

BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA
COLUMBIA, SOUTH CAROLINA

HEARING #09-11017

MARCH 20, 2009

10:30 A.M.

ALLOWABLE EX PARTE BRIEFING

REQUESTED BY THE OFFICE OF REGULATORY STAFF - Renewables and
Clean Energy, and Their Role in South Carolina.

**TRANSCRIPT OF
PROCEEDINGS**

VOLUME 1

HEARING BEFORE: Elizabeth B. 'Lib' FLEMING, *CHAIRMAN*, John E. "Butch" HOWARD, *VICE CHAIRMAN*; and COMMISSIONERS David A. WRIGHT, G. O'Neal HAMILTON, Swain E. WHITFIELD, and Randy MITCHELL.

ADVISOR TO COMMISSION: Joseph Melchers, Esq.

STAFF: Charles L.A. Terreni, Chief Clerk/Administrator; Jocelyn G. Boyd, Deputy Clerk; F. David Butler, Jr., Senior Counsel; Josh Minges, Esq., Legal Staff; James Spearman, Ph.D., Executive Assistant to Commissioners; Phil Riley, Tom Ellison, and Lynn Ballentine, Advisory Staff; Jo Elizabeth M. Wheat, CVR-CM-GNSC, Court Reporter; and Deborah Easterling, Hearing Room Assistant.

APPEARANCES:

*SHANNON BOWYER HUDSON, ESQUIRE, along with
LEIGH C. FORD and JOHN FLITTER, representing THE
OFFICE OF REGULATORY STAFF*

*JOHN FANTRY, ESQUIRE, acting as non-staff
certificator*

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P R O C E E D I N G S

1
2 **CHAIRMAN FLEMING:** This briefing will now come
3 to order. At this time, I'm going to call on
4 Attorney Melchers to give us information on this ex
5 parte briefing.

6 **MR. MELCHERS:** Thank you, Madam Chairman. On
7 February 27th, the Office of Regulatory Staff
8 requested that a notice be posted in regard to an
9 allowable ex parte briefing on renewable resources
10 and clean energy, scheduled for today, March 20th,
11 commencing at 10:30.

12 **CHAIRMAN FLEMING:** Thank you, Attorney
13 Melchers.

14 **MR. MELCHERS:** Yes, ma'am.

15 **CHAIRMAN FLEMING:** At this time I'm going to
16 call on the Office of Regulatory Staff.

17 **MS. HUDSON:** Good morning, Madam Chairman,
18 Vice Chairman, members of the Commission.

19 **CHAIRMAN FLEMING:** Good morning.

20 **MR. MELCHERS:** My name is Shannon Bowyer
21 Hudson. I'm an attorney with the Office of
22 Regulatory Staff. With me I have two coworkers:
23 Mr. John Flitter, who is the director of our
24 electric and gas regulation department, and Ms.
25 Leigh Ford, who is an electric specialist.

1 Ms. Ford is going to conduct the presentation
2 today. The topic is Renewables and Clean Energy,
3 and Their Role in South Carolina.

4 Before Ms. Ford begins her presentation, I
5 want to say thank you. Thank you for granting our
6 request to do an allowable ex parte presentation.
7 We appreciate it very much. Also, I'd like to
8 thank Mr. Fantry for his assistance. And I'd also
9 like to recognize Ms. Boyd. She provided great
10 assistance to me on helping getting everything
11 prepared for this morning. So thanks to you all.

12 With that being said, I'd like to turn it over
13 to Ms. Ford.

14 **CHAIRMAN FLEMING:** Okay. And we appreciate
15 your bringing us this information to us today, as
16 well.

17 **MS. HUDSON:** Thank you.

18 **CHAIRMAN FLEMING:** Mr. Fantry?

19 **MR. FANTRY:** Madam Chairman, thank you, very
20 much. Before we get started this morning, I'd like
21 to introduce myself to the audience. I am the
22 neutral for this particular hearing, and I would
23 ask everyone's cooperation. I have signed a
24 statement coming in, that says that I'm attending
25 the hearing, and I would encourage everyone to be

1 conscious of the fact of making that statement
2 available to the Commission and to me for the
3 filing purposes.

4 My name is John Fantry. I'm an attorney but I
5 have my attorney hat off today and am serving as
6 neutral, and will enjoy and appreciate the
7 opportunity with the Commission and with Regulatory
8 Staff to hear the presentation. Thank you, Madam
9 Chairman.

10 **CHAIRMAN FLEMING:** Thank you.

11 **MS. FORD:** Good morning. Can everyone hear me
12 with the microphone?

13 **CHAIRMAN FLEMING:** Yes.

14 **MS. FORD:** Great. As Shannon said, my name is
15 Leigh Ford, and again, I would like to thank you,
16 as well. We do appreciate this opportunity. We
17 feel this is a very important topic.

18 I'm pretty informal, so if you all have any
19 questions as we go along, please don't hesitate to
20 let me know. And basically, what we're going to
21 discuss today are renewable resources and clean
22 energy. And as Shannon said, we're going to
23 specifically discuss how they play a part in South
24 Carolina's electric generation portfolio mix. When
25 we are looking at this presentation, the majority

1 of the time I will be discussing utility-scale
2 resources. We might address residential, but
3 predominantly this will be utility-scale resources.

4 And what exactly is a renewable resource?
5 We've been hearing a lot of information about
6 renewables lately. They've gained a lot of
7 popularity, and these typically include solar,
8 wind, biomass, geothermal energy, and hydroelectric
9 power. Renewable resources, as the slide says, are
10 those that can be generated naturally; they are
11 replenished in a very short amount of time.

12 So why has there been so much interest in
13 renewable resources lately? Well, there's a lot of
14 good reasons. Our demand for electricity is on the
15 rise. We have multiple computers at home, some
16 people have multiple refrigerators in their home.
17 We're using a lot more electricity, so our needs
18 are growing.

19 Also, we're getting a lot of concern about
20 greenhouse gases. What are they doing to our
21 environment? What is their effect on global
22 warming? And one big problem with fossil fuels is
23 they do have a lot of emissions. You can see the
24 numbers here, and there is technology out there.
25 There's scrubbers, there's SCRs. There's

1 technology being installed that does lower the
2 emissions, but ultimately there are still emissions
3 with our fossil fuels. Also, our fossil fuel
4 supplies are depleting. It takes millions of years
5 to create coal, and it does not take millions of
6 years for us to go through it. So that's another
7 concern, is that we are going through our fossil
8 fuel supplies faster than they can naturally be
9 generated.

10 Just to give you an idea of where we are in
11 the United States, and also in South Carolina,
12 these are some pictures of how we get our
13 electricity in the country. Nationally, it's about
14 50 percent for coal, and then nuclear follows up
15 with -- the next closest, with 20 percent. Natural
16 gas is also there right with nuclear at 20 percent.
17 Now these numbers for South Carolina are probably
18 different than what you've seen. The numbers that
19 the Department of Energy puts out actually states
20 that South Carolina has about 60 percent nuclear
21 and 30 percent coal, so these two numbers are flip-
22 fopped. The reason that we're presenting a
23 different number is because our generation numbers
24 take into consideration that we have multistate
25 companies. The Department of Energy numbers, when

1 they calculate what generates the electricity for
2 South Carolina, they only look at those plants that
3 are physically located in South Carolina. So we
4 have two companies, Duke and Progress, that operate
5 both in North and South Carolina, and they have
6 generating facilities both in North and South
7 Carolina. When looking at ratemaking, those
8 facilities are put all together and then equally
9 distributed among their customers. Therefore, we
10 feel that this is a more accurate picture, because
11 this is what is passed along to the ratepayers and
12 how our electricity for South Carolina is
13 generated.

14 When calculating these numbers, we did
15 allocate a certain percentage for each company.
16 With Duke, we allocated 25 percent of all their
17 generating facilities to South Carolina, because 25
18 percent of their customers are South Carolina
19 customers. Also, for Progress, we allocated 12
20 percent, because 12 percent of their customers are
21 in South Carolina. For, obviously, SCE&G, Santee
22 Cooper, other generating facilities, those are 100
23 percent because they only have South Carolina
24 customers.

25 If you look here on renewables, nationally,

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it's 1.81 percent, a very small percentage. For South Carolina, it's even smaller: .07 percent.

Another thing to consider when looking at renewables, and any type of generation, is something that's called a capacity factor, and you may or may not be familiar with it, but ultimately a capacity factor is a way that we measure the productivity of a power plant. We look at how much power the plant actually produced and compare it to what it would have produced if it had been running at 100 percent. So the way I like to think of it is, if you look at a work day, if we are supposed to be at work for eight hours and someone leaves early to go play golf -- you leave four hours early -- in that situation you worked four out of your eight hours, your capacity factor would have been 50 percent. So this is used across the industry to compare resources.

And just to give you an idea of a couple of typical or conventional resources, nuclear and coal have very high capacity factors. Nationally, nuclear has a 92 percent capacity factor, meaning it is producing power 92 percent of the time. Typically, the only time nuclear is not producing electricity is when it goes down for refueling or

1 some type of maintenance outage. But nuclear is
2 kind of the workhorse of the electric generation
3 portfolio. This is also what you see as base-load
4 generation. It's the generation that's working all
5 the time, at night, in the morning, on the hottest
6 days, you're going to see nuclear and coal being
7 your base-load generation.

8 Looking at renewables -- now, these numbers
9 that I'm going to give you are specific to South
10 Carolina, because resources -- the availability
11 differs through different parts of the country, so
12 all of these numbers are specific to South
13 Carolina. For wind, you're looking at about 25 to
14 35 percent of the time it would be available for
15 you; solar is a little bit lower at 19 to 21
16 percent; and then some of our biomass resources --
17 landfill gas, wood, poultry and swine waste --
18 those have a much higher capacity factor and tend
19 to model like a conventional resource. And I'll
20 discuss why these are important as I go through
21 each one.

22 The first resource we're going to start with
23 is solar. Solar is very, very popular right now, a
24 lot of attention being given to solar, and there
25 are very good reasons. When you generate

1 electricity from solar, there are no air emissions.
2 You're not combusting a fuel; therefore, you do not
3 emit any greenhouse gases, which is very positive
4 when you're looking at a carbon-constrained
5 society.

6 Also, photovoltaic, which are known as PV
7 systems -- that's what's actually used to convert
8 the sun's energy into electricity -- there's no
9 water that's needed. You don't have to have a big
10 body of water to cool the facility. So that's
11 another great thing, because if there's a drought
12 condition, you're not limited by the resources, you
13 don't have to be concerned about the environmental
14 impact of that.

15 Also, another great advantage of solar is you
16 can place it on existing structures. There's a lot
17 of projects out in the West where they're actually
18 putting solar panels on office buildings, on the
19 rooftops of schools. So therefore, you would not
20 need any new land if you're going to utilize solar
21 in this fashion. During the peak times -- or,
22 during the day sun is typically available. Now, I
23 would like to clarify, we have looked at a lot of
24 solar output charts, and in those charts in the
25 hottest -- or, the peak of the day, peak for

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electric usage, which is typically late afternoon as people are coming home, turning on the TV, solar is not generating at its peak, but it is typically available during that peak time on those hot days in the summer. So I would like to clarify on that part there about peak times. Also, when you're utilizing solar electricity, as I mentioned, you are not combusting a fuel; therefore, you do not have any ash or spent-fuel concerns. So there are a lot of advantages to solar energy.

On the flipside there are some disadvantages. As with everything, there's pros and cons. These numbers again are specific to South Carolina. The installed cost for solar is about \$4-5,000 per kilowatt. Again, that's for utility scale. On the residential side, the costs are about \$8-10,000. So a question I get a lot is, "Well, how much would it cost a typical resident if they're looking to install solar panels?" On average we see about three-kilowatt installations for the State, so looking for a residential customer it's going to be anywhere from \$25,000 to \$30,000 for solar panels on their home. Now, I would like to clarify that will not eliminate or mitigate all of their electric usage. They still will need to purchase

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power from their company based on the numbers we have seen. Typically, the numbers I've seen, it eliminates about a third. You can generate a third of your electricity, and the remainder you would need to purchase from your utility. And also, I mean, one aspect is the sun's not shining at night, and obviously we still use electricity at night.

These are numbers, like I said, that are South Carolina specific. Looking across the country at different projects, most of them are not disclosing their cost, so it's very difficult to determine for utility-scale generation what it really is costing. Part of why these numbers are so high is silicon. It's a main component in a certain type of panels, and those are the type of panels that would be best in the Southeast. That is very expensive and it's in short supply. Now, as technology continues, this may not be a resource that's needed quite as much, but at this point based on the technology, this is one of the cost drivers.

The cost estimates for generating electricity -- and this again is for South Carolina -- is 16-1/2 to 50 cents per kWh. To give you a comparison, in South Carolina all the utilities, including the municipalities, co-ops, the average retail rate is

1 about 8 cents a kilowatt-hour. So as you can see,
2 even on the low end, it's double what the retail
3 ratepayer is currently paying. So that is one of
4 the greatest disadvantages in the Southeast and
5 specifically in South Carolina for solar.

6 Surprisingly, South Carolina has some
7 geographic limitations with solar. And this was
8 pretty shocking to me. I consider South Carolina
9 pretty hot and pretty sunny. Apparently, for our
10 solar radiation, we are hot; we're not as sunny as
11 I thought. On average, we receive 4-1/2 to 5-1/2
12 kilowatt-hours per square meter, per day. This is
13 a number that's used to determine your solar
14 radiation and how you would be able to utilize
15 solar for electricity. This number is obviously
16 lower in the winter. We have shorter days, we
17 don't get as much sunlight. But what's important
18 about this number is it's less than the recommended
19 6.75 kilowatt-hours per square meter, per day. So
20 this is lower than what's recommended. It does not
21 mean we cannot utilize solar; it just means our
22 electric output is going to be lower than other
23 parts of the country.

24 I have a map here for you. As you can see,
25 South Carolina is in the yellowish area, and you

1 can compare. Here it's 4-1/2 to 5-1/2; out west,
2 their numbers are much greater. And this map right
3 here -- there are several different types of solar
4 panels. This is a flat panel that does not move.
5 This is what's best for the Southeast. It helps us
6 capture the most sunlight and most electricity that
7 we can generate. Out west, ones that actually look
8 like a half-pipe, they're called trough systems,
9 they are more effective out west, so when you look
10 at that map their numbers are actually up here in
11 the 7 to 8 range. So for South Carolina, as you
12 can see, we are lower, but we're also better than
13 some parts of the country. We're better than
14 Alaska, a portion of the Northeast. So like I said
15 before, it doesn't mean we cannot utilize this
16 resource; we're just not going to have the
17 electrical output that, say, the Midwest would.

18 Also, another consideration is the
19 availability of sunlight. As I mentioned before,
20 sunlight is not always shining. It doesn't shine
21 at night. We had a string of cloudy days recently;
22 sunlight would not be able to be used at that
23 point. Also, dust and pollen -- and as you know,
24 we're coming into pollen season -- we get a lot of
25 pollen; pollen can sit on the solar panels and also

1 pollen is in the air and ultimately is a filter for
2 the sunlight and lowers our solar radiation.

3 I mentioned before the capacity factor: 19 to
4 21 percent. A good portion of this is because the
5 sun is not always shining. It's not available at
6 night, but this is something to consider because it
7 will be producing electricity about a fifth of the
8 time, whereas base-load would be 90 to 70 percent.
9 So that is another consideration for solar. I
10 mentioned in the winter, you have less solar
11 radiation; conversely, in the summer, you have a
12 higher solar radiation. You get more of an output
13 at that point.

14 I mentioned before that solar panels are being
15 placed on existing structures. If it is not placed
16 on existing structures, if you need to go out and
17 have a solar field, then land use would be
18 considered. That's something that you would have
19 to take into consideration at that point. Because
20 there are so many different types of solar panels,
21 and the solar radiation is so different for every
22 part of the country, it's difficult to determine
23 the size that would be needed to have a utility-
24 scale generation facility, because it does vary so
25 much on location and also the solar panels that you

1 use. I do have some information on actually the
2 largest solar facility. It's located in the Mojave
3 Desert of California. It takes up over 1,500
4 acres. This is a picture of one of the nine solar
5 plants that they have throughout the desert. The
6 capacity is a 354-megawatt capacity. To give you a
7 bit of a comparison, the average nuclear plant is
8 about 1,000 megawatts, so it's about a third of the
9 size of that. It is comprised of 900,000 mirrors.
10 And as I said before, it's on 1,550 acres. Because
11 the sun is not always shining -- even in the Mojave
12 Desert they do have cloud cover and you do have
13 nighttime -- there is a natural gas backup system.
14 So they have something to kick in when the sun is
15 not shining or in the evening, so that they're
16 continually providing electricity. And just to
17 give you a comparison, this area receives 7
18 kilowatt-hours per square meter, per day.
19 Comparatively, we get 4-1/2 to 5-1/2. So you can
20 see the solar output is substantially higher in
21 this part of the country.

22 To give you an idea of how large 1,550 acres
23 is, I've got a couple of comparisons here for you.
24 Our Riverbanks Zoo -- and this includes Botanical
25 Gardens -- is about 170 acres. This picture right

1 here is half of Central Park; Central Park is 843
2 acres. And the best comparison I could find
3 locally is Sesqui State Park; it's almost 1,500
4 acres, but that does equate to 1,174 football
5 fields. It's end zone to end zone, just to give
6 you an idea of how large this facility is.

7 Any questions on solar before I move on to
8 wind?

9 [No response]

10 All right, moving into wind, this is another
11 area that's gotten a lot of popularity lately, and
12 a lot of the reasons are the same for wind and
13 solar. You do not combust a fuel; therefore, you
14 do not have your air emissions. You also do not
15 need the use of water. You might need, if the
16 blades get dirty, because there's natural particles
17 in the air, you might need to clean the blades with
18 that, but ultimately you don't need the amount of
19 water that you would with some of our conventional
20 resources.

21 When the wind blows, your supplies are
22 unlimited. Also, you do not have the ash or spent
23 fuel, as I said before. And when turbines, if they
24 are removed from the land, you don't have the
25 concerns about solid waste or any fuel residues

1 that would be left behind. The land is taken back
2 to how it was.

3 Again, there are disadvantages and for South
4 Carolina one of the biggest ones is the cost. You
5 can see these costs are less than solar, but they
6 are still a higher number. There's two types of
7 wind power: onshore and offshore. Onshore is
8 something that would be located on the land.
9 Typically you think of the Midwest with all the
10 wind turbines. That's onshore. Offshore would be
11 something located off the coast, so you would see
12 it, you know, off the coast of our, say, Myrtle
13 Beach area. Obviously, the costs for that are
14 higher. It's almost double to do offshore rather
15 than onshore. This is also like solar panels; it's
16 very different. Each location needs something very
17 specific, so the cost to produce the energy -- it's
18 a little difficult to determine, but the numbers
19 that we have are about 12 to 15-1/2 cents per kWh.
20 Again, our retail payers are -- retail ratepayers
21 are paying about 8 cents per kWh at this point. So
22 this number is a lower number than our solar
23 projects that we've seen.

24 We also have some geographic limitations.
25 Typically, looking at the manufacturers, grid-

1 connected turbines reach their, what they call
2 their rating at about 14 meters per second, which
3 is 31 miles per hour. And that rating is where
4 it's producing what it is rated to produce, so if
5 it's a 3.6-megawatt wind turbine, at 31 miles per
6 hour it would be producing 3.6 megawatts. Right
7 now, we're -- well, not right now; this isn't going
8 to change. But South Carolina does not have
9 sufficient wind speeds onshore to support this
10 resource. When you're looking at our annual wind
11 speed, it's 70 meters, so the wind turbine is 70
12 meters high, we're getting 6-1/2 to 7 meters per
13 second, wind speed, which only equates to about, on
14 average, 15 miles per hour. So you can see that's
15 substantially lower than the rating of 31 miles per
16 hour. Conversely, we do have some offshore wind
17 available.

18 This is a wind resource map, and you can see
19 the Midwest is booming with colors. That's a great
20 thing when you're looking at wind; you want a lot
21 of color. South Carolina, we do have some colors
22 here in the Charleston/Beaufort area, but as you
23 can see, as you get closer to Myrtle Beach, in that
24 portion of the State, our wind resource potential
25 increases dramatically. We're not as much as, say,

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New England or even off of the coast of North Carolina, but we do have some resources. But as you can see, our entire State is white; that's not good for wind. That means we don't really have the resources.

If we are looking at offshore wind, you have to take in a lot of considerations. One is that you would have underwater transmission lines. You have the turbines in the ocean, they are turning and generating electricity. You have to get that electricity back onshore to where customers would use it. These transmission lines are very costly. The numbers that we have seen for onshore, just your typical transmission lines, you're looking at about \$750,000 to a million dollars a mile, for transmission lines. Offshore, the number we've seen is about \$5 million a mile. So, substantially higher numbers, because you are looking at taking electrical currents through water. Ideally, any project would be within ten miles of the shore, because that is such a high cost. The further out you go, you do get better wind speeds, but you have to factor in the increased cost of transmission lines.

Additionally, offshore permitting -- when you

1 go beyond three miles of our coast, you're now in
2 federal waters. So once you've gone three miles
3 out, you not only have to site it locally, but you
4 also have to site it with the federal government,
5 so that would be a consideration as well. Also, as
6 I'm sure you're aware, we do get hurricanes in
7 South Carolina. GE has a turbine that they rate to
8 sustained winds of 130 miles per hour, which is a
9 Category 3 hurricane. When looking at the past
10 about 150 years, South Carolina, North Carolina,
11 and Georgia have experienced 21 Category 3
12 hurricanes, so we do get this -- and that's
13 Category 3 or higher, so it could have been a
14 higher one. So we do definitely get our share of
15 hurricanes, and that's a consideration as well when
16 you're looking at offshore wind.

17 The wind is intermittent. It does not always
18 blow. I know, the dead of summer, there's -- half
19 the time you're begging for a breeze and it won't
20 happen. In that situation, you would not be able
21 to generate electricity. Also, that's a big
22 portion of why we don't have the onshore
23 capabilities. Offshore, the wind is less
24 intermittent. Because of that, you do have to have
25 some kind of backup for non-windy times. If you're

1 relying on a turbine to generate your electricity
2 and the wind's not blowing, you do need some kind
3 of backup. So like that solar facility that has a
4 natural gas backup, the same type of situation
5 would be needed for wind.

6 The capacity factor for wind is higher. This
7 35 percent is for our offshore wind, so we do have
8 a higher capacity factor; it is available more
9 time. But one consideration also is that it's not
10 dispatchable. We can't determine when the wind is
11 going to blow, so when it blows you have to accept
12 that electricity, regardless of if it's when you
13 need it or not. So that's another consideration.

14 As I said with solar, it doesn't mean it's not
15 an option, but there are some limitations for South
16 Carolina and the Southeast as a whole.

17 To give you an idea of the size of the
18 turbines, these are quite large. The blades, each
19 individual blade, is 160 feet long. There are
20 three blades on each turbine. The tower -- so just
21 this tower portion here [indicating] -- is 295
22 feet. When you add in all of the equipment and the
23 blades, it's 455 feet tall, which the Capital
24 Center in downtown, Columbia's tallest building,
25 that's 25 stories. So you can do a comparison;

1 this is 38 stories high. It's a very, very large
2 piece of equipment. Vertical airspace is talking
3 about how much space it takes as the blades are
4 turning. So this is -- I'm not sure why they call
5 it vertical, because it's actually every direction
6 -- a 364-foot wingspan, for lack of a better word.
7 And as you can see there -- just more information
8 for you -- this does vary, this information about
9 the platform, depending on where you put it, but
10 this is just some general information from GE to
11 give you an idea, and you can see compared to this
12 little house down there, they're quite large.

13 There are no offshore wind projects in the
14 United States. There are projects in Europe.
15 They've been utilizing offshore wind for a awhile,
16 but in the United States there are no projects.
17 However, the one that seems the most promising is
18 Cape Wind. It's off the Nantucket Sound in
19 Massachusetts -- Cape Cod, and right in the
20 horseshoe area. This project is proposed and
21 they're going through all the environmental studies
22 as we speak. The capacity for this is 420
23 megawatts, so a little less than half of your
24 average nuclear plant. The space that it will take
25 up is 16,000 acres, which is larger than all of

1 Myrtle Beach. These are spaced about a nautical
2 mile apart, so obviously you don't want to
3 interfere with shipping, you don't want the blades
4 to hit each other, so it's about 16,000 acres and
5 it's comprised of 130 wind turbines. There are no
6 cost estimates out there on -- that has not been
7 provided. But just to give you an idea, it's 34
8 acres per megawatt generated.

9 Any questions on wind?

10 [No response]

11 All right. We're going to move into a few
12 resources that are very viable options in South
13 Carolina, one of which is biomass, and landfill gas
14 specifically.

15 Landfill gas is taking the methane that
16 naturally occurs in landfills, as all of your
17 products there, there's naturally methane that
18 occurs. And what this does is, typically landfills
19 have to remove this methane, because it's a highly
20 combustible gas. They typically flare this off, so
21 they pipe it up, light it on fire, flare it, to
22 remove the methane. What this is doing is
23 capturing that methane and using the methane,
24 combusting it to generate electricity. So this
25 prevents emitting that methane or flaring it off

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into the environment. And methane actually has a very high heat-capturing -- it's a very high heat-capturing greenhouse gas, so it's really, really bad when you're looking at greenhouse gases.

The capacity factor for this is 80 to 85 percent, substantially higher -- especially when looking at some of our other resources, it is much more along with our typical base-load generation. Landfill gas also is dispatchable. If you have a peak time you know your generation -- you know, you're reaching your peak, you need more electricity, you can use landfill gas at that point. However, the resources are limited. We only have so many landfills. I know there was talk about our mega-dumps, how we're receiving trash from other parts of the country. That even being said, we do have limited resources. You have to have a certain size landfill to utilize this. The Btu content of this methane is 9,500. The reason I reference this is to give you an idea, the coal we typically receive is about 12,500 Btu. So it is a lower Btu content. You're going to need more of this to generate the same amount of electricity. However, the costs are substantially lower; it's 5.9 to 9 cents per kWh. I mentioned before we're

1 at about 8 cents per kWh. So this is right in line
2 with our generation portfolio that we have right
3 now.

4 Currently, there are ten landfill gas projects
5 online in South Carolina, and there are many more
6 that are planned. One of the biggest ones in the
7 State is BMW is utilizing the Anderson County
8 landfill. From this, they get 70 percent of their
9 paint shop's electric needs. So they are
10 eliminating that usage they would normally do
11 because they're generating that from the landfill
12 gas.

13 To give a little idea of what's going on,
14 anything that is in red are projects that are
15 currently online. Greenwood right there, it's
16 coming online the beginning of April, so I went
17 ahead and put it on there because they're just
18 finishing up the last part of it. These numbers
19 that are here correspond to the names on the left-
20 hand side. These are potential landfill gas sites.
21 And you can see, along the coast, we have a lot of
22 projects going on right there. But we do -- this
23 is a resource that we are currently using as a part
24 of our generation mix.

25 Do you have any questions on landfill gas?

1 **COMMISSIONER WRIGHT:** I have one.

2 **MS. FORD:** Yes, sir.

3 **COMMISSIONER WRIGHT:** Good morning. If you
4 say it's a limited resource --

5 **MS. FORD:** Yes, sir.

6 **COMMISSIONER WRIGHT:** -- how limited, when you
7 say that? I mean, if you were to use it for
8 dispatching, okay?

9 **MS. FORD:** Yes, sir.

10 **COMMISSIONER WRIGHT:** Before you start -- it
11 starts declining, how long -- how many years, or
12 are you talking --

13 **MS. FORD:** I do not have that number. I do
14 know that we have a lot of landfills that we can
15 use, and, I mean, ultimately, landfills are
16 continually producing methane.

17 **COMMISSIONER WRIGHT:** Right.

18 **MS. FORD:** But I do not have a number as to
19 how long this resource would be available.

20 **COMMISSIONER WRIGHT:** But at some point,
21 though, you cap out.

22 **MS. FORD:** Absolutely.

23 **COMMISSIONER WRIGHT:** Yeah, okay.

24 **MS. FORD:** Yes, sir. All right, thank you.

25 I'm going to move into another form of biomass, and

1 this is wood and wood waste. What this does is
2 it's taking wood waste that is already in our
3 State. We have a good logging industry in the
4 State, and if you look at the logs that are, you
5 know, going down the highway on the logging trucks,
6 there's no branches and there's no bark, typically.
7 That would be a wood waste. Now, you do have to
8 look that a lot of times this wood waste is used
9 for, say, landscaping. You know, the bark is used
10 in landscaping, but this is an option. Also when
11 you're looking at when companies clean out a
12 portion of the trees so the remaining trees can
13 grow, that would be an option, as well.

14 You can utilize this in two ways: The first
15 is direct fire, meaning you take that wood waste,
16 burn it, and that way you generate electricity; or,
17 you can do what's called co-firing, which is
18 putting it with another fossil fuel, such as coal,
19 so you would grind up the wood, throw it into the
20 boiler the same way you would with coal, so you're
21 using less coal and replacing that with a wood or
22 wood waste.

23 I put here that emissions, the CO₂, they still
24 exist but the carbon footprint is reduced. When
25 you burn wood, you emit CO₂; however, this is

1 typically considered carbon-neutral, because
2 although you emit CO₂ while you're burning the wood,
3 on the flipside while that tree was growing it was
4 absorbing CO₂, so it's considered carbon-neutral.
5 The reliability, similar to landfill gas, is a
6 slight bit lower; it's 70 to 75 percent. So your
7 capacity factor is higher; again, it is
8 dispatchable. You can use it when you need it, and
9 it does have that higher capacity factor that gets
10 you closer to our conventional base-load
11 generation.

12 We also are limited by the availability of
13 fuel. You know, we don't want to go and clear-cut
14 our whole State just to be able to generate
15 electricity. And also, you have to consider long-
16 distance transportation. If you've got lots of
17 wood residue in the upstate and you want to bring
18 it to a site down in the lowcountry, well, you have
19 to factor in -- wood is light. You know, you're
20 looking at bark, and it could potential fly out of
21 the truck. And also looking at the fossil fuels
22 you're going to be using to haul that. You know,
23 you're going to need diesel or gasoline to
24 transport it. So that's another consideration.
25 You ideally would like a facility to be close to

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wherever your resources are.

The Btu content of wood is much more comparable to coal; it's about 12,000 compared to that 12.5 Btu that we see, and the cost, a little bit higher than landfill gas, but again, getting closer to what we currently have right now; it's 9 to 13-1/2 cents per kWh.

Questions on that?

COMMISSIONER WRIGHT: One more.

MS. FORD: Yes, sir, absolutely.

COMMISSIONER WRIGHT: In the debates that are going on in DC right now --

MS. FORD: Yes, sir.

COMMISSIONER WRIGHT: -- on RPSs and the effort -- the focus on the South by those people who want to push the national portfolio, is the biomass, saying that we can reach it by using biomass. And they talk about switch grass and sustainable forest, or stuff like that. You mention again we're limited in what we can do, and as I understand it usually if a person -- if a company is going to build a plant for using wood waste or something like that, is it a 50-mile radius from where they like to pull their stuff? Is that correct?

1 **MS. FORD:** I think it depends on the resource.
2 For some, it would need to be closer than others,
3 but that is an estimate that I've heard, that you
4 do want to -- within 50 miles, I have heard that
5 number, yes, sir.

6 **COMMISSIONER WRIGHT:** And do you have any idea
7 on the limits, again? You know, you say we're
8 limited.

9 **MS. FORD:** Right.

10 **COMMISSIONER WRIGHT:** Do you have any idea --
11 when you say that, you know, if we're questioned,
12 how do we answer what question? They say, "What do
13 you mean limited, and how long?"

14 **MS. FORD:** The great thing with wood is you do
15 have some fast-growing trees that, if you devoted
16 just to that, you would continually have that
17 resource available.

18 **COMMISSIONER WRIGHT:** Like loblolly pines?

19 **MS. FORD:** Yes, sir, and you'd have that
20 resource available. Our limitation is how much
21 land do we have for this.

22 **COMMISSIONER WRIGHT:** Right.

23 **MS. FORD:** It's similar to the ethanol debate,
24 do we take all the corn that we have in the country
25 and use it for gasoline? So, and ultimately we

1 don't even have the land to convert everything to
2 gasoline, but it would be the same situation.

3 **COMMISSIONER WRIGHT:** That's where I was
4 going.

5 **MS. FORD:** Yes, sir.

6 **COMMISSIONER WRIGHT:** What are we going to do,
7 just not allow anybody to build anything anymore?

8 **MS. FORD:** Exactly, and so it's a -- you have
9 to come up with that balance of --

10 **COMMISSIONER WRIGHT:** Right.

11 **MS. FORD:** -- what resources do we want to
12 take from, say, manufacturing -- you know, that
13 industry -- and put it into our electric generation
14 mix?

15 **COMMISSIONER WRIGHT:** Thank you.

16 **MS. FORD:** Absolutely.

17 **COMMISSIONER MITCHELL:** I have a question.

18 **MS. FORD:** Yes, sir.

19 **COMMISSIONER MITCHELL:** I assume, as you talk
20 about -- I remember a year or two ago when we had a
21 debate about using corn for ethanol.

22 **MS. FORD:** Yes, sir.

23 **COMMISSIONER MITCHELL:** And you're considering
24 doing that and the economic status like it is in
25 the United States, just like you've mentioned, you

1 start taking wood for these products, what's that
2 going to do to the price of the houses and -- as
3 corn did for the price of feed for poultry and --

4 **MS. FORD:** Absolutely.

5 **COMMISSIONER MITCHELL:** -- for the food in the
6 store? I guess what my question is, when you're
7 considering these sources, sometimes would it be
8 pertinent to conduct studies to see how it's going
9 to affect other parts of the economy? Because that
10 was the first question that arose with corn awhile
11 back; now, people are seeing that. They're coming
12 back and saying, well, it's driven the price up,
13 but when you say use these sources, it's apparent
14 to me that you need a study to see how it's going
15 to affect the other parts of the economy, and that
16 should be a part of it, when you say, "Well, we
17 want to use this and this for renewable."

18 **MS. FORD:** Absolutely. That is one of the
19 biggest debates is, like you said, with using corn
20 for gasoline, you had a trickle-down effect where
21 the cost of us just buying corn to eat went up, the
22 cost for feed, so, you know, farmers were seeing
23 that in their pocketbooks because the cost did go
24 up. I believe you would see the same type of thing
25 as -- if you're taking from one resource --

1 **COMMISSIONER MITCHELL:** Particularly wood
2 products. I mean, you're talking about wood
3 products. I mean, what's that going to do to the
4 price of lumber to build houses, to -- it just
5 would be a cost-effective study to spread that
6 around, should be included in any kind of
7 recommendation. I'm not sure it always has been,
8 though, has it?

9 **MS. FORD:** You're right. There are a lot of
10 different studies out there, and some take it into
11 consideration, some do not. I agree -- if you're
12 taking an undevoted resource -- you know, something
13 that normally would go into the trash -- obviously
14 I don't think you would see that trickle-down
15 effect, but if you're taking half the lumber in the
16 State and devoting it to another option, then I
17 think you would see that, and that is something
18 that should be studied and considered.

19 **COMMISSIONER MITCHELL:** Thank you.

20 **MS. FORD:** Absolutely. Thank you.

21 **VICE CHAIRMAN HOWARD:** I have a question for
22 you.

23 **MS. FORD:** Yes, sir.

24 **VICE CHAIRMAN HOWARD:** We discussed landfill
25 and we said, you know, it's limited.

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MS. FORD: Yes, sir.

VICE CHAIRMAN HOWARD: We discussed the solar panels and silicon; that's limited. Wood, as Commissioner Mitchell pointed out and I believe you pointed out, that's limited. Why are these, you know, sort of the darlings of renewable portfolios, whereas stuff like nuclear energy is not considered, and how can these be termed renewable when the supply is exhaustible, I guess, is what I want to say?

MS. FORD: Yes sir, that's a very good question. You know, when looking at a renewable portfolio standard, one size does not fit all. And that's one thing that we've been trying to advocate, because what's available in the Midwest is not necessarily available in the Southeast, or what's available in New England is not available in California. So a one-size-fits-all approach we don't feel is appropriate. And you're right, South Carolina and the Southeast in general have a lot more stumbling blocks than other parts of the country.

Also, in renewable portfolio standards, a lot that are being proposed, they do not include existing hydro, and as you mentioned nuclear is not

1 included. You know, we feel that when you're
2 looking at -- if our ultimate goal is to reduce
3 greenhouse gases, reduce our carbon footprint, try
4 to prevent global warming, we believe that those
5 should be included. Nuclear should be included,
6 existing hydro -- because ultimately it's
7 greenhouse-gas-free -- and biomass. Obviously we
8 don't have an endless supply, but biomass as well.
9 And also there should be consideration for what are
10 called forest sinks, that forests naturally absorb
11 CO₂. Obviously, South Carolina is a very green
12 State, and we feel you should get credit for that
13 as well, because we're absorbing CO₂ more so than
14 say Arizona, because we have more forestry.

15 So, truly, a one-size-fits-all I don't believe
16 is an appropriate approach, because there are so
17 many variances in the United States in what's
18 available that it seems that it would be unfair to
19 certain parts of the country to say you have to do
20 X, Y, and Z. That's why we believe a non-one-size-
21 fits-all is a better approach.

22 **VICE CHAIRMAN HOWARD:** Well, going to another
23 question, I can understand us not having a limited
24 problem of poultry litter and swine waste. As long
25 as we have Clemson, that'll always be there.

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COMMISSIONER WRIGHT: Now, now, now.

COMMISSIONER MITCHELL: We need fertilizer,
too.

[Laughter]

VICE CHAIRMAN HOWARD: I knew that. But we're
talking about wood and wood waste.

MS. FORD: Yes, sir.

VICE CHAIRMAN HOWARD: Apparently, according
to your statement, it does produce some carbon.
Since carbon is really a no-no in the electrical
industry now, what percentage of -- what, I guess,
less percentage of carbon in coal would be used,
produced with wood sources?

MS. FORD: You mean if you were doing co-
firing?

VICE CHAIRMAN HOWARD: Well, it would still
produce carbon, I guess, would it not, in
emissions? So what percentage, what less
percentage of carbon emissions would be generated
by using wood than would be used by coal?

MS. FORD: Typically in the industry it's
considered carbon-neutral, because it did absorb
carbon while it was growing, that although you're
producing carbon while it's burning, it's kind of
an even mix. So according to industry, I guess

1 specialists in the industry, they consider it
2 carbon-neutral, so they do not feel that -- in the
3 big picture, it does not emit carbon on the wood
4 side.

5 **VICE CHAIRMAN HOWARD:** Thank you.

6 **MS. FORD:** You're welcome. Yes, sir.

7 **COMMISSIONER WHITFIELD:** Thank you for coming
8 today, Ms. Ford, and bringing us this update. I
9 have a question from earlier, and I do have a
10 comment back to what Commissioner Mitchell said
11 about the wood, about having a study to study
12 biomass a little further, and I'm aware of a
13 biomass plan, I think, just below the Atlanta area
14 in central Georgia there. But back to what he
15 said, when you're looking at the brush and the bark
16 and all that from a logging operation, that's
17 great, but when you get into taking new forest and
18 growing it specifically for that, you get back into
19 the ethanol type situation, and I do think that we
20 need to study both of those implications from
21 utilizing both type products, the waste and also
22 the new trees. And if you go -- if you look back
23 recently, as Commissioner Wright testified before a
24 U.S. Senate panel, I noticed in that testimony up
25 there, he had a guy from the Forest Landowners

1 Association, but I didn't see anybody there from
2 the Southeastern Lumber Manufacturers Association,
3 paper manufacturers, International Paper,
4 Weyerhaeuser, that type, so I don't think that the
5 manufacturers are really on-board as strongly
6 pushing for that just yet, so I do agree with
7 Commissioner Mitchell, we need to study that and
8 study that a lot harder.

9 My question for you, if you don't mind backing
10 up to the landfill gas situation -- could you get
11 back to that slide and maybe show me which ones are
12 existing -- I think you've got green dots here --
13 and which ones are potential?

14 **MS. FORD:** Yes, sir.

15 **COMMISSIONER WHITFIELD:** Maybe expand on that
16 a little more?

17 **MS. FORD:** Absolutely. The green dots
18 correspond with the name, so those are existing
19 landfill gas sites that are currently online. The
20 only exception to that is Greenwood, but that one
21 will be coming online the beginning of April, so I
22 went ahead and included it, because we're almost
23 there. So for example, Palmetto, that's the one
24 that BMW is utilizing for their paint shop. So
25 these are the ones that are existing. If you look

1 at the numbers -- and where it kind of gets
2 confusing is in the upstate, because there's a
3 number one -- let me get my handy-dandy pointer.
4 There's a number one right there next to Palmetto.
5 Those are actually two different sites. As you can
6 see on the left-hand side, Wellford? So these ones
7 that are in purple and the numbers, those are
8 potential sites, and there are actually a lot more,
9 but these are the ones in the short term that have
10 the greatest potential for becoming sites.

11 **COMMISSIONER WHITFIELD:** So most of the
12 proposed ones are the ones we're seeing there in
13 the lowcountry?

14 **MS. FORD:** Yes sir.

15 **COMMISSIONER WHITFIELD:** Okay.

16 **COMMISSIONER MITCHELL:** Well, one quick
17 question. Is there going to be stimulus money
18 available to develop these sites? Is that in the
19 new program, or are you aware of that?

20 **MS. FORD:** I am -- I'm not aware. I know
21 there is a good portion of the stimulus money
22 devoted to energy and clean energy.

23 **COMMISSIONER MITCHELL:** But I'm saying
24 specifically for --

25 **MS. FORD:** Specifically to landfill gas,

1 honestly I do not know. I can find that out for
2 you.

3 **COMMISSIONER MITCHELL:** It would be very
4 interesting, since we're discussing the stimulus
5 package, and it'd be interesting to know.

6 **MS. FORD:** Yes, sir, I can do that for you.

7 **COMMISSIONER HAMILTON:** If I can make one
8 comment --

9 **MS. FORD:** Yes, sir.

10 **COMMISSIONER HAMILTON:** -- and we've discussed
11 the wood use, and some study is -- has been done by
12 individual industries as they decide what to do
13 with that. I know I was part of a team that
14 recruited a paper mill, and they looked at
15 generating their electricity, or purchasing it. If
16 they kept their waste, they made fiberboard out of
17 it for construction. And their -- when they made
18 up their mind which way to go, the profit for the
19 corporation was greater for making the fiberboard
20 than it was to purchase the electricity at the
21 price they were able to receive it at that time.
22 So I think the waste is not being just left, if
23 it's usable, to rot in the field. Now, if you're
24 going to go out after a field that has been clear-
25 cut and pay to get that wood up and what you'd have

1 to do to use it, I don't think it would be as
2 practical as your slide.

3 **MS. FORD:** Right. And you're right. Each
4 situation would be different, depending on where
5 you're getting the waste from, what it would have
6 been used for in the past. And you're right, so
7 the economics would vary with each situation.
8 Absolutely.

9 **COMMISSIONER HAMILTON:** Okay. Thank you

10 **MS. FORD:** Thank you. Moving on to another
11 type of biomass, we have poultry litter and swine
12 waste. It's the dirty side of electricity, if you
13 will. Basically, with poultry litter and swine
14 waste, historically this has been used as
15 fertilizer, as Commissioner Mitchell said. There
16 have been some concerns about groundwater
17 contamination, so this could be a potential
18 alternative to that.

19 With poultry litter and swine waste, there are
20 no new carbon emissions, and the reliability is
21 much greater. You're looking at 70 to 85 percent
22 capacity factor, and this also is dispatchable, so
23 you could use this to help shave your peak. It's
24 available when you would need it. It assists
25 farmers in eliminating waste. I know especially

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with swine, this is a big concern because there's so much waste. This would help eliminate that waste. And then when you finish, once you utilize this for electricity, that ash can then be used as a fertilizer. So to a certain extent, you get a double whammy out of it. You can use it for electricity and then also use it as a fertilizer.

The Btu content is much higher. It's 12-14,000 Btu. So in some situations this is even higher than the coal that we currently use in this State.

There are considerations -- again, we're going back to we are limited. South Carolina is not as prevalent in the swine industry as, say, North Carolina. They have a lot more swine farms than we have. Poultry litter is a lot more prevalent in South Carolina. Poultry litter, on the flipside, you need a lot more of it because chickens are smaller than pigs, so you're going to get less waste from chickens than you do from pigs. On the flipside, swine waste is actually a moister waste, so it takes more to use for electricity than poultry litter would. Swine waste, because we do not have as many herds in this State, we are more limited than, say, North Carolina would be. You

1 would need more transportation if, say, you were to
2 bring it from another state. If you're looking to
3 take advantage of all the swine farms in North
4 Carolina, your transportation costs and your
5 emissions would need to be considered.

6 Because we're limited in our resource, most
7 likely this would be used as co-fired, so it would
8 be taking the poultry litter and co-firing it, say,
9 with coal, so how you would do with wood waste,
10 because we do have smaller amounts than other
11 states.

12 These costs again are much more comparable.
13 We're looking at biomass around the same area of 9
14 to 13-1/2 cents per kWh, keeping in line with about
15 where we are right now.

16 Any questions on poultry litter and swine
17 waste?

18 **COMMISSIONER WRIGHT:** One general question --

19 **MS. FORD:** Yes, sir.

20 **COMMISSIONER WRIGHT:** -- about all the
21 different things that you talked about, outside of
22 -- well, outside of solar and wind.

23 **MS. FORD:** Yes, sir.

24 **COMMISSIONER WRIGHT:** What is South Carolina's
25 potential, when you add it all up, for what you

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talked about here?

MS. FORD: Yes, sir. There is a study that we actually reference quite a few times. It was a study that was released the end of 2007 specific to South Carolina and looking at our biomass potential.

COMMISSIONER WRIGHT: The LaCapra study?

MS. FORD: Yes, sir, the LaCapra study. And they break it down into two types of potential, technical and practical. Technical is kind of best-case scenario, if everything went perfectly what we could have. Practical is realistically where we are the next ten years, what could we have. Their practical potential -- and this is in megawatts -- for wood biomass is 423 megawatts; for agricultural byproducts, which would be like your switch grass that you referenced, 68 megawatts; landfill gas to energy is 70 megawatts; and then they also include hydroelectric, which I'll get into for small hydro, and that's 105 megawatts. So looking at all those, you're looking at a total of 665 megawatts, and actually the LaCapra study stated that due to cost limitations, offshore and onshore wind, as well as solar, were not options for the State within the next ten years.

1 **COMMISSIONER WRIGHT:** What about swine and
2 poultry --

3 **MS. FORD:** And that would be -- that's
4 considered an agricultural byproduct, as well.

5 **COMMISSIONER WRIGHT:** Oh, okay. All right.

6 **MS. FORD:** I didn't include that, but, yes,
7 sir, that's included there.

8 **COMMISSIONER WRIGHT:** Okay.

9 **MS. FORD:** So our biggest amount is obviously
10 from wood and wood waste; agricultural byproducts
11 is a much smaller number.

12 **COMMISSIONER WRIGHT:** Okay.

13 **COMMISSIONER HAMILTON:** One -- the poultry
14 litter and swine waste, use of the swine waste, has
15 that been perfected to any extent? To my
16 knowledge, our fellow commissioners in North
17 Carolina think that's still a -- I know they'd like
18 to get rid of it, but I don't think they've reached
19 a point where that's possible, have they?

20 **MS. FORD:** It is more difficult than the
21 poultry litter, just because predominantly the
22 moisture content is higher, so it takes longer to
23 be able to utilize the resource. I hear a lot more
24 about poultry litter than swine waste.

25 **COMMISSIONER HAMILTON:** The poultry litter

1 doesn't wind up in the landfill, it winds up as
2 fertilizer on the fields --

3 **MS. FORD:** Absolutely.

4 **COMMISSIONER HAMILTON:** -- and it's not a loss
5 in --

6 **MS. FORD:** Right.

7 **COMMISSIONER HAMILTON:** -- South Carolina.
8 It's a valuable --

9 **MS. FORD:** Absolutely.

10 **COMMISSIONER HAMILTON:** -- byproduct.

11 **MS. FORD:** And ultimately, you could still use
12 the ash, once you utilize this. You could use that
13 as a fertilizer. You are going to take some of the
14 benefits of it out, but you can utilize that. And
15 you're right; swine waste tends to be a bigger
16 environmental concern than poultry litter.

17 **COMMISSIONER HAMILTON:** Well, if they figure
18 out how to get it done, that would be tremendous.

19 **MS. FORD:** It would be. It would be
20 wonderful. My brother and sister-in-law live in
21 Wilmington, and they would love if they could
22 figure out a way to take care of that. Absolutely.

23 We're going to move into geothermal energy.
24 And to be honest, I'm not going to spend a lot of
25 time on this. Geothermal energy, as I'm sure

1 you're aware if you've looked around, we don't have
2 hot springs, we don't have any geysers shooting up,
3 so not surprisingly, we do not have a great
4 resource when looking at geothermal potential.

5 With this map here, out in the West again,
6 amazing benefits that they can take from geothermal
7 potential. There are three types of geothermal
8 availability. The first is for electric. That's
9 that dark purple, and you can see out west a lot of
10 it. Basically, that's taking those hot springs
11 and, because it is such hot water, it already --
12 you can drive a steam turbine with it. Direct heat
13 is taking that warm water -- that warm water that's
14 naturally in the earth -- and using it for, say,
15 heating your pool, for water heating. There is a
16 small pocket here in the Savannah River Basin of
17 direct heat availability. We actually have some
18 water inspectors who have said that when you go
19 down in the wells, the water is warm. So we do
20 have that availability.

21 The rest of South Carolina and the rest of the
22 country have the ability of geothermal heat pumps,
23 and basically what that is doing is, once you go
24 below a certain level in the earth, the temperature
25 is constant. So in the winter, you can actually

1 take the heat from the earth to heat your home; in
2 the summer, you take the coolness from the earth to
3 cool your home. That is an option that is
4 available for the entire country, but really that's
5 on a residential side. For utility-scale electric
6 generation, we would not be able to utilize that.
7 But I've even seen in Lake City, for their Bean
8 Museum, they're looking to put in a geothermal heat
9 pump when they do the renovations on that.

10 So that's really our only option. I did want
11 to make you aware of it, because when looking at
12 proposed renewable portfolio standards, this is a
13 part of most of those.

14 And then also on hydroelectric. Again, I'm
15 not going to spend a lot of time on this, because
16 with hydroelectric -- specifically, when you're
17 looking at a renewable portfolio standard, all the
18 ones I've seen proposed do not include existing
19 hydro. So what we currently have -- Lake Murray,
20 the dam there -- that would not qualify for a
21 renewable portfolio standard. That's not
22 necessarily what we believe is ideal, but it is
23 what's being put out there. There is some
24 possibility for small hydro, some very small -- a
25 lot of them are run-of-the-river, where you take

1 the natural current of the river and use it to turn
2 turbines, but for large-scale utility generation
3 we've kind of taken advantage of our resources, so
4 I did want to go ahead and mention it, but not
5 spend a lot of time on it.

6 So that concludes the portion about renewable
7 resources, so do we have any questions before I
8 move into clean energy?

9 [No response]

10 **MS. FORD:** Okay. Clean energy and renewables
11 can sometimes be one and the same; sometimes
12 they're not. We feel that this is important
13 because, as I mentioned before, we are looking to
14 reduce our carbon footprint and reduce our
15 greenhouse gases. We feel that you also need to
16 take into consideration not just renewables, but
17 clean energy. And clean energy is, for
18 electricity, when it is generated it does not
19 produce pollution. Obviously, our renewables fall
20 into that, and we also include nuclear in that.
21 When you're generating electricity through nuclear,
22 you do not have any air emissions, you do not have
23 greenhouse gases.

24 There are advantages as I mentioned before.
25 You do not have your air pollution. There are low

1 fuel and operating costs. Now, this is fuel and
2 operating; not talking about capital costs. The
3 cost for nuclear fuel, when you're looking on the
4 State, it's about 1/2 cent per kilowatt-hour,
5 average, for the State. Coal is about 2-1/2 to 3-
6 1/2 cents. So you can see it's a very, very low-
7 fuel-cost resource. And as I mentioned before, it
8 has a very high capacity factor: 92 percent.
9 Actually, in South Carolina, our average was about
10 93 percent, so we're a little bit better than the
11 United States with that.

12 On the flipside, there are disadvantages, like
13 anything else. You do need water. You have very
14 large cooling towers, you need bodies of water to
15 cool this resource. Also, you have concerns about
16 spent fuel. You have on-site storage and then
17 potentially offsite storage. And then you do have
18 your very high capital costs. So you have the high
19 capital costs, but conversely you have the low fuel
20 and operating costs with nuclear.

21 Currently in the United States there are 104
22 nuclear reactors that are online. South Carolina
23 is third in the country for nuclear industry. We
24 have seven reactors that are located in South
25 Carolina.

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There are two around the Rock Hill area. Oconee, there are three units there, and that's about 30 miles from Greenville. Robinson 2 is in the Florence area, and then we have VC Summer just about 30 miles down the road. So we do have quite a few reactors in our State, and because of that we are third in the country.

This is just to give you an idea of where these reactors are located, and it also tells you the years that they have been in commercial operation. In South Carolina, ours are anywhere between 20 to 39 years, which -- as you can see -- is pretty much the average for the United States. We are going through a nuclear renaissance now, so I think in ten years -- 10, 15 years -- this picture will be a little bit different, but as you can see, we, along with Illinois and Pennsylvania, are pretty high up there for nuclear energy. That's also one of the reasons that our cost for electricity is lower than the national average. I mentioned that we're at about 8 cents per kilowatt-hour; the national average is over 10 cents per kWh, so this is one of the reasons why.

And as I mentioned before, we feel that nuclear is appropriate in a part of a clean energy

1 portfolio, not necessarily renewable, because if we
2 are ultimately trying to cut down our greenhouse
3 gases, we feel that that is an appropriate part.

4 I mentioned with everything there's pros and
5 cons, so what does this mean? Renewables, yes,
6 they are part of the mix; they are not the
7 solution. Unfortunately, there is no silver
8 bullet. We are limited in South Carolina,
9 especially with solar and wind, where other parts
10 of the country are not. At this point, solar and
11 wind are not economically feasible.

12 Ultimately, any of this could be done. How
13 much can we pay for it? I mentioned before, you
14 know, we're at about 8 cents per kWh. Solar could
15 be an option at, say, 17 cents per kWh. But, in
16 this economic time, we have to consider what the
17 ratepayers -- not only the residential but also our
18 industries and our commercial ratepayers. So at
19 this time, solar and wind are not economically
20 feasible; however, I do see that changing as
21 technology develops and the costs do go down.

22 Biomass obviously is an option for our State,
23 and the best option that we have at this point.

24 Geothermal and new hydroelectric are not
25 available for utility-scale generation.

1 And nuclear, as I mentioned before, we feel is
2 an appropriate part of a greenhouse-gas-free or
3 -reduced society.

4 Do you have any questions for me?

5 **VICE CHAIRMAN HOWARD:** I do.

6 **MS. FORD:** Yes, sir.

7 **VICE CHAIRMAN HOWARD:** I think I know the
8 answer. You avoided -- you didn't discuss tidal
9 generation. There's been a lot of studies done on
10 the South Carolina coast for tidal generation.
11 Does that fall under the same category it's not
12 economically feasible because of offshore wind?

13 **MS. FORD:** Absolutely. The question about
14 tidal -- using the ocean's waves to generate
15 electricity, there is nothing that is -- from what
16 I've seen -- even within ten years of being online
17 and the technology being available. It's still a
18 very, very new technology, and you're absolutely
19 right; it is cost-prohibitive at this point, as
20 well as the technology is not readily available.
21 Yes, sir.

22 **VICE CHAIRMAN HOWARD:** I guess when I'm
23 looking at offshore wind, one of the factors, you
24 know, I know in the lowcountry and I guess Myrtle
25 Beach, is the cosmetic effect of wind turbines off

1 the coast. A lot of people are not going to go for
2 that, whereas tidal is basically hidden and you
3 wouldn't have that effect, so consequently you
4 might not have to go as far offshore to produce it.
5 And I thought there were some in the East River.
6 Isn't there some generation in New York, a tidal
7 experiment or something?

8 MS. FORD: There have been tests. Also in the
9 Gulf, there have been tests. At this point I think
10 the technology is so new, is why you're not seeing
11 it as part of -- it's actually included in
12 potential renewable portfolio standards. They do
13 include, for future, tidal projects. But at this
14 point I think because the technology is still being
15 developed, within the short term -- the next 10 to
16 15 years -- it is not considered an option.

17 But you're right, one of the big concerns --
18 and I did not mention this -- with wind, especially
19 offshore, is can you see it. And that's been one
20 of the big opponents of Cape Wind; you know, you're
21 in Cape Cod, you have multi-multi-million-dollar
22 homes, and it's the not-in-my-backyard mentality of
23 "I don't want to look out to the ocean and see big
24 turbines out there," and that is something again
25 looking at this balance, you know, the Myrtle Beach

1 area is one of our biggest tourism areas. Would
2 that affect tourism? And people are doing studies
3 that, you know, would it or would it not affect
4 tourism? So that's another consideration that
5 should be given for wind.

6 And you're absolutely right; if we could have
7 something under the water, to take advantage of
8 that, you always have tides. Take advantage of
9 that. For the short term, I don't see it being an
10 option just because the technology is still
11 underdeveloped.

12 **VICE CHAIRMAN HOWARD:** The other question I
13 had is yesterday several of us were on a conference
14 call, and one of the discussions were renewable
15 portfolio standards and how would we -- in our
16 situation in the Southeast, you know, as you
17 indicated it's a little different from the rest of
18 the nation. They were talking about a possibility
19 of a credit off of renewable portfolio standards,
20 given a credit for existing and new nuclear, and
21 existing and any new hydro that might come along.
22 What is your concept of that in ORS, do you think a
23 credit would be feasible or do you think it has a
24 chance of being passed?

25 **MS. FORD:** I have not seen anything with a

1 credit, but we strongly feel that we should be
2 given credit in one way, shape, or form for the
3 nuclear and hydro, because as I said before, we
4 ultimately are looking to reduce our greenhouse
5 gases. Those are both resources that do not emit
6 greenhouse gases.

7 The technicality behind it, would it be a
8 credit, would you actually -- you know, is it a
9 one-for-one, I don't know. I know some proposed
10 renewable portfolio standards that I've seen, that
11 seem to have a lot of momentum, have nothing about
12 nuclear or existing hydro; it's only new hydro.

13 **VICE CHAIRMAN HOWARD:** Well, my professor on
14 this subject was Commissioner Wright, and we
15 discussed it yesterday at length, so there could be
16 some room for error there.

17 [Laughter]

18 **MS. FORD:** I am not saying that. I didn't say
19 there was error.

20 **VICE CHAIRMAN HOWARD:** Thank you.

21 **COMMISSIONER HAMILTON:** One comment on the
22 matter that Commissioner Howard was discussing.
23 Commissioner Wright and myself both were privileged
24 to have a meeting with Secretary Chu, along with
25 some other people, and this question was asked.

1 And he said he felt like some credit should be
2 given to nuclear; however, he advised us that he
3 worked for someone else, and how they felt was
4 going to be the prevailing thought.

5 **MS. FORD:** And that is, from what we've seen
6 and what tends to be the most viable bills out
7 there, do not include nuclear and do not include
8 existing hydro. They do include new hydro, but as
9 I stated before we have very small amounts of that.
10 We've pretty much taken advantage of all the
11 conventional hydro that we have.

12 **COMMISSIONER HAMILTON:** And I think the
13 information you've provided us today has been
14 excellent, and I don't think any of us have seen
15 any surprises. But I think one song that I did
16 hear you sing, that one size doesn't fit all and
17 there are reasonable differences, is the point that
18 we need to continue to make to Congress, as our
19 opportunities are available. We appreciate that
20 being part of your presentation.

21 **MS. FORD:** Well, it's a great concern for us.
22 You know, a part of our mission is to look out for
23 the ratepayers. I mean, that is a part of it. And
24 when you're looking at, say, one of these proposed
25 RPSs, you're ultimately looking at a transfer of

1 wealth, because if we can't generate a certain
2 percentage of our electricity from renewables, you
3 have to pay. And you are paying other states that
4 have more resources than we do. And so ultimately,
5 a state -- South Carolina has 18 percent less
6 disposable income than the rest of the country;
7 we're number two in unemployment; and now we're
8 going to have to ship our money to another part of
9 the country just because, based on our geography,
10 we don't have the resources. That's why we feel
11 that credit should be given for nuclear and
12 existing hydro, because -- and it's not just South
13 Carolina. Honestly, it's the Southeast. And we
14 don't feel that a transfer of wealth is a way to
15 reduce greenhouse gases.

16 **COMMISSIONER HAMILTON:** Well, we're getting
17 ready to see a lot of it, if we aren't, I guess,
18 lucky. I don't know what else we're going to be.
19 I just returned from a conference that part of the
20 conversation was building transmission to move the
21 renewables, for us to be able to buy them to meet
22 our portfolios.

23 **MS. FORD:** And that is something that's being
24 discussed. One of the concerns with that is you
25 have transmission losses. So to get the

1 electricity generated from the Midwest, say, via
2 wind, to South Carolina, you're going to have such
3 substantial losses that, really, where's the
4 benefit? And then, of course, the cost. I stated
5 about a million dollars a mile for onshore
6 transmission lines. That's a substantial cost.

7 **COMMISSIONER HAMILTON:** Yeah, well, any of us
8 that have the opportunity need to talk about
9 reasonablism, and I think we need to talk about
10 being vertically integrated. And enjoyed it.
11 Thank you.

12 **MS. FORD:** Thank you.

13 **COMMISSIONER WRIGHT:** Maybe this is a caution.
14 Maybe I'm overly cautious on this, but the line
15 you've got in there that says biomass is an option
16 for South Carolina?

17 **MS. FORD:** Yes, sir?

18 **COMMISSIONER WRIGHT:** We have to be careful I
19 think how we use that or where we use that, because
20 in a national RPS debate, if you were to say
21 biomass is an option, they're going to take that as
22 biomass is an option to meet your 20 percent. And
23 I know just from what I've been able to research so
24 far, you can't do it with biomass.

25 **MS. FORD:** It's an option but not a solution.

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COMMISSIONER WRIGHT: It's available and can be used toward meeting an overall, but it can't meet the overall.

MS. FORD: You're right.

COMMISSIONER WRIGHT: So you're still going to be way short, and that point needs to be driven home to our congressional delegation that -- you know, I think. Because that's what -- that right there is exactly what they're saying nationally, is that we can meet it through biomass, even on the panel that I was at.

MS. FORD: Okay.

COMMISSIONER WRIGHT: So I think we've got to educate a little bit there.

MS. FORD: Absolutely.

COMMISSIONER WRIGHT: That's a concern I have. Just maybe an overly cautious --

MS. FORD: You're absolutely right. It is a limited option for our State.

COMMISSIONER WRIGHT: And two other points, that in how ORS and others who are here in this hearing can maybe help affect policy on a national scale, the people who were pushing a national RPS, they don't care about cap-and-trade. They don't care about reduction of greenhouse gas. They're

1 about promoting the renewable sector, period, and
2 the growth specifically of wind and solar. So
3 you've got to get past that objection -- and I'm
4 speaking of Senator Bingaman when I say that,
5 because that is his concern.

6 When you talk about cap-and-trade or any
7 reduction of greenhouse gases, we do have things in
8 common with West Virginia, Indiana, and Wyoming.
9 And so there are multi-region areas that we can
10 help affect policy with, too, in hopes that we push
11 a clean energy debate versus an RPS, you know.

12 **MS. FORD:** And that's our stance, as well.
13 Ultimately, we want to reduce greenhouse gases, and
14 what's the best means to do that.

15 **COMMISSIONER WRIGHT:** Yeah, so that's going to
16 be how we impact the federal policy, is pushing
17 that policy, I think. Thank you.

18 **MS. FORD:** Thank you.

19 **CHAIRMAN FLEMING:** Are there any more
20 questions?

21 [No response]

22 **CHAIRMAN FLEMING:** Well, I have a couple of --
23 I wanted to -- a couple of questions. One, the
24 silicon that's used in solar panels --

25 **MS. FORD:** Yes, ma'am.

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CHAIRMAN FLEMING: -- I know you say that there's no spent fuel or ash created, but are there any effects of the silicon production that give any byproducts that have to be dealt with?

MS. FORD: When you produce solar panels, there are greenhouse gas concerns. Yes, ma'am, there are. Specifically a byproduct? I don't know specifically of those, but I do know that that has been a debate of -- you're generating so much greenhouse gas to create the solar panels, how much are you really offsetting. So I know there has been debate about that. I'm not sure if that's addressing exactly what you're speaking to.

CHAIRMAN FLEMING: Right. So there are issues with that, too.

MS. FORD: Absolutely, yes, ma'am.

CHAIRMAN FLEMING: Okay. I did go to a solar summit in Oak Ridge, Tennessee, and I know that our range is not ideal, but what they were seeing there is that we are better, though, than Germany or the State of Washington. So, I mean, their point is that it can be viable; it's the economics of it that --

MS. FORD: Absolutely.

CHAIRMAN FLEMING: -- that has to really be

1 dealt with.

2 **MS. FORD:** Absolutely. We can utilize solar
3 -- not to interrupt you. We can. It is going to
4 be less than in other parts of the country, and as
5 you said, exactly, it's the economics at this
6 point.

7 **CHAIRMAN FLEMING:** Right.

8 **MS. FORD:** Yes, ma'am.

9 **CHAIRMAN FLEMING:** Right. But I guess there's
10 a lot of research, though, going on at our major
11 institutions in the State, and can you tell me a
12 little bit about what they're doing and where
13 they're at in the scheme of things with renewables,
14 as it affects the State of South Carolina?

15 **MS. FORD:** I don't know specifics of where
16 they are at this point. I do know exactly what you
17 said, they are doing a lot of research on it. And
18 not just for solar. Biomass, fuel cells -- there's
19 a lot of research being done in this State. As to
20 specifics, where they are and what they've come up
21 with, I can't speak to that, unfortunately.

22 **CHAIRMAN FLEMING:** Are you all in
23 communication with them? Is there any dialogue
24 going on there --

25 **MS. FORD:** Yes, ma'am. Actually --

1 **CHAIRMAN FLEMING:** -- to coordinate --

2 **MS. FORD:** -- ORS, uh-huh, we're on several
3 councils, one specifically being the biomass
4 council, and that is a collaboration of biomass
5 producers, you know, interested citizens, the
6 universities, ORS. So we are a part of
7 organizations like that. And so we do stay abreast
8 of all of it, but specifically with universities
9 and where they are, like I said, unfortunately I
10 can't speak to that.

11 **CHAIRMAN FLEMING:** Okay. Well, it was an
12 excellent presentation.

13 **MS. FORD:** Well, I do appreciate --

14 **CHAIRMAN FLEMING:** Thank you

15 **MS. FORD:** -- your time. Thank you very much,
16 on a Friday morning, for taking your time for us.
17 We do appreciate it.

18 **CHAIRMAN FLEMING:** Very informative.

19 **MS. FORD:** Thank you.

20 **CHAIRMAN FLEMING:** Thank you.

21 **VICE CHAIRMAN HOWARD:** Thank you.

22 **COMMISSIONER WRIGHT:** Thank you.

23 **CHAIRMAN FLEMING:** Ms. Hudson?

24 **MS. HUDSON:** I want to reiterate our
25 appreciation. Thank you.

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CHAIRMAN FLEMING: Okay. I didn't know whether there would be another presentation.

MS. HUDSON: No, ma'am, this concludes the presentation -- concludes the allowable ex parte presentation by ORS. Thank you. And enjoy the first wonderful day of spring.

CHAIRMAN FLEMING: Well, and once again I just want to reiterate how much we appreciate your coming to us with this information, and hope that there will be many more of these in the future as we work on these issues.

MS. HUDSON: Thank you

CHAIRMAN FLEMING: Thank you, very much. At this time, the briefing is adjourned.

[WHEREUPON, at 11:45 a.m., the proceedings in the above-entitled matter were adjourned.]
