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5 BEFORE: Chairman Edward S. Finley, Jr., Presiding
6 Commissioner Robert V. Owens, Jr.
7 Commissioner Lorinzo L. Joyner
8 Commissioner William T. Culpepper, III
9 Commissioner Bryan E. Beatty
10 Commissioner Susan Warren Rabon

11 IN THE MATTER OF:

12 Generic Proceeding - Electric: Establishment of a North
13 Carolina Advanced Energy Corporation
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P R O C E E D I N G S

CHAIRMAN FINLEY: All right, ladies and gentlemen, let's come to order, please. We are here this morning in Docket No. E-100, Sub 37A. We are here to hear the annual presentation and report by Advanced Energy Corporation. We do this on an annual basis and we're happy to have representatives of the corporation here and we're anxious to hear from them.

MS. WILLIAMS: Thank you, Mr. Chairman, members of the Commission. We're delighted to be here today to present this report. We appreciate your hospitality this morning. And I would like first to introduce the members of the Advanced Energy Board. I'll call their name and ask them to stand as I call their name.

Attorney Fred Alphin; Alan Butler with Weaver Cooke; Dr. Leigh Hammond; Dr. Bob Koger; David Mohler with Duke Energy; Bob Powell with NC A&T; Beth Rehbock with Microcell; Michael Thompson with Dominion Power; Dr. Carolyn Turner, Professor Emeritus at NC A&T.

Have I left anyone out?

CHAIRMAN FINLEY: You left yourself out --

MS. WILLIAMS: And I was just going to say --

CHAIRMAN FINLEY: -- you're Chairman Hope Williams.

1 MS. WILLIAMS: And I'm Hope Williams, thank you,
2 with the Independent Colleges and Universities.

3 DR. KOGER: Good morning, Mr. Chairman,
4 Commissioners. Glad to be here. I was anticipating maybe
5 the newest of the new Commissioners being here, so I put a
6 few basic slides up since I thought she might not know
7 anything about Advanced Energy, but primarily we want to
8 report on a couple of items.

9 We do so many different things we can't possibly
10 cover all we do in one of these meetings, so we try to
11 bring to you some of the new things we're doing. And
12 we're going to -- we're focusing today really on our --
13 the retrofit product that we have for existing homes,
14 you'll hear from Keith Aldridge about that.

15 And then we're going to talk about plug-in
16 hybrid electric transportation, "Get Ready Raleigh,"
17 whatever. And we have our own person who is the head of
18 our transportation division now, along with Mike Liggett
19 from Progress, Mike Rowand from Duke and Julian Prosser --
20 Prosser -- Assistant City Manager from Raleigh is going to
21 make some short comments.

22 Do you have an agenda in front of you? Okay.
23 Just wanted to be sure. Well, even though we don't have
24 the newest Commissioner here, I'm going to -- we'll go

1 through these real quickly, then I'll turn it over to
2 Keith.

3 (Brief pause.)

4 Okay. Well, all of y'all know this, we're
5 located on NC State Campus. We were founded back in 1980.
6 It's pretty clear there what our mandates are. The last
7 one that's suggested, a very important one, is "to
8 encourage energy efficient economic development in North
9 Carolina."

10 We've got about 60 employees. We're growing.
11 More and more of our work is out of state. We -- the
12 Commission and a committee of our board along with the
13 Attorney General's representative decided back in the
14 early 90's that there was nothing in our charter that
15 prevented us from serving out of state. And the reason we
16 wanted to serve out of state, we started getting requests,
17 number one; but number two, this allowed us to hire
18 additional expertise which we could use in North Carolina.
19 The money from the ratepayers was not sufficient to hire
20 big enough staff to really be able to work with all the
21 utilities in all the different areas we wanted to work,
22 plus, working nationwide, that's the only way you can
23 change a lot of things.

24 We've worked with EPA closely. We -- they

1 changed their EnergyStar rules on housing two times now
2 because of work we've done. We continue to work with
3 them, do a lot of surveys for them. We work with other
4 federal agencies, DOE, for example, to change their motor
5 rules, electric motor rules because of our work, so forth.
6 So being nationwide, having a nationwide outlook really
7 benefits North Carolina.

8 So that was just a lead-in for the newest new
9 commissioner. I'll turn it over to Keith.

10 MR. ALDRIDGE: Thank you, Bob. Thank you for
11 this opportunity to talk to you this morning. I'm Keith
12 Aldridge. I'm the managing director of our Applied
13 Building Science team, and I want to talk today -- okay.

14 (Brief pause.)

15 I want to talk today just for a few minutes -- I
16 want to leave plenty of time to talk about transportation
17 -- about a new program that we are designing --

18 DR. KOGER: You might move that mike over on the
19 end of the table if you want to.

20 MR. ALDRIDGE: Can you hear me okay?

21 CHAIRMAN FINLEY: Yeah, we can, but perhaps
22 people in the back of the room would like to hear too, so
23 move it over if you don't mind.

24 MR. ALDRIDGE: Is this working? Does that work?

1 Can y'all hear me back there? Okay. Now I've got both
2 hands full. I'm in trouble.

3 This is a new program that we're rolling out
4 right now, and I want to tell you about it just over the
5 next 15 minutes. Let me first kind of give you the
6 problem statement about why we started looking at this way
7 of doing existing homes.

8 Right now there are a lot of programs running
9 around the United States, mostly funded through utilities,
10 often using government money as well. And we've seen the
11 house assessment part, that is someone comes out and looks
12 at the house, we've seen that cost going up and up and up
13 to the point where it's running at the low end about \$300
14 on the house to the upper end of \$1,000. This is money
15 that's spent through a utility program before any work is
16 done on the house, but there are a lot of houses out there
17 that can be fixed for a thousand or \$1,200. So on a
18 national basis to be incurring these kind of upfront costs
19 before we do any work on the house didn't seem like a
20 particularly good idea.

21 The other thing was is that the measures, the
22 things that we decide to do, the houses don't vary very
23 much at all in a given geographic area. Now, what we do
24 to a house in Phoenix is going to be different than what

1 we do in North Carolina. But what we do to houses in
2 North Carolina isn't going to be very different whether
3 you're looking at one house in Durham or one house in
4 Asheville, and certainly within a city like Durham or
5 Raleigh, you just don't see that much difference. So what
6 are we getting out of this \$300 to \$1,000 of assessment.

7 And the other thing that's really making this
8 the hot topic in the Department of Energy and the
9 residential side these days is that we're being asked to
10 ramp up the retrofit production by tenfold or more. Right
11 now we're doing 30,000 to 40,000 houses a year nationwide.
12 And if we're going to make a dent in the problem anytime
13 in any of our lifetimes, we need to ramp that up by 10,
14 20, 30 times. So clearly we need a more efficient
15 process, a more cost-effective process to promote the
16 retrofit of houses.

17 So we have developed a comprehensive package
18 that we call "House Characterization." It consists of
19 three main steps; the classification of the house,
20 solution packages and then a standardized work process.
21 And I'll go through these just one at a time.

22 The classification process really kind of goes
23 back to what had to be done in World War II when we had a
24 lot of hotshot young pilots right out of high school

1 flying very large, dangerous machines around looking for
2 ships and other enemy aircraft to attack. And they had to
3 be able to recognize what they were looking at very
4 quickly. We didn't have radar and all the computers we
5 have now. And so they were trained over and over and over
6 to look at silhouettes. So when they came out of the
7 clouds and they saw another plane or a ship, they knew how
8 to recognize it simply from the silhouettes. So this is
9 kind of that same concept.

10 Basically we divide all the houses into levels.
11 The level one house is a small -- actually, not
12 necessarily small. It doesn't matter how big it is. A
13 single-story house, slab on grade, no weird things going
14 on in the attic. Level two gets a little more
15 complicated. We see a lot of crawlspaces in North
16 Carolina. There are tons of level two houses in North
17 Carolina, for instance.

18 Level three you start getting into more
19 complicated houses. This is when assessments start to get
20 more complicated, but on the first two levels of house a
21 qualified contractor can look at those houses and say,
22 okay, I know what I need to do to that house without ever
23 taking any equipment out of his or her truck and just go
24 straight to work.

1 Level four is more complicated. I'm not going
2 to go through the details, but we've got attached garages,
3 porches, lots of things going on.

4 Level fives get to be these large complex houses
5 that have lots of things going on; combustion issues
6 inside the house, those sorts of things. A level five
7 house is going to take a detailed assessment. A
8 simplified assessment process is not going to work at the
9 level five, but at the other levels it can make a big
10 difference.

11 One of the real factors behind house
12 classification is, is that one of the main things we're up
13 against in houses is how air moves in and out of the house
14 in an uncontrolled way, air infiltration. And houses are
15 just basically nothing but a series of boxes. A level one
16 house is a simple box. There's a slab, the house sits on
17 the box. There's an attic and a roof on top of it that's
18 missing from this drawing, but there's not many places
19 that house can leak air. It's going to go out of the top.
20 It'll come in the outlets, it'll come in the windows, but
21 if you seal the top of it, the air won't come in. So it's
22 a very simple house to work on.

23 And, again, if a contractor, whether it's a
24 weatherization crew or a rental rehab crew or a private

1 contractor working for private money drives up to a house
2 like this, they know what to do to that house. They don't
3 have to do any fancy assessment. Single-story slab,
4 that's a level one. There's the box.

5 Level two gets a little bit more complicated.
6 Now we have a crawlspace, so we have to worry about the
7 leakage from the crawlspace into the house. We also have
8 to worry about how moist the crawlspace is, how much
9 damage -- you know, is there mold growing in it. So there
10 starts to get a little more complexity there.

11 Level three, we get these things in the attic up
12 here that we call knee walls. Every house, with very few
13 exceptions, that are built with this kind of construction
14 are built wrong. And so from the day they're built
15 they're ready for a retrofit. But again, if a contractor
16 knows that that's where it's going to leak and that's what
17 they need to look at, then they don't need any fancy
18 equipment to fix that house.

19 Now, level fours start to get to be a different
20 story. We don't have a lot of these split levels in North
21 Carolina, but we have a lot of complex houses. These get
22 to be very difficult. But again, a lot of the work can be
23 done without a lot of fancy analysis.

24 And then the level fives are these kind of

1 houses. They're going to take a lot of analysis. They're
2 going to take -- we'll talk about it a little bit more,
3 but they're going to take very highly trained crews. We
4 don't have to have really highly trained crews to work on
5 level one, twos and threes. And that's where we get the
6 production that we need to ramp up right now.

7 So this is the box concept. We've seen it in
8 real life. The porch on the outside, this is one of those
9 things that people -- most -- you know, lay people don't
10 realize that if you have this leakage path between floors
11 and it's covered by your front porch, nobody ever knows
12 it's there. But a trained contractor will know it's
13 there. You don't have to have any X-ray vision or
14 anything to know that that's a detail.

15 And garages, there are other things that are
16 covered up by attics. Siding, fireplaces that are hung on
17 the outside of houses, bay windows that are hung on the
18 outside of houses, they all have characteristic problems.
19 And again, it doesn't take any kind of fancy equipment to
20 figure that out.

21 So these are just examples of some other things
22 that typically -- we find typically in houses that
23 typically leak. And this is just what they look like on
24 the inside. Got this fancy ceiling that people like that

1 steps up and gives you a nice feel. Very difficult to
2 insulate and air seal. You've got a beam that comes
3 across that is often a big air leakage path, and you've
4 got vents that go up. These are all things that you can
5 see from the inside and you know that -- crawl up in the
6 attic and you have to seal them off.

7 And here are some just features from inside the
8 house, and some more. We have these details, we don't
9 need to go through them here, but it's a big part of the
10 standardized work process is getting pictures of the
11 details that we need people to know how to fix.

12 So house classification allows us to match the
13 skill of crews to the house level. As we ramp up and try
14 to multiply what we're trying to do -- for instance, in
15 North Carolina, we're trying to ramp up the low income
16 weatherization program by more than ten times. And so if
17 we have level one crews that are going to be -- you know,
18 have recently been trained going out in the field trying
19 to do level five houses, we're going to get a lot of
20 problems.

21 DR. KOGER: You might tell them how much money
22 that entails for North Carolina.

23 MR. ALDRIDGE: I don't know.

24 DR. KOGER: I thought it was 130 million.

1 MR. ALDRIDGE: I've heard so many numbers I
2 can't remember which number goes with which. It's about
3 130 -- I think in the hundred -- just a little shy of 130
4 million.

5 DR. KOGER: Used to ramp up.

6 MR. ALDRIDGE: And what they've been getting in
7 the past -- actually, North Carolina is more than ten
8 times the money because the formulas are changing. And I
9 can't remember what they're going from, but it's something
10 like 6 or \$7 million a year up to 130 million. And so
11 it's just a mind-boggling increase in money.

12 And, of course, Washington is saying that if you
13 don't use this money well, then as the rest of the money
14 starts to flow out of the energy bill, you know, you're
15 going -- you're not going to get that money. So there's a
16 lot of fear in the network about ramping up.

17 And we're really worried about, you know, lots
18 of crews getting very light training and getting thrown
19 out into very difficult houses, so we want to match those
20 crew skill levels to the houses. It cuts training costs
21 because conversely we don't need to train crews to do
22 level five houses if we're only going to send them out to
23 do level one houses.

24 And by the way, the best way for people to learn

1 to do all this is to go out and work on houses. It makes
2 a lot more sense to train somebody for a couple of days
3 and send them out to do level one houses than it does to
4 hold them in a classroom or a lab for a couple of weeks
5 and then send them out. They learn -- everybody learns
6 better in the field.

7 And it just speeds up -- for the contractor, it
8 speeds up revenue. We have piloted some of this training
9 in some electric co-ops in North Carolina and we have
10 people out productively working in houses under
11 supervision with half a day of training. So from the
12 contractor's cost point of view, they give up a worker for
13 half a day, the next day he's out making money. So again,
14 as we ramp up across the country, we think that's going to
15 be pretty important.

16 By the way, if you have questions anywhere along
17 the way, stop me. Okay. I'll keep -- I'm going to start
18 talking into the remote control here.

19 Solution packages, basically there are some
20 things that almost every house in the United States needs
21 done to them: Duck leakage, attic air leakage, attic
22 insulation. Hot water is increasingly going to be
23 something we're looking at. There's new technology
24 coming, a lot of opportunities there. Pretty much every

1 country -- every house in the country these need to look
2 at. One thing that's missing there is compact fluorescent
3 lights, or LEDs, as they come on line.

4 Then there are climate specific issues or
5 geographic issues. Crawlspaces, we don't see any
6 crawlspaces in Arizona, but we do see them in North
7 Carolina. Sunscreens are a big deal in Arizona. They
8 don't do sunscreens in North Carolina. In the northern
9 tier we have to worry a lot about ice damming, but we
10 don't have to worry about that here or in Arizona. So
11 there's some things that are really, really, really
12 climate specific.

13 And then I want to talk just -- yeah.

14 COMMISSIONER JOYNER: Let me interrupt. What is
15 ice damming?

16 MR. ALDRIDGE: I was afraid you were going to
17 ask that. It has to do --

18 COMMISSIONER JOYNER: Well, I was hoping
19 somebody else would, but clearly I'm the only one who
20 doesn't know.

21 MR. ALDRIDGE: No, it's something we don't see
22 here. It has to do with warm air leaking out of your
23 house into your attic and -- with snow on the roof. And
24 it melts the snow above the attic and it starts to run

1 down toward the eave of the house. And as it gets towards
2 the eave, it gets outside the area of the roof that's
3 warmed by the leaking air and it will refreeze. And so
4 you get a buildup of ice out on the eaves of houses and so
5 what happens -- so several things start to go badly at
6 that point.

7 One thing is you get liquid water that builds up
8 behind it and starts to seep under the shingles and will
9 actually leak back up through the roof and down into the
10 attic and leak down into the living space. And the other
11 thing, if it gets bad enough, it'll actually rip the eave
12 of the house off, so -- you get so much ice that builds
13 up.

14 So you've got all this snow being warmed by air
15 leakage comes down to the eave, it gets out towards the
16 eave where it's not being warmed anymore and freezes and
17 these big ridges of ice form. Just another reason not to
18 live up north.

19 And then maybe the most important thing of all
20 of this is standardized work processes. Because even if a
21 company doesn't use the house classification technique,
22 what we've seen out in the marketplace is that every
23 company does everything a little differently. Every
24 weatherization crew does everything a little differently.

1 And so what we're starting -- what this product preaches
2 is get a right -- I mean not a right way. There's several
3 right ways to do these things. Get one way that your
4 company is going to do it and do it that way every time so
5 that you can now really have a quality control process
6 which is all about doing the right thing the first time
7 every time.

8 So we're teaching people these critical details.
9 It's all very pictorial based. We have some language
10 issues, so we deal with Spanish a lot, but mostly we're
11 getting away from using language and more toward using
12 pictures.

13 Here's a job instruction breakdown. This does
14 require language. This is where you take a relatively
15 complex job and you break it into a series of small steps.
16 Any engineer has done this. It's a very common process.
17 But it's not common in the retrofit business. In the
18 weatherization programs and the utility programs and the
19 private programs this is not commonly done, so we're
20 teaching people how to do job instruction breakdowns.

21 And that's the program. Right now we have --
22 we've done some pilots in North Carolina. We have a large
23 scale pilot going in Arizona that's funded by the
24 Department of Energy and all the electric utilities and

1 the gas utilities and the state energy offices -- or
2 office is participating. We have proposals in to DOE to
3 build this on a national basis. And we're starting to
4 roll it out with private companies as we speak, so it's
5 starting to hit the streets.

6 I've got a few more minutes before they run me
7 off. Any questions?

8 COMMISSIONER BEATTY: Keith, if someone were
9 interested in having this done at their house, how would
10 they go about having it done?

11 MR. ALDRIDGE: Well, let's see, I believe
12 Progress Energy's program is about to gear up, right. If
13 you're in the Progress Energy territory, there is a
14 program right now. If you're in some of the co-op
15 territories there's a program. Anywhere else they would
16 have to call us for a referral to a private contractor.

17 And we're just starting to train people in North
18 Carolina. I mean, this is just starting to roll out. We
19 did the beta training on this last week for a private
20 contract in New Hampshire. That was our first rollout of
21 the training.

22 Like I said, we've tried some of the concepts in
23 a pilot in North Carolina, but it's -- as a total package,
24 it's -- I mean this is brand-new.

1 DR. KOGER: You might mention you had
2 indications from DOE that they like it.

3 MR. ALDRIDGE: Well, yeah, the -- we have a
4 proposal from DO -- into DOE that they have told us it's
5 -- what were the words they used -- it's virtually 100
6 percent guaranteed that we'll get the money, so we'll see.
7 And they've told us they'll let us know by the end of this
8 month, so we'll see about that too.

9 COMMISSIONER JOYNER: Is the money being derived
10 from the stimulus?

11 MR. ALDRIDGE: The money that we're talking to
12 various folks about is coming from lots of different
13 directions.

14 When we started the pilot program, it was pure
15 DOE money, so state energy money in Arizona, plus a grant
16 from DOE, plus utility program money. So that was the
17 first place where we were merging the state energy office
18 and utility -- because they have requirements there like
19 Senate Bill 3 here.

20 Now we have the stimulus money coming in and
21 it's coming in in two ways -- three ways. One is through
22 the state energy offices; one is through stimulus grants
23 like we are hoping to get to develop the curriculum; and
24 then the other is through the energy efficiency block

1 grants that cities are getting. So Durham is doing an
2 energy campaign and the training component of it will be
3 based on this concept.

4 The City of Detroit is looking at doing a major
5 campaign and the training program will be based on this
6 concept. So there's a lot of money out there and it's
7 coming in a lot of different ways. Interesting time
8 trying to keep up with it.

9 Anything else?

10 (No response.)

11 Well, thank you. We'll turn it over to Jeff.

12 (Brief pause.)

13 MR. BARGHOUT: Good morning. I'm Jeff Barghout
14 and I'm relatively new to Advanced Energy. I joined
15 Advanced Energy in November and I'm now -- in 2009 they
16 actually started the transportation sector. Although
17 we've been doing a lot of transportation initiatives for
18 quite a while, since the 90's, in 2009, as I mentioned, is
19 when we actually formally put it together into a program
20 to move forward. And in that capacity I'm now the
21 Director of Transportation Initiatives.

22 This morning what I would like to talk to you a
23 little bit about, first, give you a high level overview of
24 the new sector as well as talk about a couple of projects

1 that we have going on that give you a broader idea of what
2 we're working on, but then also specifically talk to some
3 of the electrified transportation initiatives that we're
4 working on.

5 So as I mentioned, we're a relatively new
6 sector. And our mission that we put together is to create
7 positive social, environmental and economic benefits by
8 accelerating the transition to electrified transportation.
9 So it's a broad vision, but we really want to have an
10 impact. We feel that by moving away from fossil fuels and
11 if we can have an impact on moving away from fossil fuels
12 to electrified transportation, it will be -- there's
13 opportunities for obviously the environmental side of it;
14 there's economic, as we have business development; as well
15 as social because it will have broader impacts on the way
16 people live their life and potentially paradigm shifts in
17 transportation.

18 So to get there, over the next two -- over the
19 next ten years we see three major thrust areas: First
20 being infrastructure; next being testing, validation and
21 demonstration; and the final one being outreach and
22 facilitation.

23 So under infrastructure, it's not just about
24 putting in a charging station. We're talking about a lot

1 of things. We're talking about obviously the charging
2 stations. We're talking about what's involved behind the
3 charging stations, working with the utilities to help
4 figure out what is that going to do to the grid; what are
5 the impacts going to be; making sure that we bring
6 together the right people to talk about those issues; what
7 are -- are they going to need to have new electrical
8 infrastructure.

9 Then it also starts moving into other pieces or
10 avenues of that of what are the barriers or what are the
11 potential issues and opportunities associated with
12 electrified transportation; do incentives drive people to
13 move in this direction; are the technologies priced too
14 high; are there usability issues. So what's actually
15 involved in this. And so that's kind of the broad piece
16 with the infrastructure.

17 The testing, validation and demonstration really
18 touches on as the technologies come out, as we have
19 charging stations or new vehicles or any of the other
20 support equipment that might be included there, getting
21 them into the field and seeing what they actually do;
22 proving the product claims and seeing what the real world
23 performance is. And then once again, having that feedback
24 group of saying, okay, this is what we're seeing happen,

1 what does that really mean to the end users; are there
2 ways that they can be improved so that there can be better
3 acceptance or better usability of the technologies to help
4 move this forward rather than just letting it happen.

5 And there are -- some of the things that we're
6 identifying already, there are a lot of things that aren't
7 quite as intuitive associated with electrified
8 transportation that if you just start putting in stations
9 and just start trying to sell cars, it might not be the
10 best way. It might actually cost more down the road and
11 create prohibitive -- it may become cost prohibitive down
12 the road.

13 Then the outreach and facilitation is the final
14 piece. And that actually is also a broad area where we
15 want to educate the public about what electrified
16 transportation is; make sure that the word gets out there
17 to identify what the fears are, whether they're real or
18 perceived, and make sure they understand, obviously the
19 perceived ones, what the reality are [sic], but then also
20 be able to address the real world -- the real world fears.

21 For example, many people are very worried about
22 -- they have range anxiety for electric vehicles, very
23 afraid that, you know, they may need to drive to
24 Washington, D.C., tomorrow unexpected. The average

1 commuter miles driven in the Triangle is 35 miles a day.
2 So if electric vehicles come with a 100-mile range, then
3 really the majority of their driving patterns, which is
4 about 80 percent, 80 to 90 percent of their driving
5 patterns are met by this vehicle and then it's only going
6 to be those longer trips that they'd have issues.

7 So if they had a second car that might be a
8 plug-in or even just a regular gasoline, then all of their
9 longer -- then basically their needs are taken care of.
10 But it's really addressing and making sure that people
11 understand the broader issue and how it ties in.

12 So with that, I want to go into three different
13 projects that we're working on right now. First, I want
14 to talk about the plug-in hybrid electric school bus
15 program. This program was probably one of the big
16 programs that really launched Advanced Energy into this
17 sector. Although we have many other projects, this one
18 had a lot of visibility.

19 What we did here was a previous employee of
20 Advanced Energy, Ewan Pritchard, saw the need or saw the
21 opportunity. Driving behind buses he noticed they stopped
22 a lot and they seemed to have the perfect characteristics
23 of what a plug-in vehicle would be. So he thought about
24 this for a while. I mean, he went out and brought

1 together all the potential stakeholders, the people that
2 would be purchasing the vehicles, the people that would
3 have to make the vehicles, who would design the vehicles,
4 and knew that the only way that this would happen is to
5 bring them together to make sure that they talked about
6 it. Because before that, the manufacturers didn't want to
7 build a vehicle because there was no demand and people
8 didn't understand what these vehicles were, so they really
9 didn't want one. So it was basically not going to happen.

10 So he brought all the stakeholders together, got
11 them speaking. Then from that there were some soft orders
12 placed on buses. And then the Navistar International
13 Corporation built the first commercially available plug-in
14 hybrid vehicle in the United States, which was a school
15 bus, and then made them available in 2007. So that was
16 very exciting.

17 And there's currently 15 school buses in the
18 program on the road today. And they're located all over
19 the country right now, so you can see it's quite diverse.
20 And we also have several pending, including California,
21 Michigan, which actually will be having one come on line
22 in September. Texas has a couple that they're looking at
23 coming on line relatively soon. Virginia and Washington,
24 and hopefully that list will grow. There is some stimulus

1 funding in place for the next generation of bus, so if
2 those are awarded, there will be additional buses.

3 So this program has been very successful. The
4 first couple of years we've basically wanted to get them
5 on the road so we could do some initial testing, see what
6 some of the usability issues were. And then in this final
7 -- in this year here, in 2009, we've really started doing
8 a lot of detailed analysis to really figure out how these
9 work.

10 The key thing that we've really seen is that
11 it's critical to make sure that you have the right
12 technology matched to the right application. So for these
13 buses, they might not perform their best if they're not
14 driving on the right routes. Plug-in hybrids do their
15 best when they have a lot of stop-and-go conditions. So
16 if they're driving on the highway predominantly, you're
17 not going to see the best benefits. If you put them in
18 the urban and city routes, you see tremendous benefits.
19 So with -- even with some of these initial 15, not all of
20 them were originally placed in the right routes, but we're
21 putting them into better routes so that people can really
22 see the benefits.

23 So as these -- as we have more of these buses
24 roll out over the next years to come and the next

1 generations come out, we'll make sure that you can really
2 see an impact. And then as the technologies improve, the
3 areas where they'll work will expand, so the technology
4 will have larger application ranges, which is really quite
5 exciting.

6 The next generation bus, which will be coming
7 out within the next year or two, will have an all-electric
8 range of somewhere between 10 to 40 miles, so we're really
9 seeing a big impact. That will have a bigger impact. So
10 we're very excited about this program and this will
11 continue into the future we expect.

12 Another project which is ongoing is we're
13 working with the Cooperative Research Network on a plug-in
14 hybrid demonstration project. And for that particular
15 project there's 15 different co-ops nationally that have
16 come together and we're working with them to facilitate --
17 wanted to facilitate a user group. And during this user
18 group they ask us a lot of questions, we do a little bit
19 of research and put together small reports to really
20 address some of the questions and issues that they have
21 with the plug-ins.

22 So they each have a plug-in that's participating
23 in this and they're seeing different types of performance.
24 And we're monitoring the performance and providing reports

1 on that, but we're also looking at trying to identify what
2 are their issues, what are the questions that they have.
3 As far as usage characteristics, are they being used in
4 the right place or are they basically being used in an
5 application that you could just use a regular hybrid to
6 get the same results.

7 And then also trying to identify -- one of the
8 questions that they need to ask, what additional research
9 might be needed on their behalf, and even pointing them in
10 the right direction of papers that have already been
11 written. So not necessarily reinventing the wheel to try
12 to reinvestigate things, but pulling together some of the
13 information that's already out there.

14 So this is still in its early stages of -- I
15 guess it's a year and a half long project and it's about
16 six months into it, so it's still in its early stages, but
17 it's definitely an exciting project which demonstrates
18 what we're doing on -- and, once again, on a national
19 basis of trying to accelerate the acception [sic] of the
20 adoption of transportation by being there front and
21 center, and also to make sure that the utilities are --
22 that we're engaged with the utility because they are a
23 critical component to the success of electrified
24 transportation.

1 The third and final product I want to talk to
2 you about -- I'm going to spend a little bit more time on
3 this because I think this project really incapsulates what
4 we want to do with the transportation sector at Advanced
5 Energy. I want to talk about the NC Get Ready initiative.
6 It's a new initiative being piloted here in the Triangle
7 that's being supported by a consortium of cities and
8 official energy leaders and non-profit organizations. And
9 in particular the utilities, Duke and Progress Energy,
10 have been very supportive of this initiative as well.

11 Our overall objective is to coordinate the
12 effort of -- to overcome real and perceived barriers
13 related to technology, consumer demand, infrastructure and
14 incentives of electrified vehicle. So really what that
15 means is we're trying to get in there, figure out what the
16 issues are, make sure that they're all documented, figure
17 out what the solutions are to the issues and barriers, as
18 well as identify what opportunities exist as far as
19 potential economic develop; can we have companies come
20 here and start producing some of these components to North
21 Carolina, as well as other types of opportunities within
22 organizations or companies in the area that might save
23 money or to have a new type of transportation strategic
24 plan. With the city support, we can help them develop

1 those strategic plans where they would be able to use less
2 fuel, have a better -- and have a better footprint on the
3 environment as well. So it's really quite exciting.

4 Now, I want to give you a little background.
5 Although we've been working in this area, there's another
6 national initiative known as Project Get Ready. And that
7 was initiated by the Rocky Mount Institute back in
8 February of this year, so not too long ago. And their
9 overall goal is to provide basically a national forum for
10 pioneering cities to come together to discuss lessons
11 learned and develop a national roadmap for both best
12 practices and overall processes.

13 So we're working -- I guess -- and North
14 Carolina, or Raleigh in particular, was actually chosen as
15 one of the first pioneering cities to join into this
16 initiative because of all of the work that we've been
17 doing here already. So that was great that we were
18 recognized as being one of those pioneering cities and are
19 part of that. And Project Get Ready is expanding to
20 additional cities and it really is a great organization.

21 So going back to the North Carolina Get Ready,
22 NC Get Ready, we have five main key objectives of what we
23 want to achieve. So first is to facilitate stakeholder
24 working groups. We realize that this is a big initiative,

1 this is a paradigm shift in transportation and mobility
2 and this can't be done alone. It needs the input from a
3 lot of different people and organizations, so the
4 utilities are actively involved in this to help understand
5 in the working groups.

6 We're speaking with the cities. So the City of
7 Raleigh has been a tremendous supporter of this and
8 providing a lot of input. Other cities such as Cary,
9 Durham and Chapel Hill have all expressed interest and --
10 or will be joining in and participating more, as well as
11 some of the businesses, the local businesses and
12 organizations in the area where they need to tell us and
13 be involved in this conversation to identify what are
14 their concerns, what kind of issues. Do they already have
15 incentive plans or short and long-term transportation plan
16 opposed to just going after this and saying we just want
17 to put in a charging station, let's look at the holistic
18 approach and see what their impacts are and make sure that
19 it's not just a piecemeal piece -- project, but it's
20 something they can actually benefit for.

21 So the only way we can really look at this,
22 develop a roadmap basically on what needs to be done is
23 make sure we pull all the stakeholders together and get
24 them involved early on. And then there's -- it's easier

1 for buying at the end.

2 We also need to educate stakeholders. And that
3 ranges or that expands beyond just the end users and the
4 businesses -- I mean, from the businesses to the end users
5 as well so the consumers that might be buying these
6 vehicles are installing charging stations in their homes.
7 And they really need to understand what this is all about.

8 But then the other side of it, which is equally
9 as important, is making sure that first responders
10 understand. If you have a very huge battery basically
11 driving around, you want to make sure they know what
12 they're doing if they have to rescue someone in advance
13 basically, as well as making sure that you have the right
14 level of technical services so that you can have these
15 vehicles serviced when they're needed.

16 So that's actually a pretty broad area with
17 educating stakeholders and we'll be working with other
18 entities locally here from the university systems to make
19 sure that that happens or would like to do that.

20 Establish a sound infrastructure. So this goes
21 back to figuring out what charging stations need to be in
22 and what the overall impacts would be or -- and what can
23 be done -- when we're looking down the road, what can be
24 done now that might reduce some of the costs.

1 So on one side we want to look at developing
2 usage corridors. So if individuals are going to be using
3 those vehicles in these primary corridors, which are --
4 you can look at it and say home, then workplace as well as
5 some of the public areas they'd go to, make sure that the
6 charging stations are properly located so that as they're
7 driving their vehicle or the places that they'll be
8 parking their vehicles they'll be able to recharge opposed
9 to them having to go way out of the way or -- and that
10 would -- in order to charge, which doesn't make sense, and
11 that would definitely hinder adoption.

12 And then on the other side to that also is for
13 home infrastructure, for example, we want to make sure
14 that we have standards, even if they're not necessarily
15 official standards, but at least standards developed so
16 that when the charging stations they're putting into
17 homes, they're not all over the place and everything done
18 different. So coming up with regular methodologies that
19 can be taken into the home so that the stations are put
20 in, as well as in the public where it makes sense. So
21 that's what we mean with the sound infrastructure.

22 Then develop -- continue to develop the
23 relationships with carmakers as well as the supporting
24 technology. So we've already -- us and our partners in

1 this program have already been working very closely with
2 the large carmakers such as GM, Ford, Chrysler, Nissan,
3 Mitsubishi, Mile [sic] Electric or the Coda vehicle which
4 was here more recently. So we've already engaged them.
5 They're very active in the overall Project Get Ready as
6 well as part of the -- have spoken with the NC Get Ready
7 as well.

8 And that's really key because we want to make
9 sure that when these vehicles come, and they're coming
10 next year, that we get some here. Because obviously
11 overall their volumes are not going to be huge, but -- so
12 they're going to be selecting key market areas. And so if
13 we're not ready for basically the electric -- for the
14 vehicles that are coming, they're not going to want to
15 bring them here. So working closely with them we can make
16 sure that all the requirements are addressed to make sure
17 those vehicles come here. And then since they're involved
18 in that whole loop, that we become one of those pilot
19 areas early on so they can make those arrangements. And
20 that's already in the works.

21 And then finally we want to explore
22 opportunities for economic development. And this is
23 something that I think is very important. Since we're --
24 since this is a whole new area and it's pretty early in

1 the adoption, there's opportunities here. So we have the
2 choice to either sit on the sidelines and watch it happen
3 or try to be active in this whole initiative and become a
4 key player and bring in potentially some of the businesses
5 here.

6 So a key example of that would be some of the
7 charging station companies. There's -- no one's
8 essentially committed to any of this, but perhaps there
9 will be excess capacity with some of the companies to
10 bring their manufacturing facilities here, especially if
11 we're one of the early adoption and this is where some of
12 the volumes of charging stations are being put in place.
13 So that's just one example.

14 Another example are the batteries. Battery
15 technology, the new battery technology is primarily -- are
16 reliant on an element called lithium. And the largest
17 reserve of lithium in the United States happens to be in
18 North Carolina. Now, we don't use that lithium currently
19 because it's a little bit more expensive than the lithium
20 that we can find other parts of the world, but as we start
21 increasing production of vehicles, and to make sure that
22 we don't have dependence -- trade oil dependency for
23 another type of dependency, we can explore those
24 opportunities here as well. And so different

1 organizations such as the Freedom Center or A-TEC are
2 looking at the battery technologies, and other
3 organizations as well, of how we can best utilize those
4 lithium reserves.

5 So going into the background a little bit, what
6 is electrified transportation? And as I mentioned -- you
7 know, we've been talking about vehicles and we've talked a
8 little bit about infrastructure, but basically these are
9 the two sides. So with the vehicles, there's hybrid
10 electric vehicles, which are the vehicles you see on the
11 road today such as a Toyota Prius or a Ford Escape. And
12 they basically have a motor and an engine that runs on
13 gasoline to drive your vehicle.

14 As you move to the plug-in vehicles, you have a
15 much larger battery pack so that you can ideally drive on
16 -- or actually so that you can drive on electric only.
17 And then as you move towards the all electric, which just
18 would have a large battery pack or some equivalent where
19 you don't need gasoline and you basically plug in to get
20 your power. And that would be the all-electric range,
21 moving in a cleaner direction.

22 And then infrastructure, once again, has to do
23 with charging stations, electrical load management, the
24 technical support that's involved with that as well as the

1 incentives, policies and drivers that would enable the
2 success of these new transportations.

3 On this particular slide we have a couple of
4 examples of what the charging stations look like. One's a
5 cooling charging station and there's -- they've got the
6 Sure Power. I forget which one that is, but that's
7 another one. And both of those will actually be coming to
8 Raleigh soon. Except the one on top won't have that tire
9 on top, it will just be the square bottom part, so that's
10 pretty neat.

11 So as you saw on the previous slide, we moved
12 from basically gasoline all the way to all electric. So
13 why would electricity be better? First, the economics.
14 Electricity cost per mile is about a quarter the cost of
15 gasoline. So you're looking at for -- per mile, 2 to 3
16 cents for an electric vehicle versus anywhere from 8 to 10
17 cents for gasoline depending on the price of gasoline. So
18 there's definitely some economics there.

19 Additionally, with all-electric vehicles the
20 maintenance costs are lower. They're a lot simpler, a lot
21 less moving parts, and they require a lot less servicing.
22 So overall, the -- that makes them less expensive.

23 The bad side is the battery technologies are a
24 lot more expensive. So until the battery technology

1 prices drop, which is the hope as volumes increase, the
2 vehicle original purchase price will be higher, but the
3 rest of the vehicle will be lower. So from one side it is
4 cheaper, but then the initial cost is a little bit higher.

5 They are cleaner. CARB estimated that a plug-in
6 hybrid with just a 20-mile electric only range emits about
7 half the greenhouse gases compared to a gasoline car. So
8 as we start moving to plug-ins such as the Chevy Volt,
9 which is looking to have a 40-mile range, you definitely
10 -- that definitely could have an impact. And as you move
11 to the all electrics, then you'll see even more.

12 Now, the other -- one of the misconceptions
13 that's out there on the cleaner is a lot of people say
14 that, well, with these vehicles are you just putting on a
15 very long tailpipe so instead of having the emissions
16 coming out of the back of the car, is it just coming out
17 of the power plants. And the simple answer is it is. If
18 you look at the dirtier coal plants in the United States,
19 it would still be cleaner to charge those cars using the
20 power generated by them than it would be just to have them
21 driving on the street. And when you look at the portfolio
22 in the United States where we have a mixture of a lot
23 cleaner technologies, overall it's still significantly
24 cleaner. And there's been a number of studies out there

1 to show that.

2 And the other thing that's nice about it is with
3 an electric or plug-in vehicle, it's going to get cleaner
4 through time as more of the grid becomes -- comes from
5 renewable energy, so it's just going to get better over
6 time.

7 And then security is the next one here. And
8 nearly two-thirds of U.S. transportation oil is imported.
9 Roughly three percent or less, depending on the figures
10 you read, of the power generation in the United States
11 comes from oil. So in essence, if you could convert the
12 vehicles, basically convert most the vehicles into
13 electric based, we could greatly reduce our dependence on
14 foreign oil. And I think that would have a very large
15 impact, which is always a good thing.

16 So when are they coming? I mentioned a little
17 earlier they're coming next year. And right now there
18 already are a few vehicles on the road. When you look at
19 it, there are over a million hybrid electric vehicles,
20 which really were the start of the electrified
21 transportation. And there also are a number of conversion
22 kits and retrofit kits that are currently available and
23 are basically driving around.

24 So we already have some on the road now, but the

1 real bulk of the next generation, the ones that will have
2 those -- that will be commercially available for both
3 fleets and consumers will start rolling in next year. So
4 that's really not that far off. And so within the next
5 several years nearly a dozen manufacturers have already --
6 plan on offering plug-ins and electrics. And over 18 have
7 given intent to produce within the -- shortly thereafter.
8 And tens of thousands of electric vehicles will be
9 available starting next year from automakers such as Ford,
10 GM, Nissan and Toyota. So they're all going to be hitting
11 the market and we're hoping that we'll have some of those
12 here.

13 And just as some examples, there are just a lot
14 of them. So these aren't just concept cars. Here are
15 just some of the many vehicles, with a hand sample of the
16 ones that are -- will be coming to a dealership near you.

17 So moving forward, what we're working on with NC
18 Get Ready. We're currently working on facilitating the
19 working groups. So we've already started putting some of
20 those working groups together and we're getting a little
21 bit of input from them now. This is still in its early
22 stages, so the working groups will really start kicking
23 off later this summer, but we've already had some
24 discussions moving forward.

1 We are continuing to collaborate with the
2 automakers and the support technology, so working with
3 making sure that we have charging stations here, that
4 we'll be able to get vehicles here.

5 We're identifying the prime usage corridors:
6 Where will these charging stations need to be; who's going
7 to be buying these vehicles and make sure that everything
8 gets matched up together.

9 Site selection is currently underway for ten
10 charging stations here within Raleigh, so those -- we
11 already have those in our lab now, so we're working with
12 the City of Raleigh and Progress Energy to identify
13 exactly where those will be put in and so those will be
14 installed this year.

15 We're also working to develop a roadmap that can
16 be implemented across North Carolina. So as we start
17 identifying what the lessons learned are in the Triangle
18 area and as we speak with other cities in the area, we're
19 going to have a roadmap, a rolling roadmap so that that
20 can be transferred to other communities so that we can see
21 other communities benefit from the initial efforts and
22 then we can have -- basically get the whole state ready,
23 NC Get Ready. And we want to have that -- those -- that
24 rollout basically overlap. So obviously we don't want to

1 wait until the entire roadmap is done, we'll have it in
2 different phases.

3 And then, of course, exploring funding
4 opportunities to implement and expand the NC Get Ready
5 initiative. Especially with the stimulus funding, we've
6 put in some proposals into clean cities and we're looking
7 at other opportunities as well as we move forward so that
8 we can really make this happen here.

9 With that, if you have any questions, I'd be
10 happy to answer them.

11 CHAIRMAN FINLEY: Yeah. I have a couple of
12 questions, Jeff. The lithium in North Carolina, where is
13 it and why is it more expensive than what's normally used?

14 MR. BARGHOUT: Lithium's in the western part of
15 the state. The reason it's more expensive is right now a
16 lot of the lithium reserves that are being used for the
17 batteries we have in our regular appliances, they come
18 from, I guess, dried-up lakebeds and it's very easy to
19 access and basically extract.

20 The ones that we have here in North Carolina
21 have to be mined and they're not quite as accessible and
22 they're -- I guess it's -- and the process, the extraction
23 process is a lot simpler in the lakebeds than the ones
24 that are here. That's about as much as I know about that.

1 I just know it's a little more expensive.

2 CHAIRMAN FINLEY: Well, that's more than I know.
3 What is the difference between an all-electric vehicle and
4 an electric plug-in vehicle? I mean, you seem to imply
5 that the plug-in has some gasoline usage.

6 MR. BARGHOUT: Right. So a plug-in hybrid
7 electric is basically like a Prius or something along
8 those lines with a much bigger battery. So there's two
9 types of vehicles there. You have the one which would be
10 the -- a lot of the hybrids that are coming out where you
11 have the gasoline engine partially drives your car and
12 then you also have an electric motor. And when your
13 battery's at a certain state of charge, the engine
14 completely turns off and you can drive just on the
15 electric motor.

16 Then there's also a range extension version,
17 which is like the Chevy Volt. In that case they just have
18 an engine that all -- its whole purpose is to turn on,
19 charge the battery and shut off. And the only thing that
20 drives the car are the electric motors. And so that's
21 another type of plug-in hybrid electric.

22 Then the next step would be just electric where
23 there's no gasoline engine at all. So the only way you
24 can get power for that is to plug it in.

1 CHAIRMAN FINLEY: A charging station, how long
2 does it -- I mean, how long does it take to charge? How
3 long do you have to sit there while your battery is being
4 charged?

5 MR. BARGHOUT: Well, that's a variable answer.
6 So, there's three levels of charging; there's level one,
7 two and three. Three is still less defined.

8 Level one is basically a plug, a regular outlet,
9 so a 110, 120 volt, a 15- to 30-amp plug. And for those,
10 if you were to plug in a, say, basically a plug-in hybrid,
11 you're talking about a 12-hourish, so give or take a few
12 hours to charge. So that takes a long time if you're just
13 going to plug it in to a regular outlet.

14 If you move to the level two, it's basically a
15 dryer plug. And for that type of charging you're looking
16 at anywhere from three to five hours to charge these
17 vehicles, so that's going to be a lot faster. And that's
18 assuming you've used all your battery. So in the case
19 where you've -- where you have the average commute of say
20 35 or 40 miles a day, if you've driven down and you plug
21 in, you might not -- if you're in an all electric that
22 needs -- you know, that has that 100-mile capacity, you're
23 not charging the whole battery. With the Chevy Volt,
24 you'd pretty much use it all, so then that would be

1 probably on the lower end of those numbers.

2 And then the level three charging, which is also
3 being developed right now, the goal for those is somewhere
4 under an hour in charging. I've heard figures of a half
5 hour, I've heard figures of less, but to be safe I would
6 rather say under an hour. And those will be in very
7 select areas. Because in most cases you don't really need
8 to charge that fast. And also, if you think about level
9 three charging, people are going to be charging their --
10 if they need that charge very quickly, it's probably going
11 to be during the day, which is going to have issues on
12 peak load. So that really needs to be studied, but
13 luckily that's not really upon us yet.

14 The level two makes a lot of sense because if
15 you drive to work, you plug in when you get to work and
16 you're easily going to have your vehicle charged by the
17 end of the day or halfway through the day. And even if
18 you drive down to -- so if it takes three hours to charge
19 your battery, three to five hours, you're going to be
20 parked there for that period of time. And then if you're
21 just going down to the mall, you're not going to
22 necessarily get your full charge, but you'll be able to
23 top off with level two or get a little bit of charge, but
24 hopefully the overall range of your vehicle would be fine.

1 CHAIRMAN FINLEY: What about this notion of
2 rather than recharging your battery at the charging
3 station you change out your battery and get a new fully
4 charged battery?

5 MR. BARGHOUT: Yeah. Project Better Place -- I
6 think that it's very important to look at all the
7 different models for charging. And I think that some of
8 the economics will make some of them succeed and others
9 not succeed. So that's actually -- Project Better Place
10 has been getting a lot of people to sign on memorandum of
11 understandings to -- and explore using those technologies.

12 They do have -- they do plan on putting stations
13 in Israel and I believe Denmark currently. And in those
14 areas it may make more sense. There are a host of other
15 issues that are associated that would have to be addressed
16 such as added battery capacities; when would the batteries
17 be charged; the cost for having -- since batteries are
18 already the most expensive part of a vehicle, having two
19 sets of batteries. But in some applications that may make
20 sense. So I think that it's good to have those other
21 opportunities being explored.

22 CHAIRMAN FINLEY: Commissioner Culpepper.

23 COMMISSIONER CULPEPPER: Are these charging
24 units that would be at these charging stations that you

1 described, are they just cost prohibitive for an
2 individual to buy one and put in his or her garage?

3 MR. BARGHOUT: Hopefully not. The public
4 charging stations obviously are going to cost more than
5 home charging stations because they -- they're going to
6 need a little bit more durability and in the location and
7 with the elements. So right now there's a lot of
8 different models that are being looked at for home
9 charging, and I'll get to the costs. And there's would it
10 be in the garage; would it be in your driveway; would it
11 be in a carport; are you living in an apartment complex
12 where it would be in the parking lot. So there's a lot of
13 different things that will need to be addressed, but at
14 the simplest level, the goal is no.

15 So the goal for a lot of the charging stations
16 would be in a couple of -- would be a couple of hundred
17 dollars to install -- to actually purchase the unit to put
18 them in the home. And then depending on where -- I guess
19 depending on the home, there might be an installation cost
20 of anywhere from a few hundred dollars up to a thousand
21 dollars and that will be very dependent on the individual
22 home.

23 So hopefully we can try to figure out ways to
24 work that in with the manufacturers to make sure that when

1 someone buys the vehicle they don't have to go through a
2 lot of extended costs. But at least in the early adoption
3 phase, a lot of people that buy these types of vehicles
4 are very enthusiastic about it and tend to go that extra
5 little bit of mile. And so once you get those early ones
6 coming out, hopefully those prices will drop even further.

7 And then on the other side to help bring costs
8 down, we've been working with builders in North Carolina
9 to build those standards, to understand those standards.
10 So as new buildings go in or new homes go in, to
11 potentially have basically a plug-in wire and a plug-in
12 ready type standard. Where plug-in wired is you've run
13 the conduit already, so all you have to do -- and the
14 wire, so all you have to do is buy the charging station
15 and put it on. And then a plug-in ready is with the
16 actual charging station on so that if someone does get a
17 vehicle down the road, they don't have to go back and
18 rerun the wire, which would be the cost.

19 COMMISSIONER CULPEPPER: Well, I guess what I
20 was getting at, up until this presentation that you've
21 just given, I was under the impression that the way it
22 would work with an electric car or electric plug-in hybrid,
23 whichever, is that the charging of the car battery would
24 take place during the nighttime when electricity was not

1 being used as much as was during the daytime and that that
2 was the way things would work.

3 I just don't see how it's going to work. If
4 it's going to take 12 hours to charge your vehicle, what
5 am I going to be doing in that 12 hours while my car is
6 sitting at your electric gas station, if you will, getting
7 charged? I mean, I don't see how that's going to work.

8 MR. BARGHOUT: Actually, I agree with you 100
9 percent. And that's not what -- we're hoping that's not
10 what happens. So if you have to use level one charging,
11 that's going to be a major barrier to the success of
12 electrified transportation.

13 Level two charging, being able to charge the
14 vehicle for a full charge in three to six hours, now the
15 nighttime charging is not going to be an issue. So -- and
16 the primary charging method ideally would be at night.
17 And if you had a 40-mile-plus range for the -- an electric
18 only, then in most of your circumstances you won't even
19 need to plug in during the day, you'll be able to just go
20 home and plug in at night and utilize that offpeak.

21 And for the 40-mile vehicles, they're going to
22 have the gasoline altern -- well, it will be a plug-in
23 hybrid vehicle so that once you pass that 40 miles, the
24 gasoline engine portion will turn in, so it's not like

1 you're just going to be stranded. You'll actually have --
2 still have that mobility.

3 And then with the larger -- the all electrics,
4 they have to have much larger capacity so that you can
5 make sure that if you have to run errands, if you have to
6 go to the doctors or into the pharmacies or run errands
7 during the day that you don't get stuck someplace. So
8 they would have that extended range, so having that 80 to
9 120-mile or 100-mile range should cover the majority of
10 people's daily type of activities, but not the long trips.
11 It's not quite there for -- technology is not quite there
12 for driving to DC from here. And that kind of fits into
13 making sure that you have the right technology for the
14 right application.

15 COMMISSIONER CULPEPPER: Thank you very much.
16 Very good presentation.

17 MR. BARGHOUT: Thanks. If there's no other
18 questions, I'm going to ask a couple of people that we're
19 actually working with to speak. We have Mike Liggett is
20 from Progress Energy is going to speak for a few minutes
21 about some of their transportation initiatives and how
22 they're working with Advanced Energy, followed by Mike
23 Rowand from Duke Energy, then followed by Julian Prosser
24 from the City of Raleigh. Thank you.

1 MR. LIGGETT: Jeff, thank you very much. Excuse
2 me. I appreciate that. One of the key things that Jeff
3 said was that my remarks would be brief. So -- and Jeff
4 did cover so much that I think I can condense my remarks.
5 I was going to open with a good morning, but I think it
6 might be appropriate now to say good afternoon. And thank
7 you for the opportunity to speak in support of Advanced
8 Energy here.

9 I do have a few remarks I would like to make.
10 I'd also like to expand on Jeff's answers to a couple of
11 the questions that you raised. So let me do that first
12 and then I'll briefly go through a few remarks.

13 One of the questions was about battery swapping.
14 And Jeff was very tactful in his response and in talking
15 about the success of different options. There are many of
16 us that are familiar with the industry that think it's a
17 really dumb idea, honestly, to swap batteries and -- at
18 least currently.

19 So one of the issues is that the technology for
20 battery swapping stations is a robotic kind of a
21 technology, be very expensive to deploy, and will require
22 a supply of batteries of every kind and type and size.
23 And one of the difficulties is every one of those
24 vehicles, those 20 cars Jeff showed you that's coming out,

1 has a different size and shape in characteristic of
2 batteries, so it makes the swapping stations very
3 expensive to deal with that. It makes their inventory
4 very expensive.

5 And the level three charging that Jeff talked
6 about, the fast charging, is likely to be able to top off
7 your car and give you another 30 miles of range as fast as
8 you could swap a battery. So by the time you can develop
9 and deploy battery swapping stations, 10 years or whatever
10 that takes, the level three fast charging will be
11 implemented, standardized and will give you the same
12 benefit at a much, much lower cost and won't require the
13 automakers to standardize the batteries, which they're
14 resistant to do.

15 So generally we're not -- maybe you garnered
16 this from my comments, we're not a big supporter of the
17 battery swap. We think that the technology should push
18 towards intelligent charging infrastructure of a plug-in
19 variety.

20 And to address the question of home and daytime
21 and nighttime, we firmly believe that home infrastructure
22 should be number one priority. I've been driving one of
23 our converted Priuses for a month, put about 600 miles on
24 it this month, achieving over 100 miles a gallon, plugging

1 it in only once a day at home with one 10 outlet in my
2 garage and driving my normal 30- or 35-mile commute on a
3 daily basis and it's working out just fine. So the
4 technology exists in many customers' homes if they have,
5 for example, in a garage with a standard plug to initiate
6 this technology fine without any concerns or advanced
7 technology required.

8 But also to Jeff's point, some of the newer
9 vehicles, the all-electric vehicles, the battery electric
10 with no back-up engine are going to have larger batteries
11 and to charge in a reasonable amount of time will need
12 220, 240 kind of voltage to charge in a reasonable amount
13 of time. And a lot of customers don't have that in the
14 garages.

15 And I think that's one of the areas where
16 utilities can help is to make sure that customers
17 understand these options and have somebody they can talk
18 to to explain it, a customer service area and a technical
19 area, and then help get it installed. So one number they
20 can call to take care of that for them.

21 We do appreciate the fact that Advanced Energy
22 has been involved in this since before it was a national
23 priority. So it's clearly a national priority now. Our
24 President has stated a million electric cars by 2015 is

1 the goal we should set as a country. The government, his
2 administration and prior administration have put
3 incentives in place. So the first stimulus package, if
4 anybody remembers the definitions of the first economic
5 recovery package, had significant vehicle incentives for
6 electric cars, \$7,500, up to \$7,500 to buy an electric car
7 tax credit.

8 Also, incentives for electric vehicle
9 infrastructure, so 50 percent. If you do need to upgrade
10 your house to put in a charging station, there's a tax
11 credit for that too. So that's in place.

12 The latest stimulus funding measures have
13 allocated hundreds of millions of dollars to the
14 advancement of electric transportation, both in new
15 vehicle manufacturing, new deployment programs and new
16 infrastructure and battery manufacturing programs. So
17 clearly any initiative started under the former
18 administration are being accelerated by the current
19 administration, so it is a national priority.

20 We think that utilities can play a central role
21 in addition to organizations like Advanced Energy, which
22 we're fortunate to have here in North Carolina. Many
23 states don't have that to help the technology along.

24 One of the roles I think we can play is to

1 ensure that safe and reliable charging infrastructure. So
2 we need to help encourage the standards to train
3 electricians and contractors to make sure that when you
4 need it, there's somebody there that understands it and
5 can help guide you and coach you through options level
6 one, level two, level three; what's the cost, how do you
7 finance it, what does it do for you. So we think
8 utilities are well-positioned to do that.

9 We also think one of our roles is statewide and
10 national policy advocacy, so we do participate with our
11 other utilities to make sure that the policies are
12 sensible. For example, there's legislation under
13 consideration now in Washington that we've been successful
14 hopefully in ameliorating a little bit. Hopefully we'll
15 modify it some more, but without that modification this
16 legislation would have required utilities to bill on your
17 home bill your vehicle electricity regardless of where you
18 plugged it in.

19 So that legislation would have mandated that a
20 customer that lived in Raleigh, worked in the RTP and
21 vacationed on Cape Cod, that the utilities would have had
22 to track that electricity and get it back on your home
23 bill. So those are the kind of policies that we don't
24 think make sense and that would put too much cost into

1 this transition. So that's one of our areas is policy
2 advocacy.

3 We think customer information and education is
4 important and we touch a lot of customers, the utilities,
5 so we're in a unique position to help do that. We think
6 clear and efficient billing for the power is an important
7 role we can provide, and the adoption of those smart
8 charging technologies.

9 So this is -- Jeff said it very well. It's a
10 cleaner, cheaper, domestic fuel. It will lower customers'
11 overall energy bills. It will lower customers' monthly
12 expenses. Their electric bills would go up, but their
13 gasoline bills will go down by two or three times as much.
14 So their overall energy use costs will go down, but we
15 still have an obligation. Even though this is a
16 demonstrated cleaner technology, it's cheaper for all of
17 our customers, it still make sense to make sure it's
18 offpeak.

19 So smart charging is one of the areas where
20 we're working with Advanced Energy to test and implement.
21 All of our plug-in Priuses, for example, have a charging
22 management system on that Advanced Energy manages for us
23 that watches and monitors wherever those Priuses are,
24 wherever they travel. And with our drivers' permission,

1 Advanced Energy can turn off those cars, keep them from
2 charging in the hour we want them to. So that's one of
3 the technologies we're working on that Advanced Energy's
4 helping.

5 And finally I think it's our obligation that as
6 this new load does develop that utilities do provide
7 cost-effective electricity in a reliable, prudent manner
8 and it -- make sure there's sufficient, adequate
9 resources. We have done the studies in our service
10 territory, the 30-year estimates of load impact, the
11 30-year studies of emissions impact, so we know it's
12 cleaner; we know it's cheaper; we know what we need to do
13 to provide sufficient and reliable power. And our plans
14 do call for us to bring on renewable resources, energy, at
15 a faster pace than we're forecasting electric cars to
16 increase our load. So I think that's some of the roles of
17 electric utilities.

18 Any questions before I turn it over to
19 Mr. Rowland?

20 COMMISSIONER RABON: One quick question.
21 Somewhere in this plan down the road, and maybe I imagine
22 this, are there ways to look at incenting customers to
23 charge at home because it's cheaper to do it at night than
24 to do it -- you know, wait till you get to work in the

1 morning?

2 MR. LIGGETT: Very good question. You know, our
3 priorities are home charging first, workplace charging
4 second and a sensible amount of public charging at
5 strategic places. At a mall, for example, if you're going
6 to be there a couple of hours. So we don't envision
7 covering every street with charging stations for those
8 15-minute parkings.

9 We do think that time differentiated rates in
10 general makes sense. And as we study this new load, we'll
11 also study our current time-of-use rate to see whether
12 with the new load and customer habits that that needs to
13 be revised or a new time differentiated rate needs to be
14 rolled out that makes sense. Yep, we absolutely agree.

15 COMMISSIONER JOYNER: Would a successful large
16 scale deployment of electric vehicles or electric hybrid
17 require smart grid enhancements, any transmission
18 upgrades?

19 MR. LIGGETT: The answer is no, it wouldn't
20 require it. So a national study a few years ago by one of
21 the national labs showed there's adequate current offpeak
22 generation capacity, transmission and distribution
23 capacity, to fuel 73 percent of our existing vehicles if
24 it was all done offpeak.

1 So if there is a lot of offpeak capacity and at
2 the rate that these vehicles will initially be
3 implemented, you could adopt something like a simple water
4 heater. My water heater at home has a timer on it. You
5 could do the same thing on your garage circuit. So you
6 don't need to implement smart charging.

7 Now, if you really want to at some point when we
8 reach 30 or 50 percent penetration of electric vehicles
9 make sure that it's all offpeak, yes, you will need
10 something that's more intelligent. And it can be a -- it
11 could be part of a smart grid network -- could be -- if
12 that's cost-effective on its own, or it could be a
13 separate charging management communication system. So
14 we're working with other utilities and Advanced Energy to
15 look at those technologies.

16 But you can separate smart grid and electric
17 transportation and know that they're not dependent upon
18 each other. Thank you very much.

19 CHAIRMAN FINLEY: Thank you.

20 MR. LIGGETT: Mike Rowand with Duke Energy.

21 MR. ROWAND: Jeff and Mike have said a lot, so
22 I'll try to be brief as well. I would like to make the
23 point that Duke and I believe other utilities like
24 Progress, we really see ourselves as a catalyst to help

1 make this electric transportation happen because of the
2 benefits, as they mentioned, to our customers; we see some
3 benefits to our company, but also benefits to our entire
4 state and nation as well.

5 We also feel that electric utilities are
6 uniquely positioned to help make this happen, especially
7 from a charging infrastructure standpoint; some of the
8 smart charging that has been talked about and being able
9 to manage the load.

10 And customers and automakers and others are
11 looking to utilities to be a leader in this. They see it
12 as a natural extension. Managing electric distribution
13 equipment and how energy is used is part of our core
14 business, so we see that as a natural extension of our
15 efforts. And also as Mike Liggett said, to make sure that
16 we have -- maintain a safe and reliable electric grid,
17 that we manage peak load, then we can optimize the
18 charging.

19 We also see this electric transportation
20 aligning with our energy efficiency and our overall
21 efforts to decarbonize energy production.. Electric
22 transportation does reduce not only greenhouse gases but
23 other emissions to make things more efficient.

24 It also aligns -- I would like to point out some

1 of the -- the smart grid question that was just asked, I
2 would echo Mike's comments that it is not needed for the
3 introduction of plug-in vehicles, but long term to get the
4 most value out of electric transportation there probably
5 is a very good tie.

6 And in some regards the electric vehicle is
7 becoming a poster child of the smart grid in some circles.
8 If you think about it, it has energy storage, which can be
9 a game changer to the grid. It has its own GPS system; it
10 has its own communication system; it has its own onboard
11 computer and onboard meter; it has -- it's mobile by
12 definition. So when you look at the things we're trying
13 to do to manage the future grid with distributed
14 generation, distributed resources, smart programs,
15 different consumer behavior, if you roll all those things
16 together, you really have in the electric vehicle kind of
17 the consummate smart appliance that we're going to have to
18 manage in the future. So we don't see smart grid as
19 something that you have to have for the initial adoption,
20 but over the long term we do see it aligning well.

21 I do want to point out especially at how well
22 North Carolina is currently positioned in this industry.
23 Obviously from an automaker's standpoint the initial
24 market, southern California and the northeast corridor,

1 are going to be initial places they bring vehicles. But
2 through the work of Duke and Progress and Advanced Energy,
3 North Carolina is very well-positioned to get early
4 vehicles.

5 If you think about it, the automakers are
6 interested to not -- they don't want this to be viewed as
7 a California and a New York thing. You know, they want
8 these to be mainstream. And if you think about middle
9 America, where can middle America adopt electric
10 transportation. North Carolina is seen as a very good
11 market through the activities that you've heard about
12 today, also the demographics of the state being in the
13 southeast, so there is some desire and recognition by
14 major automakers that North Carolina can be an early
15 adoption area, but they're looking to people like us and
16 Advanced Energy and Progress to help make that happen.

17 They are looking for areas to be plug-in ready
18 as Jeff was speaking about. And to them plug-in ready
19 means the infrastructure and the customer education. You
20 know, the worst thing to happen is for somebody to buy a
21 Chevy Volt and get home after they bought the Chevy Volt
22 and they get ready to plug it in and say I thought I had a
23 plug where this would reach or they plug it in to their
24 outlet and it's the same outlet that their freezer's on in

1 the garage and it trips the breaker and they lose -- you
2 know, that's the worst thing for Chevrolet, that's the
3 worst thing for the utility, that's the worst thing for
4 the desire of electric transportation.

5 So they are looking for utilities to have
6 programs for customer education so that if someone buys an
7 electric -- a Chevy Volt, they already know that their
8 home is ready from a 110 outlet. Or if they want a 220
9 volt charger, a level two charger that was mentioned, we
10 are looking at customer programs and rates where we can
11 offer that. And just as people want us to do other
12 things, whether it's outdoor lighting or other things,
13 that may be achieving the cost benefits so that you don't
14 have to worry about getting it installed.

15 So that made -- those are some things that we
16 are looking at that you will be hearing about obviously
17 more in the future. But there are consumer programs and
18 rates that we think can be offered to make these more
19 attractive -- attractive and to make it a more seamless
20 customer experience as they adopt vehicles.

21 We do see Duke Energy having the plans to make
22 that happen, the things you've heard about with Progress
23 as well. And we're going to -- we are continuing to work
24 with the automotive companies on what their plans are,

1 their launch plans; what's the technology they're going to
2 have on their vehicles, the communications, the
3 infrastructure companies, to make sure things are
4 compatible as we look at interacting with our grid.

5 I also wanted to echo the comments about
6 Advanced Energy. They've been very well-positioned in the
7 consulting area and working with communities that has been
8 mentioned.

9 Also, if you think about the earlier things you
10 heard about from Keith about their home building channels
11 and things like that, it really makes a nice fit for
12 Advanced Energy to look at the standards and the education
13 and how you make things better at the home so that the
14 example that was given -- you know, we believe probably 80
15 or 90 percent of the need of charging can occur at the
16 home. Can we have the right programs or the right builder
17 programs and education and training to make sure
18 infrastructure is in place to make customers happy and
19 safe and reliable charging the grid.

20 Advanced Energy also provides kind of a
21 non-biased take on some of the issues. It means a lot --
22 we agree with the statements that Jeff made about the
23 emissions, for example. But it does a lot more for
24 somebody to hear Advanced Energy talk about the emissions,

1 even if the electricity comes from coal plants, rather
2 than Duke Energy or Progress. So it's nice having that
3 third party to validate some of these issues for us.

4 So in the interest of time, I'll stop my
5 comments there. And I don't know if there's other
6 questions that have come up that haven't been answered
7 before.

8 (No response.)

9 Okay. I'll turn it over to Julian from the City
10 of Raleigh.

11 MR. PROSSER: Good afternoon. I appreciate the
12 opportunity to be with you here today and to share some of
13 our experiences with the City of Raleigh and this
14 initiative with electrical -- vehicle electrification.

15 I want to thank Advanced Energy and Progress
16 Energy for their help in getting us started along this
17 path. We were fortunate enough a year and a half ago to
18 get our first plug-in hybrid electric vehicle, a converted
19 Prius, which we've been playing with for a year and a half
20 and trying to expose our folks to, our repair folks, our
21 personnel that have different applications, getting them
22 comfortable with the technology so that they are confident
23 that it can help them achieve their mission.

24 We have been working with Progress and with

1 Advanced Energy to secure additional vehicles through
2 stimulus funding, and we expect to add to our fleet in
3 specific applications, both with electric vehicles, all
4 electric vehicles, which we have a few of in use now in our
5 downtown service area, as well as conversion kits so that
6 we can take some of the existing hybrid vehicles that we
7 have and convert them to a plug-in technology.

8 We're finding as more of our folks become
9 familiar with the technology, it's like anything else,
10 they get more confident with it. They are comfortable
11 that they are not going to run out of fuel, that it's
12 going to be sufficiently powerful enough to move them
13 around the city and help them accomplish their mission.
14 So that's been probably the biggest success that we've had
15 is getting people over the fear that they have of the
16 technology.

17 We are working with infrastructure to locate the
18 charging stations that Jeff mentioned. There are ten that
19 are planned, various types that should be installed over
20 the next several months in downtown Raleigh and the
21 Triangle. We are including additional charging stations
22 in our use of our energy efficiency block grants, which
23 you heard mentioned earlier, as well as conversion kits in
24 that block grant.

1 We also have worked to install infrastructure
2 conduits in the Hillsborough Street conversion project.
3 Some of you may have noticed we're doing a little
4 demolition tear-up making it hard to get up and down the
5 street on Hillsborough, but hopefully when we get through
6 with that we'll have a more efficient transportation
7 corridor and it will be prepared to receive charging
8 stations when we determine the best locations for them in
9 the future.

10 We will also have LED lights on that street and
11 hopefully we can symbolically represent a corridor between
12 the City of Raleigh and our university here that
13 represents both of our interests, along with our power
14 company in advancing these technologies to the larger
15 community.

16 One of the things we're working on with our
17 inspection staff is identifying the appropriate permitting
18 processes. In conjunction with Advanced and Progress, we
19 want to make sure that we have our inspections personnel
20 trained in the various charging station technologies and
21 that we have knowledgeable folks that can be comfortable
22 working with electricians in the community of installing
23 the appropriate infrastructure for folks, and that the
24 permitting for those applications when they come from

1 commercial developments such as shopping centers or office
2 buildings or the parking facilities, that we have a very
3 easily understandable, transparent and expedited process
4 for the installation of that infrastructure.

5 We're trying to build into our plans review for
6 our planning personnel a systematic invitation to ask
7 developers to consider this technology as they build their
8 new commercial developments, wherever they may be. We've
9 already had a number of expressions of interest from
10 office developers as well as shopping center developers in
11 installing these charging stations in their locations
12 because I think for them it sends a signal to their
13 customers that they are knowledgeable of the technology,
14 they're advancing what is seen, I think, as a very
15 environmentally friendly and energy efficient technology.
16 And we expect that interest to grow as we all become more
17 familiar and the word gets pushed out into the larger
18 community about our initiatives.

19 We want to work with some local lending
20 institutions to try to develop financing options that are
21 favorable for these technologies. You may know that the
22 State Employees Credit Union now offers, I think, a point
23 or a two point discount on hybrid vehicles. We'd like to
24 advance that conversation with folks so that as new

1 technology such as plug-in electrics or all-electric
2 vehicles are offered, then we can assist in providing
3 favorable financing for those items.

4 We have been assisting with the public education
5 process. We started in February with a rollout meeting
6 where we had 30 or so folks from public institutions, a
7 private development community, a university community and
8 others to try to build an awareness of this application.

9 And we continue to work particularly with our
10 other sister cities in the Triangle. We have a pretty
11 good relationship with most of our sister cities and with
12 our counties. And those folks have facilities that are
13 available to the public. They have parking decks; they
14 have parking lots; they have a fleet. In most cases, if
15 they adopt this technology, can make a big difference in
16 elevating the visibility of the technology and reassuring
17 folks that, in fact, their local governments are
18 supportive of and advancing it.

19 In the future one of the things we're very
20 interested in working with Advanced Energy on is
21 additional heavy equipment technological advancements.
22 You heard about the hybrid school bus, first one in the
23 country, 15 now on the road. We would like to look at
24 some of our other heavy equipment that we think might

1 benefit from this type of application. Working with
2 Progress and Advanced Energy, we hope to look at some of
3 those new applications in the near term..

4 I want to thank you again for your support of
5 this program and for your support of Advanced Energy.
6 They've been a great resource for us and we look forward
7 to working with them in the future.

8 I'd be happy to respond to any questions you
9 might have.

10 (No response.)

11 Thank you so much for the opportunity.

12 CHAIRMAN FINLEY: Thank you, Mr. Prosser.

13 DR. KOGER: Mr. Chairman, this completes our
14 review -- our report, and we appreciate your attention.

15 CHAIRMAN FINLEY: We thank you for being here
16 and appreciate all the hard work you are doing and your
17 coworkers and partners and keep up the good work.

18 If nothing further, we'll be adjourned.

19

20 Whereupon, the presentation was adjourned.

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CERTIFICATE

The undersigned Court Reporter certifies that this is the transcription of notes taken by her during this proceeding and that the same is true, accurate and correct.



Candace Covington
Court Reporter II

FILED

JUN 24 2009

Clerk's Office
N.C. Utilities Commission