our grid, our system to support that market specifically. But also another market that's going to continue to grow in Florida is solar and utility grid solar.

So we've heard some discussion now, and you had asked about rates. Really from a rate perspective,

a lot of the discussion around electric vehicles will often go back to on peak versus off peak charging and what does that look like. We may just need to keep an eye on as that percentage of our generation capacity in the state continues to grow with more solar, do we need to look at maybe leveraging on peak charging for those electric vehicles to more so mirror the generation capacity of those solar assets.

And then lastly, and, again, this has been discussed as well, is vehicle to grid. That technology exists today. From our standpoint, it's really just having a better understanding of how we can leverage that not just to benefit the utility, but also make sure that we're, we're being mindful and benefiting the EV consumer as well.

CHAIRMAN BROWN: Thank you, Kenneth.

Commissioners, any questions of Mr. Hernandez?

(No response.)

All right. Thank you for your presentation.

MR. HERNANDEZ: Thank you.

CHAIRMAN BROWN: Moving on to Foster Ware. He's general manager of marketing and sales for Gulf Power. Hi. Welcome.

MR. WARE: Thank you, Madam Chair and Commissioners, for the opportunity to speak at the

roundtable this afternoon.

Gulf Power's presentation really consists around three things: We're going to talk about existing electric vehicle infrastructure within our footprint, explore electric transportation activity at Gulf Power, and then talk about long-term, short-term planning and process.

So you've seen slides of, of where there are chargers. We have approximately 68 charging points at 35 sites. About 20 percent of those are Tesla destination charges. We've got a DC Fast Charger there in DeFuniak Springs. But if you look at that I-10/Highway 98 corridor, you do see some gaps, as has been identified earlier. So while we do have some charging, there are gaps around I-10 and that Highway 98 corridor that will need some additional infrastructure.

Again, all these chargers are behind customers' meters, they're customer installed, and the energy is paid for on their electric service bill.

When we look at Gulf Power's electric fleet, we've got 15 EVs across three OEMs. So mostly Chevy Volts -- we took a Chevy Volt here today with some of my colleagues and it performed well -- Nissan Leaf as well as the BMW i3. Our EV fleet allows our employees to use

the EVs for business use. Our field engineers use those, our lighting reps, our energy consultants. So it's, it's a great opportunity for us to provide a competitive alternative to gasoline vehicles which we can experience from, learn from, and demonstrate to our customers. You can see in the picture there they're nicely wrapped, and those also provide for additional conversations when we're out in the field.

Again, we've taken a look at electric fleet to also include forklifts. So we're engaging in that, as well as we have infrastructure to provide charging for our fleet.

CHAIRMAN BROWN: Have you thought about the educational component similar to Tampa Electric, getting out in the schools and teaching folk, the students through driver's education?

MR. WARE: You know, that's, that's a great program, and I think we would certainly consider that. You'll see in some of the -- the next slide, similar to that -- you almost knew what the next slide was going to be. We do have some education awareness that we've done with civic groups, but certainly can include schools in that moving forward.

CHAIRMAN BROWN: Thanks.

MR. WARE: So our transportation activities on

the EV side are really in three buckets: education and awareness, project initiatives, and our pilot program. And so we've had positive reactions with multiple education awareness events. One in particular was our "Cars and Coffee" event. So similar to what Peter mentioned in the "Ride and Drive" at the state capitol, we, in the Panhandle, had small groups of customers come to local coffee shops and talk about EVs and got a chance to ride in an electric vehicle. So a positive response there around our education awareness.

In our projects and initiatives, I think a great example of where Gulf is working with our federal designation with the US Department of Energy and Northwest Florida Clean Cities Coalition. So we are working with our local transportation planning organization, the West Florida Regional Planning Council, as well as other gas and electric utilities and municipalities that, that we serve to secure federal grants and other opportunities to advance alternative fuels in our service area.

And in that last bucket is our pilot program. And we're excited about the opportunity to work with our customers on our approved EV pilot program where we believe it's a positive example of the, the flexibility and engagement by both the Commissioners as well as

other stakeholders. It's really exciting for us to move forward in that, that pilot project.

CHAIRMAN BROWN: Absolutely.

MR. WARE: From a grid reliability standpoint, similar to the other electric utilities, we use industry knowledge as well as EPRI data to, to evaluate our adoption rates in our service area. And so we see the EV charging being a gradual growth where a new load will be evaluated and treated like any other major load coming on to our system. We've estimated about 500 electric vehicles in our service area today based off of EPRI forecast data. And we expect that there will be around 120 to 190 electric vehicles over the next decade. And so as we're looking at our short-term and long-term planning process, those are the estimates that we're taking a look at. And as was mentioned earlier, a core competency for us is taking a look at load and determining what the impact is going to be on our system. And so we see minimal impacts based off of the load growth for electric vehicle adoption.

And so, you know, finally from a regulatory consideration standpoint, I mentioned in our infrastructure pilot, you know, we see new pilot programs that may emerge as certainly something that we'll keep an eye on. And we appreciate the flexibility

of the Commission and other entities involved in advancing the EV infrastructure in our service area, particularly in the Panhandle of Florida.

CHAIRMAN BROWN: Thank you, Foster.

Commissioners, any questions of Mr. Ware?

(No response.)

Thank you for your presentation.

MR. WARE: Thanks.

CHAIRMAN BROWN: And last of the IOUs, but not least, is Mr. Mark Cutshaw, who is director of business development and generation for FPUC. Welcome, Mark.

MR. CUTSHAW: Thank you, Madam Chairman. Thank you, Commissioners. I'll try to get through this quickly because I could just say, "What they said," and I think we're all pretty much on the, on the same accord.

But first I want to go through this 20-minute introduction to Florida Public Utilities, if I can figure out how to --

CHAIRMAN BROWN: Advance it?

MR. CUTSHAW: Okay. There it is. I will spare you the details on Florida Public Utilities since I know --

CHAIRMAN BROWN: We know who you are.

MR. CUTSHAW: Yeah, okay. Unfortunately

Florida Public Utilities does not currently have any EV charging programs. We're maybe late to the game. But we are very interested in finding out how we can get involved in this. We feel like there's a lot of opportunities. We do have several customers that are involved in that. We don't have any specific rates that are specifically for EV charging.

We've also been in communication with a lot of our local governments, and they're all asking for "What should we do? How can we develop? Especially in our resort areas, how can we make EV charging more attractive to customers coming to our area?"

Currently our grid is minimally impacted by EV charging. We're continuing to, to look at the, the rates of EV charging, what's in our service territory, what the state and the nation is doing, and we're incorporating that into our modeling as we go forward. So we're staying on top of it. But, like, as several others have said, we don't see it being a significant impact as, as you look at the entire grid.

A couple of concerns would be if customers put in larger Level 3 fast-charging type installations, you know, there would be some interaction with the customer not only having to upgrade their facilities, but depending on the location, it may be something that we

have to do with our system. But we don't see that being a major impact.

One of the other things that we're lacking, I think, is data in our service territory. Since we really don't have any pilot projects, we've been relying on others to give us that information. But we're very interested in getting some pilot programs going so that we can do that.

Another issue that we identified was what about EV charging post-hurricane like we just experienced? You know, I think one of the concerns and issues to look at is where are these located and how do we prioritize charging of EVs in comparison to other critical type infrastructure? But I think FPU is, is well positioned to handle this as we go forward.

Just to step out on a limb just a little bit, one of the things that we --

CHAIRMAN BROWN: I thought you just did.

MR. CUTSHAW: I'm going to step a little further out. From our perspective, we think that the Commission is something -- is a group that should stay very involved in EV charging, all aspects, whether it be ratemaking or service to the charging stations, because from FPU's perspective, we feel like as we move forward, especially on the larger public type, you know, our

involvement in those is something that we think would be very, very attractive.

Another issue that we want to throw out there is, you know, the sale of electricity typically is done by public utilities. And when you do have EV charging and you have a charger selling something to a customer, is that electricity or is that a charging service? So it's something I think -- a debate that we as a group need to make sure we, we have.

And I also think that in the EV charging arena, since utilities are a focal point of some of that, I think the utilities' involvement is important because of the grid integration that we can provide. We feel like we can help those markets develop appropriately so that we ensure that the customer benefits and that we utilize the systems as best we can. Any questions?

CHAIRMAN BROWN: Thank you, Mark, and I appreciate your candor.

Commissioners, any questions?

(No response.)

Thank you. Well, that, that wraps up our IOUs, but we do have, last but not least, Linda Ferrone. She's vice president of strategy sustainability and emerging technologies from Orlando Utilities Commission.

She's sitting right next to Cayce Hinton over there and David Byrne. Hi, Linda.

MS. FERRONE: Hi.

CHAIRMAN BROWN: Thank you for joining us. Can you make sure, Cayce, that her button is -- there you go.

MS. FERRONE: There we go. Madam Chair and Commissioners, thank you for having me here today representing OUC. I could also say, "And so on and so on." I think a lot of the conversation is the same, so I'll try and just hit the points that really differ, I think, from, maybe from a municipality perspective.

Let's see if I can get this moving. Oh, there we go. I figured out how to go backwards. That was fast.

CHAIRMAN BROWN: And we're done. Thank you, Linda.

MS. FERRONE: I know we can't go backwards. We'll see them in reverse. You can stop there. Okay. So which one am I hitting? Where you see the reliable one. The next one, next one.

Okay. There we go. You know who OUC is, so I'll skip this page. Oh, okay. That's what I wanted to get to. Okay. So we've seen these maps for some of the other folks. So obviously that's Central Florida, and

there are a lot of dots on there and we're very proud of that. You know, we, we had the chance to -- we were selected as one of nine utilities with the DOE grant back in 2010, and, you know, we took advantage of that. But I'll tell you, it was a challenge actually and we didn't meet our goal of even charging -- of getting installed the 300 that we had got through the grant. We got installed something more like 200. And I'll come back to why that was a challenge for us.

So we're proud of the progress that we made, but we were surprised to find how difficult that was. So you can see a nice map there. There is a good, there is a good system in Central Florida. All the way down the lower left, that's the parks and resorts area, which is an important part of the picture for Central Florida, and it really kind of follows I-4 all the way up to the top, which is the Sanford area.

Our programs and incentives, we, we did that big push in 2010 and it was difficult. So it wasn't something that we kept on the front burner, I have to say. We decided, during our strategic planning earlier this year, to bring it back to the front burner, and so I was thrilled when this opportunity came along. And it seems like this big groundswell is coming, the public -- or the APR announcements keep coming, and so we think

the timing is really good.

So we're getting ready to launch our next offering, which is an "Own It, Charge It" for commercial EV services. So we want to leverage what we learned from 2010 into this offering.

So you can see there's two purchasing options there. One is a leasing option where OUC would own everything. We'd operate, maintain all the equipment. And there's a turnkey opportunity there where OUC would procure and install the equipment for the customer. So we've been having some roundtables with customers to get their perspective on how those would work for them. So we're excited about that.

The rebates that you see there, we're not sure that rebates are a big driver in this market actually. So, you know, we offer rebates. Obviously people take advantage of them. We just don't know that that's the best way to incent people. So I'll keep going to what we see as the challenges.

CHAIRMAN BROWN: Yes.

MS. FERRONE: Yes. And I'm just going to speak to it in a moment. Okay. All right. I'm going to set that down. Handing it to you.

So a lot have said the things that are on this page already: Where do you charge it? When do you

charge it? Who decides that?

You know, I think for us the role of the utility in that is making sure that our electricity is reliable and people can charge when they need to charge. So that means the infrastructure is where it needs to be when, and it's available when, and there's not long lines, as people have talked about, you know, things like that. So we've talked about time of use rates, we've talked about all those things, but it certainly is a challenge.

I think the challenge that we see in there is we struggled -- the second bullet point there, we struggled to give these things away. And, you know, I know that's, that's kind of the first time -- it hasn't kind of come up, but no one said it quite so clearly, like, we really struggled to get those that would -- the location owners to take free. There's still installation costs. They're still giving up a parking space. There's safety concerns, liability concerns. There's a number of things that location owners put up as barriers.

So, you know, we really cashed in a lot of chips with our biggest customers to get the 200 rolled out that we got rolled out. So those are with the City of Orlando, they're with the airport, they're with the

hospitals, they're with some retails, they're with some hotels.

CHAIRMAN BROWN: So, Linda, being with -- being a municipality and having the ability of having the local government be your partner --

MS. FERRONE: Right.

CHAIRMAN BROWN: -- from a, from a different arm, has OUC or the City of Orlando, have they developed codes or ordinances to incentivize, you know, investment in EV, whether it's through parking requirements or some type of development codes? I'm just curious what the City has done since OUC has been very receptive to deployment of the EVs.

MS. FERRONE: Yeah, they have not. We're talking about it again, though. The City of Orlando has a green works program, and smart transportation is one of those as is just electricity inefficiency, not to mention smart city and autonomous vehicles are, are kind of a burgeoning topic there as well. So I think that topic is coming back around. That's something that we've just started pushing for again, and they've been somewhat receptive.

CHAIRMAN BROWN: Thank you.

MS. FERRONE: So stay tuned on that one.

Yeah. I think the only other point that I'll

make on here, there's so much changing in this area. Someone asked, "What's the right time?" I forget which of the Commissioners asked that. What's the right time to buy? You know, what's the right time? It's not just from a consumer standpoint, but our customers are also all these commercial places where we're installing these. They're also trying to figure out what's the right time to install these.

So I think from a, just a Florida perspective, if there's a story that we can get out there to help them over that hurdle, because it's a chicken and an egg. It's completely a chicken and an egg. But if we can help more get into that early adopter bucket that Britta Gross was talking about, it will help us turn the tide. So as many dots as we have on that map, it still is very much the early adopters.

CHAIRMAN BROWN: Thank you, Linda.

Commissioners, any questions for OUC?

(No response.)

MS. FERRONE: Thank you.

CHAIRMAN BROWN: Thank you for coming up here.

We have two other folks here today who -- my understanding is that they do not want to give presentations. It's David Byrne, who's assistant general manager, electric system integrated planning for

the City of Tallahassee. Or maybe you want to give remarks.

MR. BYRNE: Thank you, Madam Chairman and Commissioners. I do have a few remarks, if you would give me a couple of minutes without a presentation.

CHAIRMAN BROWN: Sure. Now is the time.

MR. BYRNE: But I did -- as, as an intro, I was noting a little bit on the internet that if you go searching for electric vehicle charging, and I looked around in the Tallahassee area, they sure are all over the place on the internet now. So that's a good thing. And what I found was that pretty much all the spots that I was familiar with in town come up on just about everybody's, and there's about a half a dozen different websites that are giving information about that right now.

But it's kind of exciting because I think that there's obviously enough interest in people wanting to know where EV charging is that it's out there on the internet now and folks are supporting it from that end.

And generally, from the City's perspective, we do support EV technology, and we look forward to the expansion of electric vehicle use among our citizens and, and the, the benefits that EVs could bring to our citizens.

As a system planner, which is what I do for the electric utility, I just wanted to mention that we're certainly looking at electric vehicle development as it impacts the electric system. We don't see electric vehicle charging as anything that's going to create any bulk electric system issues any time in the near intermediate term planning horizon, but we do recognize that, and this was mentioned, I think, a couple of times already, that the distribution system for our individual customers that are charging, particularly if there are some pockets of charging in one area or another, that there may be some issues that have to be addressed. And our engineering team is available to work with folks on our electric system to help with resolving any of those issues.

Also, we do include the expansion of electric vehicles as part of our annual load and energy forecasting process, and so to the extent that that does have an effect in our system, we include those as part of our plans towards expanding the electric system to meet the needs.

Also we do have a -- we want to mention that we have a rate that we support customers with. We have a nights and weekends rate that gives a nice discount to the regular rate for off peak charging. So folks that

do have an electric car could take advantage of that by simply bringing their car home in the evening and charging it overnight.

One of the things that I think is going to be among the better opportunities for EVs is -- and charging locations is looking for what I call long-leave parking areas, things like shopping malls, movie theater areas, some other -- and parking garages where people are going to leave their cars for an extended period of time. It seems to make sense that people might want to recharge a car, if it's going to take 20 minutes up to an hour to get a reasonable additional charge, you're going to want to be there for a little while, and that makes sense.

Also I think that we want to try to minimize the investments in payment processing. And I don't mean by doing less of this, but what I mean is by taking advantage of systems that are already in place. For instance, there's a parking garage operator in Tallahassee that operates garages all over the country, and they have in place a payment system in some of their other parking garages that manages charging of EVs. If those garages in Tallahassee want to incent people to park in there with their EV, I think that they should get on with a -- with an existing payment processor to

enable those, those systems and to work efficiently that way.

And, finally, I want to mention that we talked about how EVs in effect -- Kellen from the EEI at the beginning was mentioning how electric utilities are starting to reduce their overall carbon emission and in comparison to the transportation industry seeming to be able to take some of that opportunity from the transportation and move it into the electric utility area.

The City of Tallahassee is in the process of installing 60 megawatts of photovoltaic solar farms on our system, on our 600-megawatt system. So about 10 percent of our load will be served from solar in a, in a couple of years. We think that brings an opportunity for those who really wish that transportation could be fueled with clean energy. We're bringing that opportunity to our customers too.

CHAIRMAN BROWN: Thank you, David, for your presentation or comments.

Mike, I'm not even going to try to pronounce your last name.

MR. BJORKLUND: Well, I don't know why, Madam Chair. It's so easy. It's Mike Bjorklund, ma'am, and thank y'all for letting us be --

CHAIRMAN BROWN: Can you say that last name again?

MR. BJORKLUND: Bjorklund.

CHAIRMAN BROWN: Bjorklund. The J is silent.

MR. BJORKLUND: Yes, ma'am.

CHAIRMAN BROWN: Okay. Thank you. And he is general manager of FECA.

MR. BJORKLUND: Yes, ma'am. We thank y'all for letting us be here today. We don't really have a whole lot to report on the electric vehicle situation. When we reached out to our members and asked them for the information on what they were doing with it, we just haven't seen a wide proliferation into our service territories as of yet. However, if our member owners are interested in it, so are we. So as it begins to grow, we'll be looking forward to dealing with it and trying to make sure it's integrated properly.

CHAIRMAN BROWN: Excellent. Thank you, Mike.

Commissioners, any questions of any of the panelists who are here today before we wrap up the presentation portion?

(No response.)

Seeing none, we are going to open up comments to the public. And if there is anybody in the audience who would like to speak to us, we have a lectern up here

that you can more than willing. But first we have someone on the line who I believe has been listening in and waiting to, to speak. His name is Chris King. He is the global chief policy officer of Siemens Digital Grid, and he has called in. And, Mr. King, are you on the line?

MR. KING: I am.

CHAIRMAN BROWN: All right. Mr. King, you've got three minutes. If you could wrap up your comments for us, we are all listening.

MR. KING: Thank you, Chairman Brown and Commissioners, for letting me participate by phone.

I wanted to mention that Siemens is a German company, of course, that employs actually over 50,000 Americans, including over 4,200 in Florida. And in the charging space, we've actually shipped over 100,000 chargers globally.

I'd like to hit on five points quickly. One is we have focused most of the discussion today on the public charging at 20 percent of the charging, 80 percent of our discussion. I'd just like to highlight that 80 percent of the charging is at home, and utilities can play a major role here in making it lower cost and easier for residential customers.

And there's San Diego Gas & Electric who's had

their proposal now in California that I'd urge you to take a look at that would greatly reduce the cost.

The second point on the market, this is a nascent market. It needs help. Can we urge a broad strategic comprehensive approach that is open to all participants who can offer their skills and capabilities to the market? It should be -- we believe it should be competitive and that the utilities should be allowed to participate in that market.

A third point on the grid, we see a modernized grid as foundational for transportation electrification at scale. If you -- most of what we've heard is very little impact. But as we look further out, if you have 50 percent of penetration of EV and you don't manage your charging, you would actually need double the grid capacity. Now that's not going to happen because we know it's going to be managed. But that's an important feature.

The fourth point is on standards. We've talked a little bit about that. One we haven't talked about is payment standards. We're strong advocates for open standards generally. And one of them is that consumers should be able to come up to any public charging station, be able to pay for charging in an open standards fashion. And this applies to data access and

data protocols as well.

And then my final point is around this pricing we've talked about. Tallahassee mentioned the GOU rate. If you look at the average cost of electricity in the US, it equates to -- it's 11 cents, which equates to 93 miles per gallon per car. If you go with the 6-cent off peak rate that Tallahassee has, that turns it into 171 miles per gallon.

So, first of all, it's very exciting. We're not advocating new rates in addition to the rates that are out there, but we are suggesting that what you can do is use smart chargers that have metering built in to charge those rates. That way someone can put their EV on that GOU rate and not have to put the rest of their house on the GOU rate and get the benefit of those low costs. And there are some pilot programs going on around the country that are looking at doing that sub-metering approach.

So, again, thank you for giving me the opportunity to comment, and I'd be happy to answer any questions.

CHAIRMAN BROWN: Thank you, Mr. King. Those -- I appreciate you calling in and listening in and providing those comments to us and offering those points to look at.

Commissioners, any questions of Mr. King?

(No response.)

Okay. Thank you.

Now we are open to public comment.

Who are you?

(Laughter.)

MR. KELLY: Good afternoon, Madam Chair, Commissioners. And since this is a roundtable -- I'm sorry. J.R. Kelly with the Office of Public Counsel.

Since this is a roundtable, I just wanted to ask, and I'll throw it out to anybody who wants to ask, how did the Irma -- Hurricane Irma affect the operation of, of EVs? I just thought about the customers that might have been out of power for multiple days, from that aspect.

Number two, the resiliency of the equipment. I was just curious. I see them standing up a lot of times, it's just one pole. And I was just curious, did the wind affect any of those stations and so forth? And so I'd just throw it out.

CHAIRMAN BROWN: Thank you, Mr. Kelly. And I was thinking the same thing, and I was thinking that we were going to ask those questions during -- in the hurricane docket.

MR. KELLY: Okay. I didn't know if these

other people are going to be there, so --

CHAIRMAN BROWN: Okay. Mr. Hetrick, do you think it's appropriate?

MR. HETRICK: I think you have all the Commissioners here. It's a publicly noticed meeting. You can comment on -- respond to that question.

CHAIRMAN BROWN: Okay. I'm going to go to the utilities first, rather than the providers. So we'll just start with FPUC. I think you alluded to it in your comments. So, Mark.

MR. CUTSHAW: With our limited number of chargers, we didn't experience any issues.

CHAIRMAN BROWN: Foster?

MR. WARE: We didn't have any issues as well.

CHAIRMAN BROWN: Kenneth.

MR. HERNANDEZ: We had no issues with any of our company-owned charging infrastructure, nor are we aware of any issues with customer-owned.

CHAIRMAN BROWN: Thank you.

Lang.

MR. REYNOLDS: We're also not aware of any particular issues with that.

CHAIRMAN BROWN: Brian.

MR. HANRAHAN: Same, and no issues with our company-owned 180 or so chargers.

CHAIRMAN BROWN: Okay. David, if you want to add anything. Patrick, Britta, Peter, Kellen.

OUC?

MS. FERRONE: No issues.

CHAIRMAN BROWN: Tallahassee.

MR. BYRNE: No issues.

CHAIRMAN BROWN: And FECA.

Okay. Mr. Kelly, would you like to provide anymore comments?

MR. KELLY: No.

CHAIRMAN BROWN: Okay. Any further public comment?

MR. ASHLEY: Hi. Tom Ashley, VP of policy for Greenlots.

CHAIRMAN BROWN: Hi.

MR. ASHLEY: Hi. I just wanted to thank you, Chair Brown and Commissioners, for kicking us off with this process. As Britta alluded to earlier, you know, it kind of comes around every now and again, but I think we all recognize that it's here to stay.

Greenlots is an EV charging software and services firm. I would just note that in respect to Kellen, we think that the adoption curve for EVs is going to be significantly sharper than what was offered in the presentation earlier. But we do recognize that

charging infrastructure, the availability, the reliability of it really is the number one barrier from our standpoint to that level of adoption. And so there may be a handicapping of those adoption curves based on projections for installation of charging infrastructure. Greenlots is just excited to work with the Commission, with the utilities, and other stakeholders to see how we can move this market forward fast.

CHAIRMAN BROWN: Thank you. Thank you for your comments.

Commissioners, any questions?

(No response.)

Seeing none, thank you.

If there's nobody else -- oh, there we go.

MS. LARSEN: Good afternoon, Commissioners. Thank you for the opportunity to provide brief comments today. My name is Dory Larsen. I'm the electric vehicle program associate with the Southern Alliance for Clean Energy, and we're pleased that the Commission is evaluating this important issue.

We support, we strongly support utility electric vehicle initiatives and policies and hope that the Commission will encourage additional programs in Florida.

The industry is rapidly growing. More and

more drivers are switching to electric because of the convenience and money-saving benefits of these vehicles. Nearly every automaker -- nearly every auto manufacturer has announced plans for the manufacture and sale of an EV by 2020, and with this expected growth, Florida and the Florida utilities need to be prepared for these vehicles and play a role in the process.

External funding such as that from the Volkswagen settlement is available to help with charging infrastructure deployment, but utilities need to aggressively step up with their own charging infrastructure programs.

Southern Alliance for Clean Energy supports utility investment and installation of charging infrastructure at all levels as they will serve a different role and benefit for customers and the utility companies. These investments can result in more off peak energy sold, helping reduce rates for all ratepayers, and the additional load can make more efficient use of existing utility assets, which along with off peak charging can put downward pressure on rates.

EVs also offer the benefit of load control in which consumers would allow the utility to turn off or on charging to reduce load during peak demand. EVs can

also make integration of renewable energies easier as their load can be moved around to match demand needs.

Because of these benefits, utilities should be allowed to recover the costs of these assets as they benefit all customers. For any utility charging infrastructure deployment however, the utility should ensure that it actually reflects driving behavior. As we've heard today, most EV charging occurs at home, followed by the workplace where vehicles often sit for long periods of time.

Deployment should reflect these needs. Beyond the home and workplace, the utilities should consider faster charging options along major corridors in the state. Utilities should also play a large role in education and outreach to consumers. As we heard, more than 60 percent of US drivers are unaware of what an electric vehicle is. And utilities should welcome the opportunity to educate power users regarding charging during off peak times and not during peak demand and evaluate effective new rate design programs. By participating in the education of consumers, it will expedite the adoption and allow the benefits to be recognized more effectively.

In addition to these brief comments, SACE welcomes the opportunity to discuss them with the

Commission and staff in more detail. And we also want to invite you to join us for a regional conference that we will be having next month called "EVs in the Southeast Grid" on November 15th and 16th. We are hosting this conference in partnership with one of the Georgia Public Service Commissioners and would welcome your participation. Thank you.

CHAIRMAN BROWN: Thank you so much for your comments.

Commissioners, any questions?

(No response.)

Seeing none, thank you again.

Is there anybody else from the public that would like to address the Commission on this topic?

(No response.)

Seeing none, that will conclude our public comment portion. And I want to thank you all for your participation and patience through this roundtable discussion. If you would like to provide additional comments in writing or if there's anyone who wasn't able to join us today, we will be accepting written comments on electric vehicle charging infrastructure in Florida. Please submit them to Ben Crawford at bcrawford@psc.state.fl.us. We ask that you submit them by November 17th, please. These written comments, along

with copies of all the presentations that we've seen today, will be on our website in the near future.

And, Commissioners, if you have any closing comments, now is the time to give them.

Commissioner Polmann.

COMMISSIONER POLMANN: Thank you, Madam Chairman. There's been quite a bit of discussion here among all of the presenters and reference to various types of data. And I'm taking from those comments that there's quite a bit of outreach to the EV owners at various levels, and not that we should discuss this at this point because we're about to close, but I'm simply suggesting continued outreach and involvement with the owners. I'm not quite sure, but you know how to engage with the EV owners.

And I'm wondering how to answer questions as simple as do they keep track on a daily basis how many miles they drive? There was reference here from the utilities about squeezing that last mile out of, out of the battery. So I have no idea if everybody keeps track of, of their use of the vehicle, how well they're managing their battery use, and what is the level, and how much charge do they need? What is their driving distance on a typical day? How are they using that vehicle? What is the high range use that they have?

And I just think all this type of information would be very helpful as you look at your charging station type and distribution within your service area. And getting to the different types of vehicles that you're trying to support, what is the primary use among the owners? Is it just daily use commuting we're talking about, you know, the typical passenger vehicle in an urban area versus commuting to work, these types of things.

And then the other side of it in terms of developing the market and increasing the penetration, we're talking about what needs to be improved with regard to the grid. So a question: As the consumer base grows, how do we engage that population to ask them what do they think needs to be improved in the vehicle charging network so that those folks can recommend EVs to other buyers?

So these are just questions that have come to my mind as, as I've heard the discussion here today, and I just want to leave you with those thoughts. And I really do appreciate all of you being here today. It's been a very interesting presentation, and I thank you for participating.

CHAIRMAN BROWN: Thank you.

Commissioners, any other closing comments?

I would like to commend all of you here today for your efforts to help facilitate the development of EV throughout the state of Florida. I do believe that's where the future of transportation is heading, and so I commend you all for coming here. I'm excited to watch the market develop over the next few years.

I would like to ask our staff, in response to the information that we've gathered today, to create an update to our 2012 report, Mr. Hinton, that explains the developments in the industry since the last report and the current status of the EV and EV charging infrastructure in Florida. And that report should summarize the information that was presented today. And any written comments, of course, would also be -- submitted over the next 30 days will be included in there, as well as observations about the impact that EVs will have on the utilities' grid.

This report should be presented to the Commissioners at an Internal Affairs in the near future. Got it? Many thanks.

So if there are no -- any, any other questions or comments, the public, no further public comment, this roundtable is adjourned.

Thank you so much. Safe travels.

(Proceeding adjourned at 4:29 p.m.)

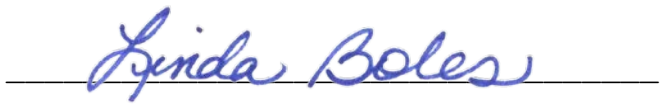
STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, LINDA BOLES, CRR, RPR, Official Commission Reporter, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that I stenographically reported the said proceedings; that the same has been transcribed under my direct supervision; and that this transcript constitutes a true transcription of my notes of said proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 25th day of October, 2017.



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