BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

COLUMBIA, SOUTH CAROLINA

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DUKE ENERGY CAROLINAS, LLC — Allowable Ex Parte Communication Briefing Regarding the Anderson, South Carolina, Energy Storage and Microgrid Project

ALLOWABLE EX PARTE BRIEFING

COMMISSION MEMBERS PRESENT: Comer H. 'Randy' RANDALL, *Chairman*; Justin T. WILLIAMS, *Vice Chairman*; and COMMISSIONERS Florence P. BELSER, Thomas J. 'Tom' ERVIN, Swain E. WHITFIELD, and G. O'Neal HAMILTON

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APPEARANCES:

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JENNY R. PITTMAN, ESQUIRE, Designee of the Executive Director of the **SOUTH CAROLINA OFFICE OF REGULATORY STAFF**

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Note: For identification of any additional referenced materials and/or links for same, please see correspondence to be filed by the Office of Regulatory Staff Designee

Please note the following inclusions/attachments to the record:

- Presentation Slides

P R O C E E D I N G S

CHAIRMAN RANDALL: Okay. We'll call the allowable ex parte to order, and I'll ask Mr. Melchers to please read the docket.

MR. MELCHERS: Thank you, Mr. Chairman.

Commissioners, we are here pursuant to a Notice of Request for Allowable Ex Parte Communication Briefing. The party requesting the briefing is Duke Energy Carolinas, LLC. The briefing is scheduled for today, here in the Commission hearing room, immediately following the full Commission meeting, which was scheduled for 2, so we're starting a little after 3, here on September 25th.

The subject matter to be discussed at this briefing is: Duke Energy Carolinas, LLC's Anderson, South Carolina, Energy Storage and Microgrid Project.

The docket's in order. Thank you, Mr. Chair.

CHAIRMAN RANDALL: Thank you.

We'll take appearances from the parties. Or the party.

MS. SMITH: Good afternoon, Mr. Chairman and Commissioners. I'm Heather Shirley Smith, and I'm counsel for Duke Energy Carolinas.

CHAIRMAN RANDALL: Thank you, ma'am.

Okay. And, Ms. Pittman, if you want to introduce yourself, and go ahead and –

MS. PITTMAN: Thank you, Mr. Chairman.

My name is Jenny Pittman. I'm a Staff attorney for the Office of Regulatory Staff, and I am here as the designee for the Executive Director of the Office of Regulatory Staff at this allowable ex parte being presented by Duke Energy Carolinas.

As the ORS representative, it is my duty to certify the record of this proceeding to the Chief Clerk of the PSC within 72 hours that this briefing was conducted in compliance with the provisions of SC Code Section 58-3-260(C). It is the ORS representative's sole responsibility and statutory duty in these proceedings to attend the briefing and file a written certification that such briefing was conducted in compliance with the provisions of this section. I am not a referee, judge, or hearing officer, and I do not and cannot represent the Commission or the presenters. It is up to the presenters, Commissioners, Commission Staff, and all attendees to ensure that the actions here today follow the provisions of 58-3-260. That is the purpose of the statement which you need to sign and

return to the desk in the back of the room when you leave today.

The requirements of 58-3-260 are, in part, that the allowable ex parte be confined to the subject matter which has been noticed. By limiting discussion to the subject matter noticed, the statute creates a narrow exception to the general prohibition against ex parte communications. In this case, the issue noticed is "Duke Energy Carolinas, LLC's Anderson, South Carolina, Energy Storage and Microgrid Project." I therefore ask that everyone here please refrain from discussing any matters not related to that subject.

Secondly, the statute prohibits any participants, Commissioners, or Commission Staff from requesting or giving any commitment, predetermination, or prediction regarding any action by any Commissioner as to any ultimate or penultimate issue which either is or is likely to come before the Commission.

Third, I would ask that the participants, Commissioners, and Staff refrain from referencing any reports, articles, statutes, or documents of any kind that are not included in today's presentation. If an item is referenced, it must be

provided to me to include in the record.

Again, please make sure to read, sign, and return the certification form to Commission Staff which you were given at the door when you came in today. This form needs to be signed by each attendee to certify that the requirements contained in 58-3-260(C) have been complied with at the presentation today.

I thank you all for your time and attention. Thank you, Mr. Chairman.

CHAIRMAN RANDALL: Thank you.

Ms. Smith.

MS. SMITH: Yes, sir. First of all, the company would like to thank the Commission for allowing us to be here today. We were originally scheduled for September 6th, and the Commission graciously allowed us to reschedule this presentation, given Hurricane Dorian.

So with that, I will turn it over to our presenter, Adam Nygaard, who is our Business Development Manager for Energy Storage.

CHAIRMAN RANDALL: Thank you.

Mr. Nygaard, welcome.

MR. ADAM NYGAARD [Duke Energy]: Thank you. Thank you, Commissioners, for the opportunity to be

here today.

[Reference: Presentation Slide 1]

Again, my name is Adam Nygaard. I'm a business development manager working on developing energy storage projects for our company. I've been with Duke Energy for over 10 years, starting originally as a nuclear engineer. But today I'm here to discuss the Anderson Civic Center microgrid and battery energy storage project.

[Reference: Presentation Slide 2]

Before I get into the specific details of the project, I thought it would be helpful to give a brief overview of microgrids, of battery energy storage, a little bit about Duke's experience in this space, and then dive into the details of that project.

[Reference: Presentation Slide 3]

So I'm on Slide 3 here, and what I've got here is a simple diagram of a microgrid. I would like to give a simple definition of a microgrid before I dive a little bit into this diagram, and the definition really is the ability for a system to disconnect from the bulk-system grid and be able to provide itself its own power in a self-sustainable way.

So in this case what's shown in this diagram is a connection from a customer to the bulk grid and, in this case, a battery-powered microgrid. The microgrid equipment here is simply called a switch, in this diagram, just for simplicity purposes. It really represents microgrid protection and controls, other electrical components, and basically a disconnect switch to disconnect that battery and host customer from the bulk-power grid.

So the way this works is, in a utility-owned microgrid that we are proposing in this case, during normal operations when the grid is — the bulk grid, power grid — is up, power is going to and from the grid and the battery. In this case, the battery is able to provide benefits to the bulk-power grid, which benefits all customers. I'll get a little bit more into all the different benefits and use cases of storage in the next slide. But in this case, the way it's configured in front of the meter, you can see that that power goes to and from the grid from the battery, to provide benefits to all customers.

In the event that the bulk-power grid goes down and there's an outage, which is shown by the

emergency operation piece there in the red lines in the diagram, in that case then the switch disconnects the host customer from the bulk grid and, in that case, the battery would provide power in only one direction to the host customer.

[Reference: Presentation Slide 4]

So that's a simplified kind of overview and diagram of what a microgrid is, and now I'd like to move on to what energy storage is, and, in this case, battery energy storage.

So, energy storage in general can consist of many different things. As shown in the bottom five pictures here, there is thermal storage, compressed-air storage, flywheel storage. I'm sure you've heard of Duke Energy's pumped-hydro storage facilities. And in this case today, we're focused on battery energy storage.

So what is battery energy storage? In this case, we're talking about lithium-ion technology. There's many different sub-chemistries of lithium-ion, but the lithium-ion chemistry of battery energy storage is what we are focused on for this project, in particular.

The energy storage in this case for the bulk-system power benefits is able to do many different

things – as I'm sure you've heard, battery energy storage tied to renewables – so it is capable of helping with the intermittency of renewables and firming the grid in that standpoint. In this – in the case of the Anderson project, it will not be providing that use case; it's not required or necessary. That is one use case, though. Another use case is to control voltage and regulate frequency, so basically maintaining the grid, balancing generation with demand. Another thing that energy storage does is it helps make the grid more reliable. And, finally, in times of peak-power and low-power needs, it's able to shift power from times of low demand to times of high period demand. That can potentially allow us to eliminate or reduce the amount of peaking units in the future, if energy storage continues its sort of downward trend.

So one of the things I wanted to bring up is the lithium-ion technology. That is nothing new. It's in your phones, it's in your laptops. It's been a widely adopted technology. And so the question is, well, so, why are we just getting into this today? And that's really because of this next slide –

[Reference: Presentation Slide 5]

— which is showing the cost curve of lithium-ion.

So Duke Energy has been following energy storage for, probably, well over 10 years now. But the reason that it makes sense for us to adopt this technology now for utility purposes is because of the cost. As you can see, it's probably similar to kind of how solar-panel prices declined in the early 2000s, and that's what we're seeing here today with lithium-ion batteries.

This is really being driven by the electric vehicle market, but it's something that we'd like to take advantage of as a utility, to benefit our grid and our customers.

[Reference: Presentation Slide 6]

I wanted to give a little bit of a flavor just for how much energy storage and what Duke's experience has been. As I mentioned, we've got over 10 years of experience. We have — we are deploying 50 megawatts of energy storage at seven different sites in Florida. We are — currently have two different 5 megawatt projects under construction in Indiana, totaling 10 megawatts. And we've got 10 megawatts planned in Ohio, as well.

I saved the Carolinas for last. We have 290 megawatts filed in our latest IRP plan, which includes the Hot Springs and Asheville/Rock Hill developments that are currently under development in the Western Carolinas.

[Reference: Presentation Slide 7]

So, now moving to the Anderson Civic Center. So before I dive into the how-big and exactly-what's-going-on, the question is why did we choose the Anderson Civic Center, and the reason is we could put these batteries right next to our substations to provide all those bulk-grid benefits that I just kind of walked through, but we thought, you know, what if we have host customers who — critical-needs host customers who are willing to host these facilities, that can also then provide that backup power benefit. We can't provide that backup power benefit to them, if it's located at a substation far away from them.

So, in this case, we had spoken with an emergency preparedness counselor at the South Carolina Department of Health and Environmental Control and identified several different sites, but have narrowed in on the Anderson Civic Center. So, the Anderson Civic Center serves as the State's

largest special-medical-needs shelter, which are used during times of hurricanes, ice storms, et cetera. You know, I'm sure you Commissioners are aware in the last 24 months we've seen three major storms hit the Carolinas – Hurricane Florence, Winter Storm Diego, and most recently Hurricane Dorian – which, you know, caused several outages. And in this case, you know, this type of facility would be open for evacuees from those areas that are hit.

So it serves many different uses that are listed on this site. So, that's one reason, is that the Anderson Civic Center serves a critical purpose. The other two reasons that made this a good facility for energy storage is its proximity to a substation – in this case, the Whitehall Substation, which I've got some maps and some slides coming up here, to show you that – and, also, that there was available land and adequate land available for the project.

[Reference: Presentation Slide 8]

So how does the Anderson Civic Center site work and what are the benefits going to be to both the Duke Energy Carolinas customers and the Anderson Civic Center itself?

This is, obviously, a similar graphic to what was shown earlier, but, in this case, during normal operations we expect to use the battery, as the utility, to provide frequency regulation to the Duke Energy Carolinas grid and to also do peak-load shaving, and that basically just means charging the battery, probably at night, and discharging it during the day when demand is high.

The Anderson Civic Center would be able to receive the backup power benefits of the project, in the event that the bulk-power grid goes down. We expect various calculations that — the question of, "Well, how long could it power the facility," depends on exactly how much energy the facility is using at the time. So the answer to that is, it depends. But we — our estimates are between 30 and 40 hours of backup power that the battery would be able to provide.

The other piece here is — that I wanted to mention — is what contracts or what changes. As you can see, the project, the battery, and the microgrid equipment are in front of the meter, so it's on the utility side. So we're not proposing any different rate, any — you know, there's no change from an electrical configuration or rate

structure for the Anderson Civic Center as we would propose it. The only contract would be the ground lease between Duke Energy Carolinas and Anderson County, which is the owner of the property and the facility, and that would be a zero-dollar land lease, which has been executed between the parties.

[Reference: Presentation Slide 9]

So I wanted to give a little bit of a flavor of where we're at with the project in development. So to the point I just made, we have executed the land lease with Anderson County. We had to do that before we were able to file an interconnection request. So that interconnection request is currently being studied. We hope that that interconnection study process finishes up by the end of 2019.

We also hope to file an application with the Commission in the month of October. And if the interconnection study results are positive towards the end of the year, then we would expect to proceed with a competitive procurement to do the engineering, procurement, and construction of the project itself.

We take safety and quality very seriously, so we are very picky about what equipment and what

suppliers construct these projects for us. But that would occur, hopefully, in the first quarter of 2020, followed by selection of that vendor in the second quarter of 2020, and we would hope for the product to be placed in service in early 2021.

[Reference: Presentation Slide 10]

The next three slides, I thought, would just give a visual of where this project is, what it looks like to some degree. So this is higher-level and it will continually zoom in as I go through. But this shows where the Whitehall Substation is, to the lower left-hand corner of the slide. It then follows sort of the light blue distribution feeder line, which serves the Anderson Civic Center, and shows the proposed battery energy storage system location there in the yellow square, just to the north of the Anderson Civic Center.

[Reference: Presentation Slide 11]

The next slide shows kind of how that facility would be connected to that distribution feeder, and a little bit higher-level view of the site. In this case, we are proposing a 5 megawatt, 5 megawatt-hour battery.

[Reference: Presentation Slide 12]

And then, finally, a zoomed-in picture of the

facility itself. You can see there are four battery energy storage containers, and then two squares to the right of that show basically a pad that's supposed to represent an inverter, a transformer, and other related switchgear for the project. Also shown is the fence boundary and lease boundary for the project.

[Reference: Presentation Slide 13]

So in closing, I guess, before I get to any of your questions, I just wanted to review the project benefits again.

The frequency-regulation and peak-load-shaving benefits really benefit all Duke Energy Carolinas customers in the State of South Carolina.

The power quality and reliability on that feeder would be improved, and that would benefit all customers on that feeder.

Specifically, the Anderson Civic Center would receive backup power during times of when the bulk-grid power is down.

And then some ancillary, but still relevant, benefits to Duke Energy from an energy-storage-development perspective are integrating these energy storage assets into our operations and confirming the assumptions that we have around

costs and maintenance, for future projects.

With that, Commissioners, I welcome any of your questions.

[Reference: Presentation Slide 14]

CHAIRMAN RANDALL: Great. Thank you, Mr. Nygaard. We'll entertain questions from Commissioners.

I just had one thing: I visited, at NARUC, a battery-storage facility, and I think it was about that — it was connected to a natural gas plant, and they used it for voltage regulation, mostly — well, everything. But it was made up of — the batteries are a whole lot of — I always thought these were going to be huge batteries, but it was a whole lot of small batteries in trays and welded together, whatever. I guess that's the technology that's there right now, right?

MR. ADAM NYGAARD [Duke Energy]: That's right. It's cell — kind of, usually, packetized cell is the typical lithium-ion technology. There are various other ones. And then those cells are stacked to create a module; those modules are stacked to create a battery pack. And then, in this case, those battery packs are connected to create these battery energy storage systems. But

typically, many of the times, the same cells that are in these battery energy storage systems are the same, if not very similar, cells to what you have in your handheld devices.

CHAIRMAN RANDALL: Commissioners, questions? Commissioner Ervin.

COMMISSIONER ERVIN: Thank you, Mr. Chairman. It's good to have you with us today.

MR. ADAM NYGAARD [Duke Energy]: Thank you.

COMMISSIONER ERVIN: I appreciate your presentation. What do you believe is the useful life of the batteries as they currently are going to market?

MR. ADAM NYGAARD [Duke Energy]: That's a great question, and I think it – and thank you, Commissioner Ervin, for that question. I think the answer depends on what's the specific use case. I would generally say 15 to 25 years, but, again, it depends on how you use the battery and what it's being used for. The more times you cycle it, the faster it will degrade. But generally, 15 to 25 years is the industry kind of norm, right now.

COMMISSIONER ERVIN: Do they require a lot of maintenance? Routine maintenance?

MR. ADAM NYGAARD [Duke Energy]: My

understanding is they do not. My understanding is, typically, one to two visits a year, is my understanding. But that is information that we — we have experience with, I would say, R&D projects, so we're around them all the time. As far as projects that are this size, that's certainly something that we can expect — we'll be monitoring them 24/7, but as far as maintenance activities, there is very little maintenance.

COMMISSIONER ERVIN: Well, I commend you on the project. And I'm familiar with that area, having lived in Anderson and been to the Civic Center on many occasions. It's a great facility and an appropriate site. You have a lot of room there to grow and expand, if you wanted to. And I'm sure you've met our County Administrator, Rusty Burns? Rusty is really a visionary when it comes to long-term planning, so you probably picked up on that.

MR. ADAM NYGAARD [Duke Energy]: [Nodding head.]

COMMISSIONER ERVIN: But he and the Council have done a great job, I think, in trying to expand the public infrastructure in the County. And I'm hopeful that you'll have an opportunity to, you

know, continue to work and develop in that area. I'm wondering if you — have you given any thought to collocating a battery storage facility maybe next to a trauma hospital or — I know they have generators, but I assume they're limited in terms of the length of time they can use generators. Is that — would that be a useful way to perhaps use them?

MR. ADAM NYGAARD [Duke Energy]: Yes, sir. We are working with several different hospitals at this time. I'd say they're probably a little bit earlier stage development than this project is currently at, so that's probably about as far into the details as I'd want to give at this point.

COMMISSIONER ERVIN: Sure.

MR. ADAM NYGAARD [Duke Energy]: Certainly, critical facilities —

COMMISSIONER ERVIN: Right.

MR. ADAM NYGAARD [Duke Energy]: — are at the top of our radar for this particular use case.

COMMISSIONER ERVIN: The other possibility might be law enforcement centers, where you've got 911 communications located. It would seem that, you know, in a disaster scenario, you'd certainly want your law enforcement to have ready access to

power. So that might be another area you could look at, particularly in the metropolitan areas, you know, densely populated areas. But I'm excited about this project. I think it has a lot of potential, and I commend you on all your efforts.

MR. ADAM NYGAARD [Duke Energy]: Thank you, Commissioner.

CHAIRMAN RANDALL: Thank you.

Commissioners. Commissioner Williams.

VICE CHAIRMAN WILLIAMS: Thank you, Mr. Chairman.

Good afternoon, sir.

MR. ADAM NYGAARD [Duke Energy]: Good afternoon.

VICE CHAIRMAN WILLIAMS: Thank you for being here today. I enjoyed your presentation. On the batteries and the implementation of the batteries, it's very interesting. In terms of shoring up the grid, do you think that, in the future, this technology will be useful during, like, storms or weather events where, say, there's a power outage in a residential area?

MR. ADAM NYGAARD [Duke Energy]: Commissioner Williams, absolutely, thank you for the question. It would absolutely be useful in — many times,

these microgrids have black-start capabilities, so the power goes out but then these microgrids are able to sense that outage, disconnect from the grid, and then black-start, and restart the area that is still connected in that microgrid area.

VICE CHAIRMAN WILLIAMS: How do you think the existing grid – bulk grid, if you will – will need to change or improve in order to, I guess, stay current with the implementation of new technology like microgrids?

MR. ADAM NYGAARD [Duke Energy]: Another great question. And I guess I would say that the changes that will have to occur are really being determined through that interconnection process that we're actually in the middle of right now for the Anderson County Project. And that, as I'm sure you're all aware – it sounds like there was a lot of interconnection work in the meeting right before this, or reference to it – the reason for that interconnection process is to protect the bulk-grid power system that all of our customers have paid for, right? And so the interconnection study results will tell us what facilities and what equipment we'll be required to place with this project, to protect that bulk-power system, such

that we aren't negatively impacting it. So those interconnection study results will ultimately answer your questions of how will the grid need to change. And the answer is, the equipment and technology is there today to incorporate battery energy storage and microgrids into our bulk-power grid.

VICE CHAIRMAN WILLIAMS: Thank you. One last question. From what you know today, do you see the trend for all this technology – the batteries and other supporting technology – are the prices steadily decreasing? Is that the trend?

MR. ADAM NYGAARD [Duke Energy]: That is the trend, Commissioner. As that graph has shown and as we have seen, ourselves, in our experience in other states.

VICE CHAIRMAN WILLIAMS: All right. Thank you.

MR. ADAM NYGAARD [Duke Energy]: Thank you.

CHAIRMAN RANDALL: Thank you.

Commissioner Whitfield.

COMMISSIONER WHITFIELD: Thank you, Mr. Chairman.

Thank you for being here, Mr. Nygaard. Certainly appreciate your presentation and found it

informative. I would note right off, what you were just saying, I guess, with Commissioner Williams, how particularly you have pushed your projects here in the DEC service area, I noticed in terms of megawatts, Carolinas have the most on your, I think, page six, when you compare it to projects in Indiana and Florida and other Duke-served states, and even Ohio, it looks like, you've definitely focused a lot of your efforts here in the Carolinas and a lot of your projects here in the Carolinas, and we certainly commend you for that. You've already answered one of my questions, to Commissioner Williams, did it have black-start capabilities, and that was what I was going to ask you. And back to the Anderson site, I'm familiar with the Civic Center, as well – not as familiar as Commissioner Ervin, maybe, but I think the other Commissioners are, too, as we've had several night hearings in that location over the years, in various cases. And it's a big facility, and obviously multipurpose use, and it looks like, from your DHEC regs, that you meet a lot of – you know, it meets a lot of goals here.

My question to you is, when you – you know, based on these DHEC regs and multipurpose uses –

and many of them urgent, critical – could be urgent, critical emergency uses, were there – is there anything that has to be done to the structure itself? I see your – looking at your maps, where the actual batteries' layout is, and then you have the inverters. I cannot – you know, I can see how close in proximity that is, but does it also require you to do other things to the site, such as to the building, itself, or to things leading into the Civic Center?

MR. ADAM NYGAARD [Duke Energy]: It really does not, actually, require anything to the building. And that is because we are configuring it to be – to basically connect in front of the meter. So where the, basically, meter is for this and equipment is served, we will connect somewhere between the meter for this facility and where they receive service, and our distribution feeder. Then on the other side of that connection will be that kind of disconnect switch that's shown in that diagram, where it will basically switch off, and then that's what makes the microgrid or the – basically, the only things connected then are the battery and the Civic Center.

The only thing that I would say we would want

to install is sort of a screen inside the Anderson Civic Center, and this would require a little bit of communications, but that would show "This is the current level of charge of the battery. This is the current usage of the Anderson Civic Center." And then that can calculate "This is the number of estimated hours of backup power that you would have." And we would want the facility manager, or whoever is manning that facility during an emergency time, to have that information on a panel so that they can then make decisions on, "Hey, do I turn lights off in these rooms, or air conditioning, or turn the kitchen off?" Make the decisions they need to regarding the load side that we, as Duke Energy, don't have control over, so that they can extend the number of hours that that battery can power the facility in the event of an outage.

So the simple answer to your question is, no, there are not any building upgrades required. We would want to have some sort of panel in there to be able to give them information.

COMMISSIONER WHITFIELD: I certainly appreciate your answer. That information could become critical in an emergency situation, to

preserve the amount of life or energy left in storage, to ration it out in a situation like that. And I see your proximity to the substation, which you acknowledged is close enough – I can see on the other map – is close enough for you to have a facility like this, to be able to draw the energy you need to have that storage there. But as you said in the microgrid, in the event that something like that happens, when everything disconnects, as you said right there, the only thing that's going to be left would be the Civic Center. Is that what I – that's the way I understand it. Right?

MR. ADAM NYGAARD [Duke Energy]: That is correct, Commissioner. And we have entertained adding other facilities that are connected to that facility – actually, with Mr. Burns, the gentleman Commissioner Ervin mentioned – but ultimately decided against it, because it would take away from the number of hours of backup power that were available to the Civic Center. So we decided to focus on the Civic Center, alone.

COMMISSIONER WHITFIELD: And you're talking – what you're talking about – you weren't necessarily talking about other emergency; you're just talking about other facilities.

MR. ADAM NYGAARD [Duke Energy]: That's correct.

COMMISSIONER WHITFIELD: I see.

Well, that's all I have, Mr. Chairman. Thank you.

CHAIRMAN RANDALL: Thank you.

Commissioner Hamilton.

COMMISSIONER HAMILTON: Thank you, Mr. Chairman.

Welcome. Happy to have you. Excellent presentation. It appears the automobile industry has done a little more moving forward with the use of this in battery than probably other people, but we're happy to see you here today, and the activity that you have in Anderson, going on. The one question that's still out there everywhere I go is cost-effectiveness and when do you think we'll reach that level? I know you can – I looked at your slide eight, and it looks like it's going to be a while.

MR. ADAM NYGAARD [Duke Energy]: Thank you for the question, Commissioner Hamilton. So, in certain use cases, I would say that battery energy storage is a cost-effective alternative to traditional investments – traditional investments,

whether that's running an additional feeder; in some cases, I think in the western part of the United States, you're seeing storage being added to solar to displace traditional fossil-fuel generation. So I think battery energy storage in certain use cases is cost-effective. It just depends on what the alternative is that it's being measured to, right?

So, but to that point, we continue to see battery energy prices decrease. We continue to learn about ways we can use batteries to make our grid more efficient, and to make — to make cost savings and make the grid more efficient for our customers.

COMMISSIONER HAMILTON: It seems to have been a very slow process of getting to where you are today. And how do you think it's going to move in the future? Is there enough activity going on and enough people doing the proper research?

MR. ADAM NYGAARD [Duke Energy]: Yeah, I believe so. The Electric Power Research Institute, EPRI, is very involved in energy storage. The Energy Storage Association is another one that has grown tremendously. Actually, right now, the largest solar power conference in the United States

is taking place out in Utah, in Salt Lake City, and they are all actually just talking about energy storage, is what everyone's saying out there. All the articles coming out of that conference — it's supposed to be for solar — is actually about energy storage.

And so there's a lot of attention on energy storage. As these factories that are really under construction right now to build batteries in mass quantities come out, then that will drive the prices even lower and continue to drive efficiencies for battery energy storage technology.

COMMISSIONER HAMILTON: Do you know any places that it's being used with solar now, to make this more effective?

MR. ADAM NYGAARD [Duke Energy]: Absolutely. There's several solar-plus-storage sites, mostly in the Western United States. We do have a microgrid that I would say, really, is a small type version of this in South Charlotte. It's called the McAlpine microgrid. So it is a solar-plus-storage microgrid that's capable of providing backup power to a fire station, in this case Fire Station 24. Again, it's very similar, but it also includes some solar, which the Anderson Civic Center Project does

not.

COMMISSIONER HAMILTON: Thank you very much. Appreciate you being here, again.

MR. ADAM NYGAARD [Duke Energy]: Yes, sir, thank you.

CHAIRMAN RANDALL: Thank you.

Commissioner Belser.

COMMISSIONER BELSER: Good afternoon. On your slide number five, there are a couple of terms I'd like to ask you about, please. First of all is where it says 2024 and 2030 "implied price"? Is that just like a projected price? Is that –

MR. ADAM NYGAARD [Duke Energy]: Commissioner Belser, that is my understanding. This slide comes from Bloomberg New Energy Finance –

COMMISSIONER BELSER: Okay.

MR. ADAM NYGAARD [Duke Energy]: – so I guess I couldn't speak for them, necessarily, but I would – my assumption is that "implied" means that's their forecasted price, because it's probably hard to tell exactly what number is shown in 2024.

COMMISSIONER BELSER: And then the other one is – come down below the X axis – I think that's X. Maybe Y. Whatever. It says "18% learning rate"?

I don't understand what "learning rate" is.

MR. ADAM NYGAARD [Duke Energy]: So I think that implies that there is an 18 percent – I don't know if that is saying a cost decrease year-over-year – probably not quite that. It's probably some sort of learning rate of learning the – decreasing the battery energy storage pack cost versus the other things that go into a battery, such as the balance of plant and switchgear, et cetera.

COMMISSIONER BELSER: Okay. Thank you very much. Appreciate your presentation today. Thank you.

MR. ADAM NYGAARD [Duke Energy]: Thank you, Commissioner Belser.

CHAIRMAN RANDALL: Commissioners, any other questions?

[No response]

Okay. If not, Mr. Nygaard, we appreciate you being here. Thank you. We enjoyed your presentation. And we are adjourned

[WHEREUPON, at 3:35 p.m., the proceedings in the above-entitled matter were adjourned.]

C E R T I F I C A T E

I, Jo Elizabeth M. Wheat, CVR-CM-GNSC, Staff Hearings Reporter for the Public Service Commission of South Carolina, do hereby certify that the foregoing is, to the best of my skill and ability, a true and correct transcript of all the proceedings had regarding a requested allowable ex parte briefing in the above-captioned matter, according to my verbatim record of same;

IN WITNESS WHEREOF, I have hereunto set my hand and seal, on this the 27th day of September, 2019.

Jo Elizabeth M. Wheat, CVR-CM/M-GNSC
Hearings Reporter, PSC/SC
My Commission Expires: January 27, 2021.