

In The Matter Of:
*NEW JERSEY OFFSHORE WIND TRANSMISSION
STAKEHOLDER MEETING*

*(MORNING SESSION)
November 12, 2019*

*J.H. Buehrer & Associates
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Toms River, NJ 08732
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STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES
TUESDAY, NOVEMBER 12, 2019

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NEW JERSEY OFFSHORE WIND
TRANSMISSION
STAKEHOLDER MEETING
(MORNING SESSION)

BPU DOCKET #Q019010068
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HELD AT:
TRENTON WAR MEMORIAL
ONE MEMORIAL DRIVE
TRENTON, NEW JERSEY
10:00 A.M.

BEFORE: SUZANNE PATNAUDE
SENIOR COUNSEL, BPU

BPU STAFF: CYNTHIA HOLLAND
JIM FERRIS
ABE SILVERMAN

PANEL 1 MEMBERS:

JANICE FULLER - ANBARIC
FRANCIS CHARTRAND - ATLANTIC SHORES
DAVID WALLACE - DAVID WALLACE & ASSOC.
MIKE TABRIZI - DNV-GL
ULRIK STRIDBAEK - ORSTED

PANEL 2 MEMBERS:

DOUG COPELAND - ATLANTIC SHORES
JOSH GANGE - BOEM
KIRSTY TOWNSEND - ORSTED
SUE GLATZ - PJM
JOHN DEMPSEY - PSE&G

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1 MS. PATNAUDE: Good morning. Pursuant
2 to the Open Public Meetings Act, N.J.S.A. 10:4-6
3 et. seq., this stakeholder meeting was properly
4 noticed by the New Jersey Board of Public
5 Utilities' secretary Aida Comacho-Welch.

6 My name is Suzanne Patnaude, I am
7 Senior Counsel at the New Jersey Board of Public
8 Utilities, and I have been duly designated by the
9 Board to serve as the presiding officer at this
10 stakeholder meeting.

11 The purpose of this meeting is to
12 discuss how New Jersey should plan its
13 transmission system to accommodate the major role
14 off-shore wind plays and will play in New Jersey's
15 energy future. We appreciate your attendance at
16 this meeting, especially given the weather.

17 The Clean Energy Act of 2018 L.
18 2018(c)17 Off-Shore Wind Economic Development Act,
19 OWEDA, N.J.S.A 48:3-87(d)4 and N.J.S.A 48:3-87.1 to
20 87.2, and Executive Orders 8 and 26, require the
21 BPU to implement certain green energy initiatives to
22 achieve 100 percent clean energy by 2050. To
23 achieve these goals, the BPU has established an
24 off-shore wind renewable energy certificate, or
25 OREC, to incent the creation of new off-shore wind

1 facilities.

2 In June of 2019, the Board approved an
3 1100 megawatt, mw, off-shore wind generation
4 project. The first of several expected qualifying
5 off-shore wind projects eligible to receive ORECs.
6 In preparation for future solicitations, the BPU
7 staff is establishing the first of possibly a
8 series of technical conference format meetings
9 where interested stakeholders can provide comments
10 on one or more off-shore wind transmission
11 solutions that further state's off-shore wind
12 ambitions in a cost-effective manner for New Jersey
13 ratepayers. We asked interested individuals to
14 self-nominate serve-on panels to discuss how to
15 best meet the state's objectives.

16 As you can see, we have a court
17 reporter. She's here to transcribe the panel and
18 stakeholders' comments. In order to provide
19 clarity and be courteous to the court reporter, I
20 will insist that people not interrupt or speak over
21 one another, identify themselves by name and
22 organization for the record, and speak slowly,
23 clearly, and loudly enough to be heard. There's
24 actually a microphone right there in the front for
25 people when they will be asking questions.

1 There may be additional technical
2 conferences to further explore options, and written
3 comments may be filed by -- oh, that date is wrong.
4 We'll get back to you when you have to file the
5 written comments. Stakeholders should be aware
6 that for the purposes of the Open Public Records
7 Act, these comments may be considered public
8 documents. Stakeholders may identify information
9 that they wish to keep confidential by submitting
10 them in accordance with the confidentiality
11 procedures set forth in N.J.A.C. 14:1-12.3. The
12 BPU thanks all stakeholders that have already taken
13 part in this process for the participation and
14 comments.

15 The information and views presented by
16 staff today do not necessarily represent the views
17 of the New Jersey Board of Public Utilities, its
18 commissioners, its staff, or the State of New
19 Jersey. Staff comments do not provide a legal
20 interpretation of any of New Jersey statutes,
21 regulations, or policies. Nor, should they be
22 taken as an indication or direction of any future
23 decisions by the Board of Public Utilities.

24 The agenda for today will include a
25 fifteen or twenty-minute break between the morning

1 session and the afternoon for restroom breaks, and
2 there will be half an hour for lunch. I believe
3 we're breaking at -- the bathroom break will be at
4 11:15 to 11:30, and the lunch break will be from
5 12:40 to 1:10. November 18th for the comments,
6 the written comments.

7 Written comments are also encouraged
8 and should address the questions posed by staff,
9 and reference the associated question by number.
10 Written comments must be submitted to Aida
11 Comacho-Welch, Secretary, New Jersey Board of
12 Public Utilities, 44 South Clinton Avenue, 9th
13 Floor, Post Office Box 350, Trenton, New Jersey,
14 08625. Written comments may also be submitted
15 electronically to OSW.stakeholder@bpu.nj.gov in PDF
16 or Microsoft Word format. Written comments should
17 be submitted by November 28th, 2019. Please note
18 that these comments may be considered public
19 documents for the purposes of the Open Public
20 Records Act, N.J.S.A. 47:1(a)1, 2, 13.
21 Stakeholders may identify they wish to keep
22 confidential by submitting them in accordance with
23 the confidentiality procedure set forth in N.J.A.C.
24 14:1-12.3.

25 As previously mentioned, the

1 transcript that will be produced from the
2 stakeholder meeting shall be made part of the
3 record in this matter, and shall be reviewed by all
4 members of the Board. We believe we will have
5 commissioners in attendance this morning. In fact,
6 Commissioner Holden is already here. And, I
7 apologize, I can either wear my glasses and see
8 who's in the audience or I can read close up.
9 Commissioner Solomon has also joined us. Okay.

10 With that we are going to start with
11 our first panel. And, our first panel consists of
12 -- getting the most up-to-date copy here -- we have
13 Janice Fuller from Anbaric. Francis Chartrand
14 from Atlantic Shores. David Wallace from David
15 Wallace and Associates. Mike Tabrizi from DNV-GL.
16 And, Ulrik Stridbaek from Orsted.

17 So, with that, why don't we start on
18 the far end with Mr. Wallace.

19 MR. WALLACE: Good morning, ladies and
20 gentlemen. And, thank you for having this
21 conference and allowing the stakeholders to have
22 some comments that, hopefully, will be pertinent to
23 the installation and development of the off-shore
24 wind energy, which is going to be a major process
25 in the Atlantic Ocean off of New York/New Jersey.

1 My name is David Wallace. I represent
2 the surf plan -- (Indiscernible) -- fisheries
3 management plan, and the members of the industry
4 who participate in that. The plan is based on one
5 of the largest fisheries in the State of New
6 Jersey, and it ranges from Virginia to the Canadian
7 border. But, I also will speak on behalf of the
8 bottom tending mobile gear fisheries, such as the
9 troll fishery and what have you, who have their
10 either dredges or scallop dredges or clam dredges
11 or outer trolls on the bottom. The cables are
12 going to be a very, very major problem for
13 everyone. I have a lot of experience with
14 telecommunications cables, Transatlantic, and then
15 actually cables that run from the United States to
16 the other states which also has caused us great
17 grief in the past.

18 Most of the vessels that I am talking
19 about are very large, as far as fishing vessels are
20 concerned. They have about a 120 to 160 feet.
21 They have a thousand or 2000 horsepower. They tow
22 very large, heavy gear. And, in particular, the
23 clam industry, clam dredges, cut into the bottom to
24 wash out the clams. And, if there's anything in
25 the way below the surface, the vessel either scoops

1 them up or it ends up being entangled in the gear.
2 And, that's the reason that we are concerned about
3 these power cables.

4 Unlike telecommunications cables,
5 which start in New Jersey -- or end in New Jersey
6 depending on which way you want to look at it --
7 they run in a relatively straight line off the
8 continental shelf and go to Europe, or wherever
9 they go. And, so, they're pretty easy to manage
10 from the point of view that there's only -- they
11 only install one at a time, and we are pretty sure
12 we know where they are. And, we're made sure that
13 the telecommunications folks bury them deep enough,
14 monitor them on a continuous basis, under a law
15 passed by the legislature of the State of New
16 Jersey about twenty years ago, which I was a part
17 of. And, we need to make sure that when these
18 large cables are installed to connect the turbines
19 and then to deliver the power to the shore, that
20 they are not going to be a problem for the fishing
21 industry. We do not want to be a problem for the
22 power industry. So, we feel that there needs to
23 be a great deal of consideration on how these
24 things are installed so as to not put the fishing
25 industry vessels at risk, or the cables themselves

1 at risk.

2 And, when we are willing to
3 participate, we have not had good experience with
4 the wind industry developing people. I've served
5 on a couple of panels for Orsted up in New England,
6 and we made a number of recommendations.
7 Unfortunately, they were not considered because
8 they cost money. And, we are just flabbergasted
9 that a billion dollar project worries about just
10 really minor things like burying the cables deep,
11 so that having them come and go into and come out
12 of the turbines as close as possible, and where
13 they're not exposed to the surface where they could
14 be easy to entangle our gear.

15 And, you know, we've been here for
16 hundreds of years, and this is a brand new
17 enterprise for the world and the United States.
18 And so, we want to make sure that we are protected.
19 When Governor Murphy took office and talked about
20 sustainable energy, one thing he did say was that
21 he was going to make sure that the fishing industry
22 and the power, wind turbine, ocean industry would
23 be able to co-exist. I was skeptical of that
24 because of their power. I hope that he's right.
25 But, we seem to always end up on the wrong side of

1 the long end of the stick.

2 So, thank you very much. And, happy
3 to answer any questions.

4 MS. PATNAUDE: We're taking all of the
5 questions after all of the panel have spoken.
6 Thank you, Mr. Wallace.

7 And, next we have Ulrik Stridbaek from
8 Orsted.

9 MR. STRIDBAEK: Thank you very much.
10 Thank you for organizing this conference and for
11 giving me and Orsted an opportunity to sit in this
12 panel.

13 I am Ulrik Stridbaek. I'm in charge
14 of the regulatory affairs in Orsted working out of
15 Copenhagen. So, why am I here? Well, the BPU has
16 asked for our experiences from Europe on the
17 transmission issue. I will try to share those.
18 But, also, by in this time and manner looking into
19 new transmission models for off-shore wind in the
20 future, I firmly believe that New Jersey is
21 actually breaking new ground in trying to tread the
22 path that is also being looked at in Europe. So, I
23 think the experience is going flow both ways over
24 the Atlantic in due course.

25 But, Orsted is the global leader in

1 developing off-shore wind. We cover Europe, and
2 more than a third of all these off-shore wind
3 farms outside of china. We pioneered the
4 industry, and have experiences across several
5 markets. And, when it comes to transmission, we
6 have largely experienced two basic approaches in
7 Europe. One, being where the developer is doing
8 the transmission connection. This is what happens
9 in the UK. And, one where the transmission is
10 being developed by the transmission system
11 operator, so the transmission company separately
12 from the off-shore wind farm.

13 And, we are extremely excited about
14 being here, having our off-shore wind project,
15 ocean wind, and working together with New Jersey.
16 I thought I would share some of the insights and
17 the learnings from those two approaches. Those
18 countries having been so kind to make the
19 experiment, to being the laboratory for different
20 approaches. For that, we actually asked scientists
21 at the University of Berlin to look into those
22 experiences, both from a qualitative and a
23 qualitative approach. And, it was quite clear
24 what they came to, and there are various public
25 report, and very happy to share that. It's a

1 independent research institute, but we funded the
2 project, I should say.

3 The quantitative analysis compared the
4 transmission costs in the UK and in Germany. So,
5 UK where the transmission was done by developers,
6 and in Germany where transmission was done by the
7 transmission system operator. And, generally they
8 base it -- a similar amount of projects have been
9 made, so there is a data foundation to make it
10 empirical research. And, Germany also poses a
11 very interesting example of having actually
12 developed the shared grids in clusters of off-shore
13 wind farms. So, having in the past a fairly
14 small -- one, two, 300 megawatt wind farms
15 clustered to better in terms of 900 megawatt.

16 And, the first comment to be made here
17 on those experiences is that an off-shore wind farm
18 today is at least 900 megawatts, fitting to the
19 equipment that you make transmission system with.
20 So, the reasoning for clustering, the reasoning for
21 sharing, is very, very different from when Germany
22 started this.

23 Secondly, they look into the costs
24 from selling off the transmission grids in the UK,
25 and public information about building the

1 transmission systems in Germany. And, the
2 conclusions and results are very, very clear. The
3 British transmission, off-shore transmission, on a
4 conservative way and a conservative assessment,
5 costs at least thirty percent less than in Germany.
6 That corresponds to ten, eleven dollars per
7 megawatt hour for the entire project. So, fifty
8 million US dollars for a good one gigawatt project
9 per year. And, the availability of the
10 transmission is higher in the UK. So, very, very
11 clear evidence.

12 Now we are seeing that Denmark is
13 changing over. They are letting the developer --
14 they are going to let the developer develop the
15 project, the transmission project, in their next
16 tender. So, there is a -- (Indiscernible) --
17 here, and we are confident that New Jersey will
18 look into and take those experiences away.
19 Especially the very high value and the synergies of
20 building, or at least allowing to build the
21 off-shore wind farm, the off-shore wind
22 transmission connection, together. Losing that
23 out, or hindering that, you risk losing very, very
24 significant synergies.

25 That said, looking forward -- I will

1 complete my statement -- looking forward, we also
2 do think, we do see with the discussions here in
3 the United States and in Europe, that there is a
4 need to rethink and have another look at the
5 transmission systems. There is a need to develop
6 the high-voltage DC equipment technology, and
7 integrate and link systems in a better way. And,
8 we firmly believe that this will happen in Europe,
9 as well. And, we look forward to continuing to
10 work together with New Jersey in sharing and
11 developing these models.

12 Thank you very much for the
13 opportunity.

14 MS. PATNAUDE: Thank you. We're going
15 to take Janice next, Janice Fuller from Anbaric,
16 because she volunteered her computer for everybody
17 else to use. So, her presentation is on here.
18 Jan, you want to come up?

19 MS. FULLER: Thanks, everyone. Thank
20 you everyone. Thank you to the Board of Public
21 Utilities, the commissioners, for having us today.

22 I think we all recognize as New Jersey
23 starts on this path towards an energy revolution,
24 the importance of really stopping and thinking of
25 transmission as what a critical component that this

1 is to ensuring that the state can successfully
2 reach the governor's clean energy goals, making
3 sure that we get this right from the beginning is
4 necessary, of course, for that.

5 I'm assuming you can see on the screen
6 the presentation? Thank you. So, what is planned
7 transmission? Obviously, there's a few different
8 ways to think about that. But, at its basic
9 component it is figuring out and discussing and
10 determining what transmission should look like in
11 concert with what your future energy needs are.
12 And there are discussions that can be had,
13 obviously, about who built that transmission. But,
14 also, what needs to come first is the conversation
15 about that that transmission should look like for
16 it to meet the energy needs that we have planned
17 for the short, near, and long term.

18 Well, a lot of what we've heard about
19 already, and I think we'll hear about as we go
20 forward, the purpose of this panel to talk about
21 how other jurisdictions have approached this. And,
22 I think a lot of what we'll hear about is what has
23 happened in Europe. But, I think we can also look
24 right hear in the United States of some examples of
25 transmission planning and successes and failures

1 that we've seen.

2 I'm sure most in this room are
3 familiar with the CREZ project in Texas. This is
4 probably one of the most successful examples of
5 planned transmission. Because of the approach that
6 was taken in Texas -- and, of course, this is
7 on-shore wind, but there are lessons that we can
8 learn from that. We have seen the highest amount
9 of installed wind capacity in the country. We're
10 approaching 25 gigawatts. That has led to 25,000
11 jobs, 46 billion in capital investment, and 307
12 million each year, each year, in land owner
13 payments and state and local taxes.

14 So, much of the conversation,
15 obviously, that is happening with off-shore wind
16 and this bridging industry is the economic
17 development that will come with it. And, how can
18 the states who are competing in the space maximize
19 the economic development that is centered in our
20 state, and make sure that those jobs are created
21 here and stay here. And, we can look at planned
22 transmission, a thoughtful process for planned
23 transmission, as a way to ensure that that happens
24 in a successful way. And CREZ, the Texas project,
25 clearly presents us with a tremendous opportunity

1 there.

2 We can contrast that with what
3 happened in Maine earlier in this decade. They
4 set a target of 28,000 megawatts. At this point
5 approximately now we're only at 46 percent of that
6 goal. 923 megawatts. Five major wind farms were
7 cancelled due to transmission constraints and
8 interconnection delays. And, there's a ten-year
9 delay on addressing the bottle neck. That is due
10 to the transmission infrastructure not being looked
11 at and planned, and those problems and questions
12 addressed and answered before they moved forward
13 with their process. So, you can juxtapose these
14 two projects right here in the state as we begin to
15 learn and design what will work for New Jersey.

16 And, here is just a chart that shows
17 the capacity today for what's going on in Texas.
18 In 2000 they were at 116 megawatts. And, they are
19 on track by 2020 to exceed 25,000 megawatts. I
20 think was also is to be learned from this in terms
21 of efficiency of energy delivery, they are down to
22 point five percent wind curtailment at this point
23 in that project. So, as we look not only towards
24 how to bring it to shore, but the most efficient
25 way to bring it to shore and connect to our grid,

1 again, we can look back at the examples in Texas.

2 We've heard some from Germany, we also
3 hear about the failure of Germany in terms of
4 transmission planning of the reason why we should
5 continue to proceed as we have been with
6 transmission and generation being bundled together.
7 And, while there are many options, there's models
8 that we can look at. And, I think the biggest
9 thing that we should learn is New Jersey should
10 look at all the successes and failures around the
11 state, around the country, and around the world and
12 take from that all of the successes that we can and
13 combine what will be best for New Jersey. As we
14 look at Germany, and moving forward from the early
15 part of the century as we approach this decade and
16 going forward, as they began to plan transmission
17 we see these projects coming in on time, under
18 budget, and moving forward to the point where we're
19 going to be approaching subsidy less transmission
20 projects and wind projects in Europe.

21 And, now, when you look to the New
22 Jersey, the concerns that we heard brought up by
23 the fishery community, the concerns that we're
24 going to hear from our friends from the
25 environmental community, we understand that while

1 we have a vast ocean off of our coast, there are
2 tremendous obstacles that we face in terms of
3 shipping, fishing, environmentally sensitive areas
4 previously a place where there could be used as --
5 (Indiscernible). And, we need to figure out a way
6 to bring all of this power to shore, but be
7 respectful of all those industries and all of those
8 concerns. And stopping now to have a conversation
9 like we're having today where we can bring all
10 those concerns to light, and come up with a plan
11 moving forward, will allow us to address all of
12 those constituency concerns before we proceed with
13 the plan, and give the state the most options that
14 they possibly have in terms of how they proceed
15 with procuring transmission and generation in the
16 future.

17 And, the side that you see here before
18 you is the shift of potential vision. One of many
19 that I'm sure you will see before you today, and
20 throughout this proces with other stakeholder
21 conversations. But, the governor has a goal 3,500
22 megawatts currently stated, with two more
23 procurements happening next year and in two years
24 following that. But, for those of us, I'm sure
25 everyone in this room who are on the call at the

1 Rocky Mountain Institute a few weeks ago, where
2 they talked about the integrated energy plan and
3 recommendations for how to achieve clean energy
4 goals for the future, they recommended that the
5 State of New Jersey look to something much more
6 aggressive, more in the neighborhood of 11,000
7 megawatts. So, putting us 2,000 over, even over
8 the very aggressive goal that's coming out from New
9 York right now. So, if we were to think that the
10 state is going to pursue something in the
11 neighborhood of 11,000, you look at the image that
12 you have on the right, and if we went with a
13 generator lead line model, we see all of those
14 cables that could potentially be coming from the
15 potential wind leased areas into the shore. And,
16 those of us who have studied the on-shore grid know
17 that there are not nearly that many points of
18 interconnection that are available to take this
19 amount of power from these wind farms.

20 So, then, you look at the image that
21 is on the left, and this is just one scenario that
22 could be put forth in terms of a planned
23 transmission that looks more like a grid. So, we
24 can maximize points of interconnection. Many of us
25 are studying some of them, have applications in,

1 are moving through that process. Right? So, you
2 look at the points of interconnection. Those that
3 can take the amount of power with the least amount
4 of upgrades, and recognizing that the more
5 expensive the upgrades the more expensive the cost
6 will be for the ratepayer in the long-term. And,
7 figure out a way that we can plan the transmission
8 so you can come up with a grid, bundle the lines
9 that are coming together, form a backbone grade or
10 some other structure so that you are minimizing the
11 disruption to the ocean floor, the disruption to
12 the shipping channels, the disruption to the
13 fishery community; but, you're also maximizing the
14 efficiency of how you bring that power to shore.

15 So, just looking at those images on
16 the right and the left, those are the kinds of
17 questions that we have before us as New Jersey
18 moves forward in this space. And, we, from
19 Anbaric, are jus proud to be part of this
20 conversation and discuss some of the ideas of how
21 New Jersey can approach bringing this power to
22 shore.

23 So, thank you all.

24 MS. PATNAUDE: Thank you, Janice. We
25 appreciate Janice's technical assistance with the

1 computer.

2 And, next we have Francis Chartrand,
3 and he is from Atlantic Shores. Thank you.

4 MR. CHARTRAND: Good morning,
5 everyone. My name is Francis Chartrand. I'm from
6 Atlantic Shore. Atlantic Shore is a partnership, a
7 joint venture between EDF Renewables and Shell.
8 I'm glad to be here this morning because
9 transmission is definitely a key to the success of
10 off-shore wind in New Jersey. So, that would be a
11 first reason. And, the second reason why I am
12 happy to be here is there is currently a snow
13 storm where I come from.

14 I'll briefly discuss the European
15 off-shore wind transmission at first. I'll
16 discuss, as well, one case of US involved success.
17 And, the third point I'll finish with will be the
18 New Jersey transmission situation and COP options.

19 So, first of all, and what we see and
20 what we have in Europe is 18 gigawatts so far of
21 involved and connected off-shore wind. That's a
22 good number. This is mainly in Denmark, Germany,
23 Europe, and United Kingdom. And, there's another
24 70 gigawatts estimated by 2028. So, these are
25 large numbers, and also tells that it can be done.

1 A TSO to ensure the on-shore and the off-shore grid
2 developments are coordinated. Maybe Ulrik could
3 give more feedback on that later on.

4 Each country has created its own
5 transmission strategy based on the factors and
6 choices. So, I think that's important. It's not a
7 one situation for everyone, so it's different,
8 different design and different ownership. And,
9 that comment comes from one of my colleague from
10 the UK, all European system implemented to date
11 have good and bad points. So, there's obviously
12 both. That everything involved rather than being
13 planned from experience, so nothing -- no --
14 (Indiscernible) -- planned so far.

15 Another speaker from the NYPA
16 off-shore wind report that was issued last August.
17 What I like about that figure is you get to see the
18 evolution of the different transmission efforts in
19 Europe. I'll focus mainly on the grid design and
20 the grid ownership. So, in terms of ownership you
21 can that Netherlands was initially on the developer
22 base, and they moved towards a TSO, transmission
23 asset ownership. UK was initially a deadlocker,
24 and they moved to separate entity, the off tow as
25 they call. So, this way they were able to develop

1 8 gigawatt so far. And, there's also, there's
2 Denmark that moved from developer at the beginning
3 when they were a smaller project close to shore,
4 and they are now moving toward a TSO.

5 In terms of network, so this would be the
6 HVDC solution for Germany. So, they are the only
7 one that came out with that design so far. One
8 explanation would be the grid bottle neck that they
9 had, and also the cable landing was quite
10 challenging, they had some environmental
11 constraints. So, HVDC was a good solution for
12 this. And, it's always a TSO that developed this.

13 This is the report I was mentioning
14 before. So, I took a look at it and got some
15 interesting points. Just wanted to share the main
16 takeaways from that study. So, the first one is
17 that the most effective path to low-cost grid
18 power is through a scale and healthy competition.
19 Second item, second takeaway, is model and views is
20 dependent on variety physical and non-physical
21 factors, including geography. Third one is
22 visible, so the long-term grid banning on-shore and
23 off-shore is important. It removes barriers to
24 entry, improve coordination, and lower the cost.
25 And, the last one, which might be a bit less

1 applicable here, but it's cross border for --
2 (Indiscernible) -- how countries leverage planned
3 transmission and cross structure -- (Indiscernible)
4 -- and gaining -- (Indiscernible) -- of scale.
5 However, you can see that as maybe a cross ISOs
6 that could be applicable.

7 As Janice was mentioning, we do have a
8 success story here in the U.S., so this is the
9 Texas CREZ. So, the energy was located western
10 part of Texas, while the load was on the east side.
11 So, there was definitely some constraint in terms
12 of transmission line to bring the energy to the
13 load. So, the Texas legislature in 2005 asked the
14 public utility commission of Texas and the ERCOT to
15 design the CREZ, so, the competitive renewable
16 energy zone. And, they loved the transmission
17 plan. The PUC identifies five CREZ in 2007, and
18 ERCOT again to develop a transmission atomization
19 study.

20 In terms of off-shore wind here or
21 power load we can do to that for the CREZ is we
22 have the bond, we have the lease. So, this job is
23 already done. So, what's missing is basically a
24 transmission plan. The PUC selected a scenario
25 that would come out at 18.5 gigawatt of wind at a

1 cost of 6.8 billion dollars, and consortium was
2 initiated in 2010 and completed in 2014. So, the
3 implementation of the CREZ helped overcoming
4 curtailment in transmission, as well. Which is
5 something we need to keep in mind, their system
6 upgrade -- (Indiscernible) -- but, eventually as
7 more and more wind come in, curtailment will become
8 an issue.

9 For the New Jersey transmission
10 situation, so we do have some on-shore coastal
11 grid. While the grid is not planned to receive the
12 new generation, so this is known fact, we would
13 require significant amount of upgrades to deliver
14 the energy from the on-shore grid towards the load,
15 which is more north. And, to safely do it. As I
16 mentioned before, the congestion and curtailment
17 should also be assessed. And, we need to include
18 other resources, so it's great off-shore wind but
19 there's also in the queue there is a lot of solar,
20 there's a lot of on-shore renewables, there's
21 storage, as well. So, that needs to be taken into
22 account.

23 So, as stated here, this situation is
24 similar to the CREZ, collective planning, a lot of
25 or very large amount of wind energy to be delivered

1 from -- (Indiscernible) -- generation through
2 shared facilities. State target is to have 3.5
3 gigawatt in service by 2030. So that's fast, so
4 time is the essence. We need to work with options
5 that are available now. So, if we want this to
6 happen, it's really important that this be
7 considered.

8 Coast lines and available point of
9 interconnection, POIs, are limited, and their
10 access are very challenging. So, lessons learned
11 from Europe could also be looked at, especially for
12 the next phase.

13 Last one, so, what the option for New
14 Jersey transmission. So, we have the
15 business-as-usual interconnection process for
16 radial line. So, that's going to come up with
17 reasonable upgrades for the first project, but they
18 will ramp up quickly as more and more projects in
19 the queue. There is I-risk on both the ratepayers
20 in terms of cost for system upgrades, but also on
21 the developers -- for timing, for example. It
22 doesn't provide a coordinate approach to integrate
23 other renewables energy. And, also on the good
24 side, however, it does provide more flexibility,
25 more control to the developer. Especially for the

1 first comers.

2 Thedic roam approach (Phonetic), so
3 this would allow and this does exist, it can be
4 used. It will offer a coordinated approach with
5 other state goals. So, that's quite important.
6 Transmission plan selected would optimize the
7 system upgrade and increase reliability and reduce
8 congestion and curtailment. Again, if you do that
9 on a case-by-case, you might see the overall
10 picture. But, if you do a coordinate approach, you
11 could include that in your evaluation.

12 Time line is unknown, so that might be
13 challenging. Time line to perform the study and
14 everything. However, study could piggyback on
15 other current queue position, planned upgrades, so
16 the current projects could move on, continue, and
17 the study could consider the upgrades that are
18 really planned or getting planned for the current
19 queue position.

20 So, based on European experience and
21 other projects U.S., such as the CREZ project in
22 Texas, the on-shore system required to connect the
23 off-shore wind, must be planned. So, this is our
24 position, this is our point of view. It must be
25 planned and coordinated through the state agreement

1 approach. This should be a first priority to
2 reduce the cost at the risks for the ratepayers and
3 the developers, and to optimize the transmission
4 asset. Thank you.

5 MS. PATNAUDE: Thank you. And, next
6 up we have Mike Tabrizi from DNV-GL.

7 MR. TABRIZI: Hello. My name is Mike
8 Tabrizi from DNV-GL. Just a quick introduction of
9 myself. I've been with DNV-GL about eleven years,
10 and I lead power system advisor practice within
11 North America.

12 There was a lot of discussion made,
13 which was great, and I wish we had more time to go
14 through all this details. Before going through
15 that, just a very quick introduction about what
16 DNV-GL does. DNV-GL is a largest independent
17 advisor in the renewable industry in the world. We
18 have been involved in more than 97 percent of the
19 off-shore project across the globe. German
20 project, UK project, Danish project. And, we
21 started, basically, being involved in U.S.
22 project, as well. We have been in the shipping
23 and the port industry for 150 years. Power grid,
24 electrical engineering and planning for the grid
25 for 85 years. Off-shore oil and gas, 45. And,

1 also, wind energy more than 30 years.

2 So, all the great stories that was
3 mentioned before by Ulrik, by Janice, Francis, for
4 UK, for Germany, for Danish, for CREZ, in fact we
5 -- and especially my team -- has been heavily
6 involved in all of these project for the last ten
7 to twelve years. So, there was a lot of discussion
8 that could be made, and that hopefully that time
9 allows us to go through the details here.

10 Just European experience, as part of
11 -- we have been involved in both Nordsee at the
12 northeast off-shore development. We have been
13 working with the TSOs, or the transmission system
14 operators for 40 Hertz and also TenneT to plan our
15 system. And, which basically includes a planning
16 for the on-shore, as well as the off-shore grid.
17 During that practice, which was all from 2015 to
18 2019, we looked at various scenarios under the
19 on-shore, as well as the off-shore. For the
20 off-shore we did not limit ourself to the dedicated
21 genti line scenario. We also looked at a lot of
22 other possible scenario in which we could have a
23 bit of a stronger connection using these hand-based
24 -- technologies.

25 We looked at radial connections, split

1 connection, backbone connection, as well as the
2 grid connection. But, which is, each one of them
3 that I'm going to discuss that they have their own
4 benefit and cost. But, the question is how those
5 benefit could outweigh the cost. So, discussion
6 that was made that these project needs to be built
7 by the developers, or basically become one with the
8 generation or the TSOs, yes, we have had success
9 stories, we have had failure stories. But, the
10 conclusion comes out to be what is benefit to cost.
11 That is the main objective here that, I guess, we
12 need to focus on.

13 During those processes for the
14 particular looking at project, we look at a lot of
15 studies, and basically we try to evaluate the
16 system, the grid on-shore and off-shore from a
17 different perspective. We focus on the scenario
18 will be for the future scenario of market modeling,
19 which is kind of different from a U.S. to
20 --(Indiscernible) -- that the grid compliance under
21 American FERC, obviously European has different
22 grid codes. But, the basic, the fundamental are
23 kind of the same similar market modeling. And,
24 then, we focus on the power system modeling itself.
25 And, then, either from the basic and ready detail

1 costs benefit analysis to see which option on the
2 on-shore and off-shore outweighs the costs.

3 Another example that we have been
4 working, which is which is an ongoing project is a
5 project called "promotion", which is the basic
6 European white project. We look at the connection
7 and work out the issue, there's a solution. Right?
8 I mean, there is a discussion in a European
9 regulators that all of the off-shore wind could go
10 up to 99 gigawatts. And the question is, is the AC
11 network sufficient enough to meet that requirement.
12 So, that's why, you know, we started looking at the
13 -- (Indiscernible) -- technology -- (Indiscernible)
14 -- reliability and also decrease the cost.

15 Now, in the summary, what was the
16 lesson learned doing all the work that we did on
17 the off-shore and on-shore in the broken market.
18 The first one is we need to have holistic
19 approach -- argument that we need to go with the
20 off-shore dedicated resources, or we need to
21 compromise transmission with the generation, or we
22 need to basically socialize the cost. But, each
23 scenario is different, each country is different,
24 each grid is different. What needs to be done is
25 basically doing a detailed commitment to cost

1 ratio. So, I don't think at this state we can make
2 a general statement by saying that obviously one of
3 the option is going to outweigh the other one.

4 The other key was basically components
5 standardization. Because we are looking for
6 long-term strategies and aggressive target for the
7 off-shore. Now, in this off-shore business there
8 is going to be a lot of vendors and technology
9 vendors going to be involved. But, the question
10 is, how this components will work together. If you
11 start, basically enlist that holistic approach and
12 thinking that how this component, HDVC component,
13 AC component, the turbines -- how the --
14 (Indiscernible) -- system is going to work
15 together, so that's other area that need to be
16 really, really focused at.

17 And then lessons are learned was
18 basically optimization using energy storage. Yes,
19 renewable and off-shore they have a lot of
20 averages. So, there is no doubt about it. But,
21 without having a optimized transmission and storage
22 solution, most likely we not be able to maximize
23 the benefit of the off-shore. So, the question is
24 where and how we should be able to use the storage
25 to basically maximize the benefit, and how that

1 comes to the picture.

2 Other experience. Everybody talked
3 about the CREZ. We have been involved as
4 exclusive consultant for all the utilities that
5 have been involved in the CREZ development. There
6 are non-utilities. That the whole idea started
7 2005 by regulators, in 2008 PUCT basically approved
8 the idea and the environment or was constructed by
9 end of 2015. And, yes, that is success story,
10 there's no doubt. It was a very successful story.
11 And, in fact that was a socialized transmission.
12 So, ERCOT is one of the territories in which the
13 transmission cost is not going to be pertinent on
14 the developer. So, basically, it's truly social,
15 and the economy analysis needs to be done to be
16 able to justify the transmission.

17 Now, yes, it was success. But, it is
18 also some lesson learned. The main issue takes us
19 today is amount of wind that more than doubled for
20 last six years. The amount of solar got more than
21 thirty times for last seven years. But there still
22 there is a lot fulfillment issue. So, that means
23 even though there was a lot of investment made to
24 the Texas region, to the -- (Indiscernible) -- to
25 the panhandle area, but the developers, they will

1 not be able to maximize their investment. And
2 ratepayers, they are not able to basically take
3 advantage of this free resources, even though free
4 resources out there, but the transmission is not
5 designed well enough to be able transfer all the
6 energy without a significant fulfillment.

7 So, this is just a high-voltage
8 picture of the all the CREZ project, or basically
9 transmission lines. It is about 2,400 miles of the
10 high-voltage transmission. Which basically was
11 comprised of nine cumbent and incumbent
12 transmission providers.

13 (Whereupon there is a discussion off
14 the record.)

15 MR. TABRIZI: So, why this happen?
16 Why the success story that we had for the CREZ,
17 but you see there are a lot of fulfillment. And
18 the reason is when the system was designed, not all
19 the criteria was basically to the account. We are
20 involved in a lot of discussion with the utilities
21 and -- (Indiscernible) -- in the northeast, and I
22 heard a lot of discussion about the transmission
23 operate. And, when I ask them what do you mean by
24 transmission operate, they talk about the
25 transmission terminal -- (Indiscernible) -- but

1 from a CREZ standpoint and a CREZ experience for
2 last ten years that we have been heavily involved,
3 I can tell you that if you are going for aggressive
4 targets for the off-shore wind, terminal overload
5 is your lease concern, it's not going to be your
6 first concern. A lot of other concern that going
7 to play a major role in the design of the
8 transmission. There's grid strength, all these
9 inverter-based resources that are going replace the
10 conventional units. That's a market. That's how
11 market is going to lay out. So, what's going to
12 happen to the grid strength? We are going to use a
13 lot of inverter-based controllers with the --
14 (Indiscernible) -- controllers to the system, how
15 all those controllers is going to attract with each
16 other. Another major issue that has caused a lot
17 of problem in the past and continues to cause
18 problem even today.

19 -- (Indiscernible) -- into the grid
20 stability. Even though terminal overload is there,
21 if we have a line in the current -- (Indiscernible)
22 -- that even though the line is rated for 2000 MVA,
23 for very close to 2000 MVA, but that transmission
24 line cannot carry more than thousand MVA today.
25 Why? Because of the stability issue. So terminal

1 overload could be one of the issue, but it's not
2 all of them. What's going to happen to the
3 reserve requirements? That's also another issue,
4 the issue that instead -- (Indiscernible) -- they
5 need to take a look at. Probably not all the
6 stakeholders is going to care about grid, I mean
7 grid resiliency and reserve requirements. That's
8 the sole duty of the ISOs -- (Indiscernible). And
9 transmission congestion and curtailment is, I mean,
10 you can connect whatever generation that you might
11 have in the grid. But, the question is how much
12 actually is going to be transferred to the
13 ratepayers? How much of those is going to be
14 utilized by the grids?

15 So, these are topics that I believe
16 need to talk about. And, I don't know how much
17 time allows, but I hope that we can have a great
18 discussion here. Thank you for your time.

19 MS. PATNAUDE: Thank you very much.
20 We're going to open the question and answer portion
21 of this.

22 I would like to acknowledge that a
23 number other BPU folks have entered the room. The
24 glare is a little difficult to see people, but
25 thankfully some folks are sitting in the front row.

1 In addition to Commissioner Holden and Commissioner
2 Solomon, we have, I believe, Rob Glover, who is
3 Commissioner Holden's aide. We have Stephanie
4 Forest who is here with Commissioner Solomon. And,
5 Beth Christian who is Commissioner Gordon's aide.
6 And, if there's anybody I missed it's because I
7 can't see you from here.

8 We have several staffers at the table.
9 We have Abe Silverman, who is General Counsel. We
10 have Jim Ferris, who is in charge of a number of
11 the clean energy initiatives at the BPU. We have
12 Cynthia Holland who is our transmission guru with
13 FERC issues. And, I know Grace Strong-Power, who
14 is Chief of Staff, was here earlier. And, Kelly
15 Moie who is Deputy Director of the Division of
16 Clean Energy.

17 So, with that, can we start with some
18 staff questions for the panel?

19 MR. SILVERMAN: Yeah. Well, thank you
20 all very much. I'll start with a clarifying
21 question. This for Ulrik. You mentioned that the
22 German and the English system, that the networks
23 sort of the centrally planned system is more
24 expensive. Is that comparing apples to apples,
25 though? Because, I take it that the other system

1 is nothing but radial lines. And, how did you deal
2 with sort of numerous potential landings that
3 weren't coordinated? Is there a way to avoid that
4 under a sort of developer integrated transmission
5 planning process?

6 MR. STRIDBAEK: Thank you for that
7 question. And, I was sitting here and I was
8 regretting that I hadn't brought slides to nicely
9 and clearly illustrate my points. First of all,
10 coming back to Francis, also, and to the apples for
11 apples. There are differences in these systems.
12 There are big differences, also, between Denmark
13 and Germany and the Netherlands, for example. And,
14 how Denmark is actually going back to allowing the
15 developer to do this.

16 But, the scientists in Berlin, they
17 actually did go a very long way in really trying to
18 compare apples with apples. Maybe it's granny
19 smith with some other; but it's not apples and
20 pears. And it's, you know, variations for
21 interpretation of that study indeed, but it is
22 frankly very clear. And the synergies from doing
23 off-shore wind and transmission together are huge.
24 The bridge system is very far from perfect, I will
25 say. Many, many, many mistakes to avoid there, as

1 well. But, the synergies are very clear.

2 And, indeed, on-shore, the UK and
3 Germany have different challenges, no doubt. And,
4 some of the German challenges have spread into the
5 ocean, and their choice of the solution there, are
6 clearly enough.

7 So, I think for New Jersey different
8 lessons to be learned there. But, the key one is
9 don't at least allow for creating those synergies,
10 because that's what matters for ratepayers.
11 That's the thirty percent, at least. So, thanks.

12 MR. SILVERMAN: So, then, just let me
13 follow up real quick. Is your vision, then, that
14 every off-shore wind farm would have sort of its
15 own generator lead line and its own land fall?
16 And, is there a way to have a sort of integrated
17 model, but to avoid having, sort of, you know --
18 well, and Janice's picture was wonderful, eleven
19 versus three interconnection points.

20 MR. STRIDBAEK: So, I think absolutely
21 believe that both in Europe and the U.S. we will
22 need to figure out more intelligent ways of using
23 the landing points intelligently, allowing for --
24 as you said, allowing for off-shore transmission,
25 becoming also a strengthening on the on-shore

1 capability. These kinds of things, that's what we
2 need to develop. We don't have the answer how to
3 do that.

4 I know for sure that you here in the
5 U.S., you are very, very good at creating
6 incentives. We are a little bit behind with that
7 often in Europe.

8 MS. PATNAUDE: Do we have any other
9 questions from -- Jim?

10 MR. FERRIS: This is for everyone, I
11 think. So, Europe clearly has chosen several
12 different models. And, I'm wondering if there are
13 any specific factors or conditions, site
14 conditions, total capacity, regional capacity, a
15 number of projects, that tend to drive --
16 (Indiscernible).

17 MS. CHARTRAND: Well, maybe, for
18 example, UK, they have a huge amount of coastal
19 shore lines. So, that makes it much easier to
20 access the grid and have multiple point of
21 interconnection. As if you go to, I believe,
22 Netherlands and Germany, it's much more restricted.
23 So, you're correct, it's a big factors into this --
24 (Indiscernible).

25 MR. TABRIZI: So, system

1 characteristics under the policy's generation is --
2 (Indiscernible) -- another important factor is how
3 the market operate. Is it are we having the same
4 market structure, market -- (Indiscernible) --
5 convert to European market? This is also another
6 area that needs to be looked at.

7 So, and one point to the previous
8 question. I, personally, I don't have any one
9 opinion on that off-shore transmission should be
10 built by the states or by the TSOs, or by the
11 resource entity. But, my only concern is whatever
12 way we figure out, the question is how we make sure
13 that the off-shore transmission is planned to
14 accommodate the entire mandate, and not only the
15 specific project. To me, that's a key area that
16 we need take a look at and need to consider
17 regardless of who is going to build what.

18 MS. HOLLAND: Thank you. I did have a
19 couple of questions just to, I guess, round this
20 out. I really appreciate the different
21 presentations regarding the CREZ. One of the
22 things that I wanted to touch on is we had asked a
23 couple of questions about the concerns about --
24 (Indiscernible) -- and I was curious to what extent
25 any of the panelists wanted to comment on that. Or

1 not.

2 All right. Well, then, with regard to
3 the environmental concerns that were raised with
4 regards to fishery, I was curious if there were any
5 lessons learned from European models and
6 experiences there. Because certainly the fishing
7 industry and environmental concerns were presented
8 in Europe, as well.

9 MR. STRIDBAEK: I'm happy to try to
10 answer that. So, in all the oceans we are active
11 in there is also fishing going on, a lot of fishing
12 activity. And, we have, I think, good dialogue
13 with the fishing community, and developed different
14 solutions. Of course, both the fishing methods and
15 at least what the fishing is focused on is very,
16 very different from place to place. So, having
17 heavy equipment at the bottom of the ocean is, of
18 course, a different type of challenge than we have,
19 for example, in Denmark. So, this is an area
20 where we will have to find solutions together, no
21 doubt.

22 MS. PATNAUDE: Anyone else?

23 MR. FERRIS: Just one specific
24 follow-up question for David. You mentioned
25 telecommunications cabling. Is that a model that

1 we should be looking at?

2 MR. WALLACE: The fishing industry,
3 the telecommunications industry, and the DEP spent
4 eighteen months meeting once a month for the whole
5 period of time, dealing with all the issues that
6 each of the participants needed to be able to
7 accomplish their operation. And, so, I think that
8 if -- there are a number of similarities, and, so,
9 therefore, I think if you looked at the legislation
10 and contact the folks at DEP that participated
11 twenty years ago, they could shed light on how
12 compromises could be made where everyone gets to do
13 what they have to do without having very large
14 extra capital expenses or operating expenses. And,
15 it worked very well, because where we used to have
16 a lot of conflict with the telecommunication
17 cables -- which we didn't want and they didn't
18 want -- once we designed the systems properly, that
19 essentially went away. Except when we had large
20 storms that washed out the cables. And, one of
21 the things that we ran into there was we would then
22 notify the telecommunications folks -- cable ABC at
23 such and such coordinate is on the surface and you
24 need to do something about it. And, they cost
25 billions of dollars, so it's not like these were

1 just cheap little things that they throw away.
2 And, generally huge amounts of revenue for a
3 second. But, what we found, none of them had a
4 budget for going out on an emergency manner and
5 re-burying their cable. And, so, one of the
6 things that everybody should do is have a sludge
7 fund for those kinds of eventualities, because
8 sooner or later it's going to happen. And, when we
9 -- there's some high-voltage in a
10 telecommunications cable, but it's not going to
11 light up a steel ship. If we penetrated a power
12 cable, a live power cable, we could have a serious
13 problem because we are hooked to the ship through a
14 steel cable to the gear on the bottom. And, so, we
15 need to make sure that safety is a factor.

16 MR. FERRIS: Thank you.

17 MS. FULLER: While it's not -- you
18 asked previously about lessons from Europe and also
19 fishery -- (Indiscernible) -- it's not that -- I
20 think one of thing -- very recently I traveled to
21 the gulf region, and while it's a very different
22 industry, I think there are some parallels and
23 synergies that we could learn from how the oil and
24 gas industry has built their relationships with the
25 fishing community there, in terms of their advanced

1 planning and how it is a very cooperative
2 relationship that the energy industry and the
3 commercial and recreational fishing industry in the
4 gulf has developed over the last few decades that I
5 think is something that we could look to as we
6 proceed with energy development here.

7 MR. SILVERMAN: Francis, you -- first
8 of all, I think you mentioned time line unknown for
9 the third-party developed systems -- so how do we
10 deal with that? Is it like sequencing these items,
11 and the commercial risk associated with the cable
12 not being available, say, like Orsted or Atlantic
13 Shores, how would you address those commercial
14 realities that make it -- and sequence it in a way
15 that minimizes risk for all parties, also to having
16 to organize off-shore backbone?

17 MS. CHARTRAND: Thank you. That's a
18 very good question. If we look at CREZ, it took
19 over ten years for the whole thing to be done.
20 And, I think that was a success. I mean, I don't
21 think it was too long. I think that's reasonable.

22 One way that I personally see that
23 this could be done is to go through phases. And,
24 that was also mentioned in previous stakeholder
25 meetings. So, we can continue with the first

1 project we having a stand-alone connection, but
2 what's important is to take into account the
3 upgrade that would be done for both project, and
4 include that in a more global approach, more
5 on-shore study approach. So, this way the first
6 project get to continue with a stand-alone radial
7 connection. But, what my presentation was focusing
8 is mainly on the on-shore upgrades instead of
9 everybody -- (Indiscernible) -- and, it's to really
10 let them do their first study. But, the overall
11 planning will include those upgrades so at the end
12 it can be brought back to a more global planning.

13 MR. TABRIZI: If I may. Well, I mean,
14 that's a great question. And, not that I know the
15 answer to it. But, that was one of the main
16 challenges that what happen to Europe. And, I
17 wish I could show my slide and I was not able to.
18 But, depending on the congregation on the
19 off-shower -- and now I'm talking about the
20 off-shore -- we need to have that long-term --
21 (Indiscernible) -- we cannot solve the problem on
22 pieces as long as we have that long-term road map,
23 and take into account what technologies could be
24 placed. Because there are a lot of technology out
25 that in fact are not compatible to each other.

1 And, so, I mean not that I know the perfect answer
2 for it. But, to me that is a great question and a
3 great challenge.

4 MS. PATNAUDE: At this time I'd like
5 to take some audience questions. We don't have a
6 lot of time. But, if you could come up to the
7 podium in the center and identify yourself and the
8 entity that you represent, that would be great.

9 MR. TIDDLE: Jeff Tiddle, New Jersey
10 Sierra Club.

11 I was wondering in Europe and some of
12 the other projects that you've looked at in the
13 off-shore backbone versus having once you land on
14 shore to have to build new power lines to bring it
15 to market. So, one of the things that we see in
16 New Jersey, at least the Sierra Club's perspective,
17 is if the lines from off shore come in down, let's
18 say, Atlantic City or below, Cape May with the
19 project off of it, that grid there is fairly old
20 and would have to rebuild or you'd be building a
21 new power line to bring it to market to the
22 Pinelands to South Jersey, or up the Parkway.

23 And, so, I wondered if Europe has been
24 experienced on which works more cost effectively to
25 try to bring in a backbone or bring it on shore and

1 then have to build a new structure on shore?

2 MR. STRIDBAEK: Try to answer that.

3 So, again, maybe Germany and a country like Denmark
4 or UK has opposite ends of that. And, by the way,
5 there is only one almost example of a backbone, and
6 that is a project where off-shore wind farms
7 connected both to Denmark and Germany. And, it
8 hasn't been really built yet, it's under
9 construction. So, a very, very thin experience.

10 But, largely in a country like Denmark
11 there has been quite foresighted transmission
12 planning and transmission construction over several
13 decades. And, the transmission operator there has
14 managed to stay ahead of the curve, and being able
15 to absorb the power and take it to load centers.
16 And, I believe so in the UK, as well. Whereas in
17 Germany, that has not been possible. It hasn't
18 happened.

19 So, very much agree with the comment
20 that on the on-shore transmission you really have
21 to think ahead and have at least a long-term plan.
22 So, that's one thing.

23 The second thing is the mood, I
24 believe, in Europe now is that certainly for us in
25 the industry is that we went through the maceration

1 or almost through the maceration of off-shore wind.
2 Now we are ready, and we need to accelerate.
3 Because if we are going to have electricity to
4 transport electricity into heating into the
5 industry, we will have to build up a lot more and a
6 lot faster. And, that cannot be done, we believe,
7 without having some form of development of a
8 backbone service system where you start to connect
9 countries while connecting off-shore wind.

10 So, this will happen. But, we don't
11 have a model in Europe either. This is entirely
12 new, as well. And balancing incentives, planning
13 requirements, and capturing the synergies, it's --

14 MR. TIDDLE: I guess, because a
15 concern here is, you know, that if you end up
16 having to build a backbone on land instead, that it
17 may also have a lot of environmental impacts or
18 worsen costs, too.

19 MS. FULLER: I think the question
20 really highlights the biggest point. Right? That
21 we should think about answering these questions
22 ahead of time. We know where, roughly, the power
23 will come from. We know roughly where the power
24 needs to go. And, to answer those questions ahead
25 of time so that if the on-shore grid -- the

1 upgrades of the on-shore grid can be maximized in
2 terms of their efficiency so you're not building
3 one cable and then five years later have to install
4 another one. And, answer those questions now
5 instead of down the road.

6 MR. TIDDLE: I guess the other point,
7 I don't think it's being done yet in Europe. But,
8 on of the things versus a private company coming in
9 doing the transmission. Have the wind companies
10 themselves thought about having a consortium to do
11 it themselves, versus another company create their
12 own? Is there any movement like that in Europe, or
13 no?

14 MR. TABRIZI: I mean, my information
15 in that regard would not be great. But, I think
16 there was effort, but it just didn't go anywhere.
17 And, just a quick add on each to your previous
18 question, I agree, we got a really clean experience
19 when it come to off-shore network, the only one is
20 Germany, Danish, Denmark.

21 But, that being said, our analysis
22 shows that sometimes only focusing on the cost, it
23 doesn't give you the whole picture. There has to
24 be trade off between the cost and reliability.
25 And, one of the main issues when it comes to

1 off-shore is the concept that we -- (Indiscernible)
2 -- to the point of failure. That if one failure
3 happens in one of the equipment, are you going to
4 lose the entire off-shore? So, that's why
5 sometimes we need to look at off-shore network and
6 we can trade off the cost. Which will be more?
7 The cost, or the reliability of the off-shore?

8 MR. TIDDLE: Also, I guess the other
9 factor should be the environmental impacts versus
10 off-shore and on-shore if you have to build --

11 MS. PATNAUDE: Thank you. We're going
12 to take one more question, and then we're going to
13 take our break.

14 And, I would like to note for the
15 record that Commissioner Gordon has joined us.

16 Do we have another question from the
17 audience? Then I guess we're going to take our
18 break.

19 There are restrooms on this floor. If
20 you're looking for a quick coffee, if you go out
21 the door to the right, down the street, then make a
22 left, there's a Starbucks on that block.

23 MS. HOLLAND: I just wanted to say
24 thank you to all the panelists.

25 MS. PATNAUDE: Yes. Right. Thank you

1 very much.

2 (Whereupon a short recess was held.)

3 MS. PATNAUDE: So, Panel 2 is
4 off-shore wind transmission framework. And, we're
5 going to let Josh Gange first, because his
6 presentation is already in the computer. He is
7 with BOEM.

8 Josh?

9 MR. GANGE: Thank you. And, people
10 can see the presentation. Correct? Excellent. I
11 just wanted to make sure.

12 As she mentioned, I'm Josh Gange with
13 the Bureau of Ocean Energy Management. We are the
14 federal agency tasked with managing renewable
15 energy on the outer-continental shelf. So, the
16 off-shore wind or transmission projects we're
17 talking about today -- at least on the ocean side
18 of things. The main land side of things, please,
19 don't ask me any questions.

20 So, don't worry, I'm not going to read
21 you this slide. This is the general federal
22 regulatory framework for the renewable energy
23 system. Basically, what it says, is that the
24 Secretary of the Interior is tasked with providing
25 leases, easements or other legal instruments to

1 provide for renewable energy development in a
2 responsible manner on the outer-continental shelf.
3 In fact, no one can develop renewable energy
4 without one of these legal instruments.

5 So, again, all of our leases that we
6 provide to off-shore wind developers, the lessees,
7 once they have that, the regulations actually
8 provide for one or more easements to a transmission
9 connection point on land for a full enjoyment of
10 the lease. So, that is a non-competitive process
11 at this point. So, what happens is they would say
12 here's our preferred connection points, and then a
13 lot of survey work and consultations go into
14 determining whether that's appropriate. And, they
15 negotiate the right to connect to the grid with the
16 state utility or other entity involved.

17 In the case where you where you would
18 have a third-party working to do a transmission
19 project, the instrument involved there would be
20 right-of-way grant. And, I'll go into that a
21 little bit more.

22 So, all of our processes require a
23 competitive process, unless it's determined that
24 there are not -- there's not competitive interest.
25 And, so, what that means is, when a developer says

1 I'd like to do, put a, let's say a regional
2 backbone system out on the OCS, we first have to go
3 out and say are there others interested in doing
4 this. And, that goes out in the federal register,
5 and a request for competitive interest. We get
6 comments back, and then try to make that
7 determination whether there is competitive
8 interest. If there is, it will typically go to an
9 auction process for the right to that grant.

10 Once the grant is issued or -- well,
11 actually, I should step back -- BOEM then look to
12 determine whether it's in the public interest to
13 issue that grant. If it's determined that it is,
14 that grant would be issued to the entity, which
15 will then kick off a number of NEPA related
16 environmental processes and consultations. And
17 allows the developer to propose a project in the
18 form of a general activities plan, or a gap --
19 which involves even more environmental and
20 consultative processes.

21 So, a little bit of the details on
22 what a right-of-way is. The grant holder is first
23 qualified by BOEM, so you have to then first come
24 to us and be legally, technically, and financially
25 qualified to both hold a lease and develop the

1 project you're proposing. So, there's a little bit
2 of a process there. If a right-of-way is issued,
3 it's two hundred feet in width centered on the
4 cable. Greater widths can be added to along the
5 length of that cable for safety or other
6 environmental needs that has been demonstrated
7 after survey work.

8 The grant does not prevent the
9 granting of other rights by the United States.
10 This is not necessarily an exclusive grant, so
11 other cables could cross the grant, other cables
12 could run in parallel to the grant. This could go
13 through or around leases. Leases could be kind of
14 cohabitating, depending. And, also, any activities
15 we authorize can't unreasonably interfere with
16 other approved activities or existing operations.
17 And, also, any grant that we're issuing, the holder
18 would agree that any other user may use or occupy
19 any part of the right-of-way that's not actually
20 used. So, typically what we would see is someone
21 would say we want to put it in this general area,
22 but then they have to go out and do quite a lot of
23 survey work to determine the exact route. Once the
24 right-of-way is issued, hopefully that's narrowed
25 down and they'll give back sort of the unused

1 portions.

2 And, it should also be noted that BOEM
3 does require financial assurance for any projects
4 for decommissioning. So, the developer is
5 responsible for return the sea bed to its original
6 condition at the conclusion of the projects.

7 So, that is the general regulatory
8 framework for a right-of-way grant, which would be
9 a third-party transmission system on the
10 outer-continental shelf.

11 I'm going to try and keep it brief
12 because I figured questions are more important than
13 me talking about the regulatory code, unless you
14 want to do that later, come find me. Thank you.

15 MS. PATNAUDE: Thank you. Next up we
16 have Doug Copeland from Atlantic Shores.

17 MR. COPELAND: Good morning everyone.
18 My name is Doug Copeland. I'm the development
19 manager for Atlantic Shores off-shore wind. We are
20 a fifty-fifty joint venture with EDF Renewables,
21 where I've been for ten and a half years; and,
22 Shell New Energies. We picked up the northern New
23 Jersey lease last December. And, submitted and
24 OREC this last year. And, are excited for the
25 future solicitations. But, really here today to

1 talk about transmission, as you all are, as well.

2 And, inside of Atlantic Shore, one of
3 my main roles is our interconnection strategy.
4 And, so, been looking at all the different
5 opportunities for us to connect here into the
6 state, both radial lines but also thinking about
7 transmission in the future. And, I think sort of
8 the main thing that you heard from Francis, who
9 spoke earlier from Atlantic Shores -- and that I
10 will echo again today -- is we really prefer a
11 solution where the state takes a big lead in all of
12 this. Even though New Jersey is part of PJM, we'd
13 like to see New Jersey really kind of take that
14 lead on its own, with close coordination with TOs.
15 They know this areas better than anyone else, as
16 far as transmission; and, we'd like to see them
17 play a very active role in that overall planning.

18 And, initially, it's about bringing
19 the transmission to the beach. It will be on us as
20 developers to get to the beach, but that if the
21 transmission lines can come directly to the shore
22 from wherever the points of interconnection are on
23 land, we can get them to the shore from the
24 projects. And, I think that kind of the key with
25 all this is as the state is thinking about where

1 these transmission lines are going to go, two
2 critical things; one, is that we don't want the
3 transmission line from one project to basically
4 prevent another project from getting to shore, or
5 make it extremely difficult. And, part of that can
6 happen because, well, you just don't cross the
7 cables. Right? You have a lot of work that goes
8 into armoring them up to make sure that they're
9 protected. And, ensuring that that occurs in areas
10 that aren't going to have a really negative impact
11 on fishermen, because any commercial fishermen are
12 not going to be able to fish near an area where a
13 cable is crossing.

14 We just want to make sure that all
15 that kind of overall planning, which is in some
16 ways kind of step two, once you figure out what the
17 big plan is going to be, is take into account going
18 on, just because you are going to have multiple
19 radial lines, especially with the early projects.
20 And, we just really want to see some close
21 coordination with all of that.

22 So, I look forward to the panel.
23 Thank you.

24 MS. PATNAUDE: Next up we have -- I'm
25 going to start at the far end of the table with, I

1 believe, Kirsty Townsend from Orsted.

2 MS. TOWNSEND: Hi. You'll be told by
3 my accent that I'm British with a Scottish name,
4 Kirsty. But, I'm pretty good at responding to that
5 now. I work for Orsted. I've worked for Orsted
6 for eight, nine years, but in the off-shore wind
7 industry for ten, fifteen, which to be in the
8 industry is quite a long time. I've been working
9 on the U.S. project for sort of six months/twelve
10 months. And, my experience comes from Europe. I
11 guess from the panel earlier, the key point I would
12 say on touching on this is the whole European
13 system is really different. The way that we assign
14 wind projects in the UK, for example, is just
15 completely different to how you do it in the U.S.
16 Although, there were lessons learned there, I would
17 just be a bit cognizant to really focus in on New
18 Jersey's issues, what you develop will not be what
19 we see in any of those markets in Europe.

20 So, starting, I guess, from the
21 beginning. Your existing transmission development
22 framework and the radial lines will get you your
23 3.5 gigawatts. You kind of don't need to do
24 anything more. Where it gets interesting is if
25 those targets considerably exceeded. If New

1 Jersey really increases it's three and a half
2 gigawatts. Janice mentioned a number of eleven.
3 Or, if New Jersey sees itself as the state to green
4 coastal power to inlet states all the way through
5 to neighboring states, then your system
6 constraints, your on-shore system constraint is how
7 you get that power to load becomes the key issue
8 that needs to be resolved.

9 We've been working really hard in New
10 Jersey with ocean wind and the future bid project,
11 which a lot of work goes into on how to get that
12 power to shore. And it's tough. Just getting one
13 cable landing is really challenging, and it's
14 complicated on the permitting. This is a baby
15 industry, and we're developing it as we go. So,
16 just again, to keep in mind whatever we do there
17 let's not slow it down, or find a way of allowing
18 the industry to continue to develop while the sort
19 of wider, broader plans come into place.

20 So, stepping back. Even that world
21 where you've got that bigger target, that grander
22 ambition, if we're talking about shared assets,
23 traditionally the value of those shared
24 transmission infrastructure projects comes from
25 clustering. But, now, either as we've seen from

1 Germany, that was when we were dealing the 3.6
2 megawatt turbines and 400 megawatt projects. And,
3 that's just kind of old news. The U.S. has come
4 into this right at the beginning, you would go
5 straight into the big projects, the eight hundred
6 plus, one gigawatt plus. And, that's where you
7 need to start and continue to build forward.

8 So, actually, the value of shared
9 transmission of planning isn't from shared export
10 cables. It actually, we think, will come from
11 supporting that on-shore system. Supporting and
12 resolving the constraints that you have from
13 getting supply to load. On-shore congestion,
14 avoiding expensive operating costs, or politically
15 prohibitive upgrade costs on shore. Or, avoiding
16 really sensitive environmental areas. Your
17 off-shore transmission planning could be the tool
18 to do that. The same goes with landing points and
19 that interconnection of how to do it from that.

20 So, I guess, the recommendation would
21 be to look at, with a broader ambition, thermally
22 and stability-wise where are the top spots in New
23 Jersey? Where are the key points? What is the key
24 issues that you want to solve? And, then, as far
25 as I can tell, the U.S. has got the best incentive

1 mechanisms in the world. So, use that model, use
2 that competitive prowess. Use the existing
3 regulation you have, adopt your public policy
4 planning process with PJM, and put that out to
5 market to competitively solve those specific issues
6 in those key phases.

7 The one thing I would say, which I'm
8 going to say because I mostly represent the
9 developers, but it really is true, is that keep the
10 option open to maintain those synergies between the
11 development of the generation and transmission
12 assets. Particularly during the next five or so
13 years when we're meeting those initial targets, and
14 we're already struggling enough. The synergies
15 come from all sorts of areas, not just the sort of
16 coordination effort and the overhead and
17 procurement and the actual electrical interfaces.
18 So, although I like the vision of a full
19 coordinated system, it would make our lives easier
20 in some senses, as well. We've got to do that
21 knowing the technical constraints and the ambition
22 and the real issues that New Jersey want to solve.

23 If any of you guys have questions on
24 the UK's update system and the problems there --
25 it's probably not for this panel -- but, I'm more

1 than happy to explain in detail the pros and cons
2 and the trials and tribulations that the UK has
3 experienced. Thank you.

4 MS. PATNAUDE: And, next up we have
5 Sue Glatz from PJM.

6 MS. GLATZ: Good morning, everyone.
7 I'm Sue Glatz with PJM. Thank you for the
8 opportunity, really, to join into this discussion
9 about off-shore wind. So, we're happy to
10 contribute to this, and really welcome this
11 opportunity to talk about the transmission impacts.
12 And, certainly since New Jersey, as well as the
13 other states along the coast are a part of PJM;
14 and, so, this is going to have a significant impact
15 on our process. And, so, happy to share some of
16 our perspectives on transmission planning with
17 respect to integrating renewables.

18 So, just kind of start just a little
19 bit of a background. I just want just give you
20 some sense of our understanding of what we see
21 happening with renewables across the PJM grid. So,
22 what I have up here is some data that shows some of
23 the targets for various PJM states. And, some of
24 them are fairly ambitious or aggressive, I guess I
25 would say. And, this was actually prepared just

1 earlier in the year, but we did update two of the
2 numbers because Maryland, Ohio there was some
3 recent changes. Even though it says -- September
4 29th, so that reflects some changes. And, I think
5 a key point here is to recognize that these goals
6 that the different states set, they are dynamic,
7 they are changing. And, so, really are a planning
8 process. We need to be able to respond and react
9 to the dynamic nature of the goals that are out
10 there.

11 So, the next slide about off-shore
12 winds, let's talk about what's actually happening
13 in the wind development. And, what I have
14 illustrated up here shows the time framing between
15 2005 out to almost 2030 -- not quite. And, showing
16 what's been developed and what's in service. And,
17 looking towards the future, what are the targets
18 that are out there. And, this is cumulative, so
19 this represents all the PJM states, not just New
20 Jersey. But, you can see the targets are
21 increasing quite a bit from where they were. So,
22 we have through 2018 roughly about --- not quite
23 yet ten thousand megawatts of wind generation.
24 But, looking out to the next ten years of
25 development, that looks like you're going to be

1 over 35,000. And, of course that's -- because
2 while it's across PJM, we know that with the
3 off-shore wind it's only in a few states, really,
4 that you're going to see that type of development.

5 So, a couple of takeaways is that to
6 date the RPS targets this type of development.
7 Really has been happening just through the PJM
8 markets, so the markets been able to respond and
9 meet these targets to date. Now, the question is
10 with what's in the queue and what these targets are
11 going out there, things to think about for New
12 Jersey really is the type of framework through our
13 interconnection queue. Is that really going to be
14 sufficient going forward once the number of
15 megawatts really starts to substantially increase?
16 And, so, one of the things that we would recommend
17 for the industry, really, is start to think about
18 in New Jersey, as well as the neighboring states,
19 is what do they see as the ultimate build out and
20 the framework of our interconnection queue? Is
21 that going to be sufficient to meet what those
22 future targets are. That's one of the things that
23 we would encourage some thought about.

24 So, since this is about transmission
25 framework, what I want to talk about now is what

1 are the options day for developing renewables and
2 to fill our off-shore wind? So, There's really two
3 paths. There's the interconnection queue, which is
4 what really is supporting all the renewable
5 generation today that is coming into the PJM
6 system. And, the other option I think you've
7 already heard mentioned about, and that is what
8 call our state agreement approach. And, that is
9 the avenue that was really developed and envisioned
10 to address public policy needs.

11 So, let me first talk about the
12 interconnection queue. So, those seven or eight
13 thousand megawatts of off-shore wind, they came
14 through the PJM's queue. And, we expect this is
15 still going to be part of the process going
16 forward. So, what is the queue? It's a
17 rights-based process. So, essentially, the first
18 in line has the first access or the rights to use
19 the grid capability on the system. And, when you
20 get through studying for the process and you pay
21 for any upgrades to accommodate your generation
22 injection into the system, then those rights, those
23 injection rights or interconnection rights are
24 preserve for your project.

25 And, this applies for merchant

1 transmission, also. Our queue accommodates
2 merchant transmission that may want to interconnect
3 between PJM and neighboring RTOs, as well. And,
4 one other comment in terms of the generation queue.
5 That project, they're responsible for all the costs
6 to interconnect it. So, that's not only the actual
7 direct connection type work, the substations and so
8 forth just to bring in the project, connect it to
9 the grid; but, also if there's any impact to the
10 grid, that it creates any overloads on the system
11 or any reliability violations. Then they would be
12 responsible to pay for whatever transmission
13 upgrades or expansion to accommodate that
14 generation.

15 So, that's the interconnection queue
16 path, and that's largely what has been occurring to
17 date to interconnect the renewables.

18 Another option is the state agreement
19 program. And, as mentioned, so, this was a
20 process that was laid out when the auto one
21 thousand was developed. And, this was the path
22 that states, that identified what their public
23 policy needs are. And, then, that would allow PJM
24 to study those particular policy needs or ultimate
25 outcomes that they're seeking to achieve for the

1 public policy such as integrating renewables.
2 And, with that analysis we could identify the
3 upgrades. And, then, that would be funded by the
4 states to do those upgrades. And, that could be
5 one state, it could be multiple states. So, it's
6 not limited.

7 The key message there, though, is the
8 state would identify that policy, and they would
9 have a lot more control over not only what types
10 of, you know, determine what those upgrades would
11 be, but also who would be responsible to construct
12 that transmission. So, a little bit more --
13 they're paying for it, so they have more control
14 over that. And, through that, then those rights
15 would be preserved through that policy.

16 So, those are the two approaches that
17 could be taken for the future development of the
18 off-shore wind. Things to think about that we
19 would encourage New Jersey, as well as all the
20 others stakeholders in this industry, is to think
21 about what do you see as your ultimate build out?
22 And, I think others have also brought to that
23 point. Because recognizing, you know, what's your
24 long-term goal. And you want to try to be able --
25 you can more consciously make decisions about how

1 much investment you want to make today versus the
2 future. How much flexibility, what trade-offs are
3 you willing to take in the sense of maybe
4 minimizing impacts to some of the landing points of
5 the substations that you would interconnect with.
6 Or, even minimizing the amount of upgrades to have
7 to go back and revisit transmission lines that
8 you've already upgraded for one project, versus
9 maybe a more coordinated plan, or recognizing that
10 the timing of when these actual upgrades would be
11 needed. So, it's not to say that one is better or
12 not; but, it's more about being able to consciously
13 decide how much flexibility you want to accommodate
14 your future build out. And, so, you would take
15 control of that planning.

16 And, I guess again, it's really about
17 trying to maintain some flexibility so that, also,
18 you don't lock yourself in too early into one path.
19 And, I guess one last thing that I would share is
20 that while there may be various options in terms of
21 radial or network, and talk about the off-shore
22 grid; but, I would say there really needs to be a
23 lot of thought about the on-shore grid because
24 there are only so many available substations today,
25 there's only so many lines today. And, so,

1 regardless of whether you do radial or network, and
2 what you do off-shore, eventually it's going to
3 rely on the on-shore grid to really reach
4 customers.

5 And, so, with that, I will turn it
6 over to the next speaker.

7 MS. PATNAUDE: Thank. And, now we
8 have John Dempsey from PSE&G.

9 MR. DEMPSEY: Thank you all very much
10 for having me today. It's good to be here
11 representing PSE&G on this panel.

12 I'll just start off by saying that
13 PSE's objective in participating today is really to
14 help identify the lowest cost solution for New
15 Jersey ratepayers. With that, I think our
16 perspective here is that while radial lead lines
17 certainly may be effective for the initial stages,
18 we do view there being a couple of challenges to
19 the radial method being the most cost-efficient
20 going forward. Those challenges have largely been
21 discussed already. I'll jus touch on them
22 briefly.

23 The first is the interconnection queue
24 process, and the second is just the
25 constructability piece. On the queue process,

1 specifically, right now developers are incented to
2 file multiple interconnection requests. This is
3 really for two reasons. One is to really make sure
4 they don't put all their eggs in one basket, let's
5 just say, for interconnection spots. As Sue just
6 said, there's only a few places to interconnect,
7 and they want to make sure that -- you know, they
8 don't know what those upgrades are going to be
9 until a couple of years down the line, and they
10 want to spread some of that risk out.

11 The second reason, though, is -- let's
12 also be honest -- when they have more than one
13 interconnection requests in, then later entrants to
14 the market aren't able to access those same
15 stations just because they would be behind them in
16 the queue. So, I don't think the existing queue
17 process works for really anyone here. Obviously
18 on the state side, when you're selecting a project
19 without knowing what the upgrades are there are
20 some uncertainties there, as well.

21 As Sue indicated, PJM can't really
22 just adjust the rules. They are universal to
23 every generation resource in every state that's
24 trying to enter the grids. So, again, it's not
25 something that can be fixed easily. I'll also

1 just say -- and I think it was mentioned at the
2 start -- that congested queues also can inhibit
3 other renewable development. When you look at
4 portions of New Jersey that have land for a lot of
5 solar, it's mostly in the central and southern part
6 of the state. Which is, obviously, where a lot of
7 the off-shore wind will be impacting. And, when
8 you have -- I think Sue, you mentioned 8,000
9 megawatts in the queue, you know, if you're a solar
10 developer that's trying to put 200 megawatts on
11 that grid, there could be some downstream
12 implications. It could be harder for you to figure
13 out where to go, given all the activity on, really,
14 a relatively few number of circuits that are higher
15 voltage. And, by that I mean above 230 kV.

16 On the constructability side -- I
17 don't need to go into it -- they're all bad options
18 along the coast. There's no good option, it's
19 just what's the least bad. So, while I think
20 there are certainly ways to get in there for a
21 handful of projects -- and I'll also just note, and
22 anyone's that's followed renewables in the United
23 States over the past decade -- local permitting for
24 transmission has been a challenge for renewable
25 projects, whether it's these merchant transmission

1 projects in the north, or whether it's even
2 state-sponsored renewable projects in New England
3 trying to bring renewable down via long
4 transmission lines. So, it shouldn't be taken for
5 granted, the challenges associated permitting
6 transmission in New Jersey.

7 One of the questions in the notice --
8 and I'll try to keep this pretty brief here -- one
9 of the questions in the notices was about joint
10 planning authority between New York and New Jersey,
11 or I think it was a regional was the way the
12 question was posed. I think electrically it makes
13 a lot of sense. Certainly there could be some
14 efficiencies in trying to combine some of these
15 investments. I think politically, from a
16 regulatory perspective, it would be incredibly
17 challenged. And, PSE&G knows that, along with the
18 BPU and others in this room that have been involved
19 in some of those seams issues with our neighbors to
20 the northeast.

21 I will say, as Sue mentioned, the PJM
22 tariff on public policy process -- I think she
23 summed it up well -- it seems like it gives the
24 states a fairly wide latitude to determine the
25 types of projects they want to do. And, also, to

1 identify the people to implement them. And, Sue
2 can answer more about this; but, my understanding
3 is the rules are sort of up to the state. So,
4 what the process looks like, how long any sort of
5 planning process goes, I feel like those decisions
6 can be made jointly with PJM. But, Sue can answer
7 that.

8 Final thing is if there is some sort
9 of a third-party transmission approach, however it
10 may be executed, a couple of things on that. I
11 feel like there's obviously a lot of lessons
12 learned over in Germany. I think it would be not
13 very difficult for us to speak with the German
14 transmission owner that owns some of those things,
15 and some of those market participants, to really
16 get behind the, I'd say, the higher level to
17 understand what the real issues were; and, how to
18 design protections in the tariff for the
19 developers, to make sure that if they build a
20 project there's going to be a transmission line
21 there to serve it.

22 I also think if there is some sort of
23 third-party transmission solution, developers
24 should have time to incorporate what that solution
25 is into their bids. So, their efficiencies, for

1 example, if you can eliminate an off-shore
2 collector station that goes from 66 to 230, but
3 that 66 could be fed directly into a converter
4 station, you can save the cost of that 230 step-up
5 station if you're an off-shore wind developer.
6 So, it's important that the developers don't
7 propose a project without knowing kind of what
8 their transmission solution is. This may result
9 in some delays to actually executing some of these
10 -- putting out some of these generation RFPs. I
11 don't think we're talking about year-long delays.
12 I think we're talking about a few months.

13 Finally -- and, I'd be curious,
14 Josh -- this is an idea I cooked up in my head, and
15 I'd like to get your perspective on it. But, my
16 thought is that if there are third-party
17 transmission participants like the TOs, it would be
18 helpful if the developers were in some way
19 obligated to allow the TO to access portions of
20 their BOEM lease area, and allowed to utilize their
21 right-of-way grant. And, I can envision the BPU
22 allowing this or making this a requirement in some
23 sort of procurement so that the transmission owner
24 does not need to independently go through the BOEM
25 process, the rules of which I think are fairly

1 uncertain at least, as we saw in the Anbaric
2 proceedings earlier in the year. So, it's just an
3 idea. Again, I might have my lawyers look at that.
4 So, I guess we're getting quoted here, so maybe I
5 have to own it. But, that's it. I look forward to
6 your questions.

7 MS. PATNAUDE: Thank you. I'd
8 welcome staff back to the stage and see if they
9 have any questions first.

10 MR. SILVERMAN: Just one housekeeping,
11 though. We will be asking all the panelists to
12 make their presentations available, by the way, and
13 publish those on the website. So, we would very
14 much appreciate that.

15 I was really struck by that last
16 comment. And, talking about how would we best use
17 sort of limited rights-of-way, landing spots, and
18 how do we coordinate that. Is that something
19 where if we were to adopt a radial system, can we?
20 Can we under the BOEM rules let other people use
21 it? You seem to say it wasn't necessarily
22 prohibited from doing that. And, then, from
23 thinking about it from a cost perspective, okay,
24 so, Developer A has put a lot of money into
25 building the radial line, if we then allow other

1 people to use it at some point in the future, is
2 that something -- how would the cost responsibility
3 work? How would outage risk work? So, basically,
4 is it legal, and who pays for it.

5 MR. GANGE: I'll take the first part
6 of that. You know, our goal, sort of leasing that
7 right-of-way instruments are not necessarily
8 exclusive. So, provided that it's demonstrated
9 that something can be a cohabitated area, or a
10 cable crossing agreement is put in place and is
11 demonstrated to be safe and isn't unreasonably
12 interfering with another leaseholder's rights, that
13 is something that could be examined. I don't know
14 that I could say that it would automatically be
15 granted, because there would be some analysis that
16 would have to go into that. But, yes, there is a
17 -- when we grant a lease or a right-of-away it is
18 not an exclusive lease.

19 And, the, for the sort of cost issues,
20 I'll turn that over to --

21 MR. COPELAND: I need to jump in a
22 little bit on the cost. The devil's in the details
23 about where the transition occurs. Right? So, if
24 you had an underground vault shore side that a
25 project, when you run from the water and then from

1 there went onto the grid. And, that vault became a
2 part of Exelon system. Right? Because you're in
3 Exelon East territory --

4 MR. DEMPSEY: Sorry. PSE&G --

5 (Whereupon there is a discussion off
6 the record.)

7 MR. COPELAND: So, with that comes the
8 scenario where you could either have a smart on
9 shore facility that could accommodate multiple
10 projects. And, that you could have an efficiency
11 where maybe the first project builds extra ducts,
12 or some way of getting from, you know, a quarter
13 mile off shore to that duct. Now I'm getting in
14 the weeds here. But, the issue is that costs
15 money. And that when we are in a highly
16 competitive process, and then we at Atlantic Shores
17 would be bidding against someone else. If we were
18 to add some 20 million dollars or 50 million
19 dollars -- whatever that cost is to our project --
20 how does that get counted for us if that's the
21 value. Or it, quite clearly, would be counted
22 against us, because not it's just an increase in
23 our CapX.

24 And, so, that's really the -- I think
25 part of the issue for the BPU to decide is would

1 you like these things included into a project that
2 aren't part of that project; and, if so, how does
3 that project not get deemed for it. Because it's
4 definitely more efficient if you're going to run
5 one cable to shore, that you run one or two or
6 three more conduits in that general area, you cap
7 them, and it allows for much less impact later on.
8 But, how does a project not get penalized for good
9 planning.

10 MR. SILVERMAN: I would say, that is
11 -- I feel like we have our first topic for your
12 reply comments to address. Because I think the way
13 you just phrased that is a wonderful thing. We'd
14 love to see people's ideas about that.

15 MS. TOWNSEND: So, just to build on
16 that. The ducting is one. You can also add
17 additional spots off-shore for circuit breakers
18 that allow flexibility to connect to the other wind
19 farms, giving you that future option to have
20 multiple existing farms off shore. So, you could
21 open that flexible system, maybe as an interim for
22 a much grander longer-term plan to keep your
23 options open in a interim period. And, then,
24 again, it's ducting landing and interconnection,
25 and it's also reliability. So, using an example

1 from some of our projects in the UK, reliability
2 has become a concern, similarly you try to bring
3 the power down into congested areas from supply to
4 load. And, actually, they're using high-quality
5 battery storage integrated into the wind farm to
6 provide that additional stability to the whole
7 area.

8 So, again, that's just three different
9 types of ways. I'm sure with the innovation from
10 the tech teams there could be more that give you
11 those solutions until you've got a grander plan in
12 place.

13 MR. DEMPSEY: Are we talking about
14 bringing that duct bedding off shore by some
15 hundred meters, or are you talking about on shore?

16 MR. COPELAND: So, I'm envisioning
17 that you have -- the way I was describing it is you
18 have multiple ducts off shore, maybe a kilometer or
19 depending on the depth of how close you can get to
20 shore with your -- (Indiscernible) -- vessel. And,
21 then, you would directional drill from an on-shore
22 location out to that point. Then you can cap
23 them, they would be buried, they would be marked on
24 the other buoy, on whatever appropriate safety
25 measures are there -- this is going to be a place

1 that future projects can come into. That's just
2 one idea of picking up. The other one, you could
3 have, you know, a larger cable that's carrying from
4 a substation that's, in essence, under built for
5 future so you have just one larger cable. Which is
6 I think like the UK system, which I think has had
7 some problems. Our UK guys tell me that's not
8 what you want to do. But, I think that that's what
9 I was suggesting.

10 MR. FERRIS: I'd like to explore that
11 timing issue. Josh, how long does it take to
12 grant right-of-way; and, then, from the developer
13 perspective, where in the development process do
14 you start to need some certainty as to transmission
15 solution?

16 MR. GANGE: Yeah. On the timing it's
17 from, I guess, issuing the grant to construction,
18 is at least a couple of years. Because what would
19 happen is if we have an unsolicitor request it has
20 to go through that competitive process that I
21 mentioned earlier. And, at that point, you know,
22 there's mandated notice and comment periods,
23 there's analysis that has to go into whether it's
24 the right time and place to put something like that
25 from environmental and -- (Indiscernible) -- for

1 other purposes, navigation, DOD, et cetera. And,
2 once that is issued there's a lot of survey work,
3 more detailed survey work goes into the development
4 of the general activities plan which would kick off
5 the EIS.

6 So, it will require some advanced
7 planning certainly. I think provided everything
8 goes well, it is a shorter process than the
9 construction of a wind farm. So, there would be
10 space to sort of fit those together, I think.

11 The problem is that developers want
12 sort of certainty when it happens. And, as a
13 federal agency, we can't mandate the use of a
14 third-party line if you're talking about
15 transmission in the State of New Jersey. So, that
16 could be a place that you guys can really explore
17 is whether or not you want to mandate specific uses
18 at certain times. Obviously, that requires those
19 to be built, so perhaps that increases certainty.
20 I don't want to put that on you guys.

21 MR. FERRIS: Let me just follow up on
22 that. So, that's two years from grant to
23 construction?

24 MR. GANGE: Well, from grant to
25 construction. Yes. Then per the regs they're

1 required to, once the grant is issued, within a
2 year they are required to submit the general
3 activities plan. So, from that point on then you
4 have the general EIS process that would be
5 undertaken. And, realistically, that's probably
6 two years at minimum because of the necessary
7 consultations that go into that.

8 MR. COPELAND: Can't you roll that
9 into a project's overall COD planning?

10 MR. GANGE: So, you could if you had
11 -- so, if this was proposed as part of a wind farm
12 project where they have easements, that could be
13 rolled into the COD. Yes. I was thinking more in
14 the terms of having extra capacity via an
15 independent system.

16 MR. COPELAND: So, that you could
17 compress the time line if it was coordinated ahead
18 of time?

19 MR. GANGE: Absolutely. Yeah. If you
20 have a developer on board that was a leasee, or
21 more than one leasees that wanted, to say, connect
22 their projects, you know, there's room for that
23 sort of analysis within the COD stage.

24 MR. FERRIS: And, how about from the
25 developer perspective?

1 MR. COPELAND: So, right now, for us
2 with our few positions in PJM and other ISOs, the
3 interconnection process is not on the critical
4 path. And, by that I mean is that that's not going
5 prevent us from meeting -- (Indiscernible) -- on
6 schedule -- that is more of a function of proper
7 surveys, permits, and the whole COD process. It's
8 the critical component to the process, I don't mean
9 to push it down the list in any way.

10 But, the timing of the overall PJM
11 studies, the expected time for on-shore upgrades,
12 and the associated build out is all within the
13 schedule that we have been proposing and are
14 feasible in the future. And, I think the risk is
15 that if it gets taken out of our hands, then it's
16 not something we can account, so then you have this
17 horrible scenario where some developer wins 800
18 megawatts in New Jersey with the COD of 2027, and
19 the line isn't built in time. That's the German
20 scenario, and I think that's the one that nobody
21 wants to repeat.

22 But, I think it also comes down to
23 financing and the issues around that. And, how we
24 make sure that when you think about project
25 commands that you take in basically risks and add

1 to them -- (Indiscernible) -- when you think about
2 someone else being responsible for how to get your
3 line to shore. So, that's where you run into the
4 scenario where how much is the state willing to bet
5 on this? You know? Would you preemptively build
6 an off-shore line or a substation? Is that cost
7 something that the ratepayers can bear? But, to
8 take that risk with ratepayer dollars before a
9 project is there or fully permitted, that's really
10 the question that comes back -- from us back to
11 you.

12 MS. TOWNSEND: -- (Indiscernible) --
13 the question, as well. We take into account the
14 connection point being interconnected from the
15 layout stage. That's really, really early on, but
16 it makes a big difference -- (Indiscernible) --
17 about the integration synergies. They're not in my
18 head, but we see them, we realize them in all of
19 our projects. It doesn't mean you can't do it
20 another way, but that is what we experience today.
21 And we see this from an early -- (Indiscernible) --
22 transmission is the longest lead time of our
23 projects. So, to procure transmission -- it's
24 different, though, between AC and DC, which maybe
25 we'll here about in technical Panel 3. But

1 particularly the DC is your longest lead time. And
2 even for AC, you have to get in early, and with
3 some really smart things with procurement and
4 agreements and design which might shorten that.
5 But, at the end of the day you have to know and you
6 have to get your transmission line before you can
7 progress with the projects. Timing of when
8 changes come in to take that into account.

9 And, then, just to put some numbers on
10 it, from my colleagues in Germany, it cost the
11 German ratepayers one billion euros from one year
12 of delay -- (Indiscernible) They have a system
13 where they take the cost of delays and they put
14 them on to the German ratepayers. It's quite easy
15 to see where those costs went. But, that's not to
16 say that if you experience delays here, if you
17 incentivize that appropriately. But, that's some
18 of the numbers around the delays to interconnection
19 process in terms of that.

20 MR. GANGE: -- (Indiscernible) -- from
21 the federal perspective is that in the COD process
22 we utilize typically a -- (Indiscernible) -- so
23 there is a little bit of variability for proposing
24 multiple line options in the earlier stage. Once
25 they get down to the facilities -- (Indiscernible)

1 -- that pretty much has to be determined. But,
2 during the early stages of the project proposal,
3 there is a little bit of flexibility.

4 MS. HOLLAND: Thank you. I did have a
5 couple of questions myself. So, I know the prior
6 panel and this panel there was a strong indication
7 that we really need to know the end goal and then
8 work from there.

9 And, what I'm particularly intrigued
10 about, as was kind of discussed, is that, you know,
11 is it just the New Jersey objective; or, is the
12 fact that we are part of the PJM region, is that
13 the end goal? Because, obviously, our sister state
14 commissions and some of the other states along the
15 Atlantic coast have their own objectives. Is that
16 the end goal that we need to be looking at from a
17 PJM regional-wise perspective?

18 And, then, of course, given New
19 Jersey's unique geographical location, we're
20 actually on the border with another region, if you
21 will, which is the State of New York. And, New
22 York obviously has very aggressive objectives, as
23 does New England. So, is that the end goal that
24 we're planning the transmission grid for?

25 MS. GLATZ: So, there's pros and cons.

1 And, ideally it would be good if you could know the
2 full development. And, so, that would allow you
3 to consider where there's synergies, because you
4 may find if you ignore state boundaries you look at
5 the electrical grid, there may be more optimal
6 locations in order to bring that off-shore
7 generation.

8 And, of course, obviously, there's
9 complications. The more parties you have to
10 coordinate with, you introduce more challenges.
11 And, that could introduce more delays just in terms
12 of trying to reach some consensus position on where
13 should the cost be, because the cost allocation
14 with the rights that you would achieve with that.
15 That's never an easy discussion. So, the fewer
16 parties you work with, obviously you probably have
17 more opportunity to get some agreement.

18 So, it's a trade off. You know? Do
19 you have to do it? No. You don't. It's just that
20 there may be more opportunities to get -- to
21 recognize where is that optimal point or multiple
22 points to bring in more generation. So, it's
23 certainly worth looking at, at least to envision
24 it, whether or not you might ultimately do that.
25 But, again, you would have that -- once you have

1 that knowledge, then you can make a more
2 knowledgeable decision about is it worth looking
3 beyond just the State of New Jersey, and even more
4 so just beyond even the PJM RTO.

5 MR. DEMPSEY: Yeah. And, one thing
6 I'll just add is that New Jersey has a pretty
7 robust 500 kV system. It's fifty miles inland.
8 Absorbing ten thousand megawatts on the 500 kV --
9 (Indiscernible) -- the issue, the planners are here
10 to correct me. I'm fairly certain that's the case.
11 So, really the issue then becomes sort of for us,
12 the PJM has a system that's so big that absorbing
13 it is also an issue because of the 500 kV backbone
14 that's on land. So, I think the value may be more
15 for other states that don't have such robust
16 connections, trying to get to our existing system.
17 Unless we need to build out, let's say that coastal
18 kind of off-shore piece or even reinforced system,
19 because if the 500 kV were brought closer to the
20 beach a lot of problems would go away, in my view.
21 So, that's my perspective. Sue can correct me.

22 MR. COPELAND: I know as a developer,
23 absolutely agree bring 500 kV as close to the beach
24 as you can. But, the other thing to keep in mind
25 is that each state has these specific requirements

1 about where you're supposed to land. So, New York
2 said tell them it's JFK, New Jersey said in New
3 Jersey, Maryland said it's the -- (Indiscernible)
4 -- which actually is the legal definition, so it's
5 parts of Delaware but not all of it. And, so, you
6 end up with these kind of funny constructs because
7 New Jersey, yes, you had a more robust 500 kV grid
8 that was closer to the coast you could bring power
9 from here and then get it to New York. But, in
10 the New York process you get penalized for that at
11 a pretty high rate, along with the policy risks
12 that goes with that.

13 And, so, that's where the struggle
14 becomes one of having state policies change.
15 Because it would be a lot easier to get power into
16 Maryland from New Jersey, then trying to go with a
17 138 kV -- (Indiscernible) -- design based to handle
18 like Ocean City during the summer. That Ocean
19 City, not this Ocean City.

20 And, so, with that you got this kind
21 of bizarro scenario that maybe the technical
22 construct, you could have AC/DC line that comes
23 into New Jersey from off-shore projects and then
24 exports into New York. How does that count?
25 Right? Because you've landed in New Jersey, but if

1 it's got a shunt that runs right over to New York
2 and lands -- (Indiscernible) -- have you violated
3 the New York rules? Have you -- have you gone
4 through -- you know, you have these interstate
5 commerce, you have all these sort of things that
6 come into play that there's actual technical
7 solutions to all of them. Those are actually
8 fairly straightforward. It's the political ones
9 that become the tougher ones.

10 MS. HOLLAND: Also, in terms of
11 bringing the project and interconnecting with the
12 500 kV system -- not wanting to talk about Panel 3
13 which is more technical -- but, in terms of the
14 framework, what would your recommendations be for
15 developers coordinating with you? For example, you
16 mentioned that, you know, there's opportunities
17 here to coordinate with the transmission owners.
18 But, what are your specific recommendations about
19 that? And, with regard to the 500 kV system, how
20 would that work?

21 MR. COPELAND: So, my first
22 recommendation would be to have the TOs work
23 collectively. There's four of them, should be
24 able to figure this out to say where are the most
25 stable locations on the grid to handle -- just pick

1 a number, say ten thousand megawatts, and then to
2 think about that. And, so, that you then
3 understand the on-shore capabilities of the system.
4 And, then, you figure out how best to bring those
5 key locations closer to the beach using the
6 existing rights-of-way. That would be kind of my
7 first thing. Because we can get to our points of
8 interconnection. It's a heck of a lot simpler if
9 those points of interconnection came to us.

10 MR. SILVERMAN: So, if I could just
11 ask a real quick question. I hear most folks
12 saying that you think we should be working on the
13 on-shore portion and not on the off-shore portion.
14 Is that -- or let me ask it a different way.
15 Would you have us spending our efforts on the
16 on-shore portion or the off-shore portion of a
17 shared grid?

18 MS. TOWNSEND: I think the way I would
19 see it is your on-shore system is your biggest
20 value to getting supply to the load. You're doing
21 something you've never done before. You're getting
22 variable power, coastal two load, and PJM and your
23 RTOs should be able to with combined effort
24 articulate where those issues are. That's your
25 first challenge. Prescribing the off-shore

1 solution is a close but a secondary challenge to
2 that. And, you've got more flexibility where the
3 industry is. You don't need to prescribe that
4 solution right now. So, fix the key challenge on
5 shore. That will tell you and guide us all on how
6 best to interconnect to that. And, that will
7 automatically start to carve out a clear plan of
8 how to then bring that power in in the best way for
9 the New Jersey ratepayer, and the other stakeholder
10 groups we heard from.

11 MS. GLATZ: I'll just echo the comment
12 again about the grid. Yes. There is a 500 kV grid
13 and it's fairly robust, but it does not go to the
14 beach. That is true. And, in terms of for a
15 smaller amount of generation, you can bring it on
16 at a lower voltage. And, that may work to a
17 certain point, but eventually -- and this is really
18 getting to the point of trying to look into the
19 future, because if you do have a vision that is
20 substantially more, it would behoove you to do that
21 analysis now to figure out what might that vision
22 be, and how much would we have to expand at the
23 higher voltage. And, would we have to bring that
24 closer to the shore. What reinforcements would be
25 needed so that whatever generation is out there can

1 access that. Because that is going to be very
2 expensive, and that could become potentially a
3 hurdle for getting more off-shore wind development.

4 MR. COPELAND: I just want to echo
5 that. -- (Indiscernible) -- used car four
6 different tires on it, different sizes, different
7 manufacturers. And, instead of sort of choosing
8 the tire that was the newest and buying three that
9 matched that, just got four new ones. And, I think
10 New Jersey is at a place where we can step back and
11 existing projects can keep going. But, as you're
12 planning forward, you get to pick those four new
13 tires. You get to work with the TOs, work with the
14 developers, work with other stakeholders, and be
15 thinking about what happens after that first three
16 and half gigawatts. Because we can do that, I
17 think everyone has said that. But, it's going
18 forward, and if you've really looked at that
19 on-shore system it will help identify what the
20 off-shore system will look like.

21 MR. DEMPSEY: So, my thoughts there
22 are I think I understand and agree with most of
23 what you're saying, Abe. I think the off-shore
24 piece shouldn't be totally discounted. I think
25 there's a few reasons. One is there's only a

1 handful of companies that actually execute this
2 sort of couple. There's a couple of OEMs, there's
3 a handful of cable companies. We're all largely
4 working with the same people. I wouldn't say that
5 I have the same amount of knowledge, or anybody of
6 the developers have the same amount of knowledge,
7 but it's not like it's an impossibility.

8 I think when you look at the first
9 panel, some of the fishing concerns. And, I do
10 think there's value perhaps outside of simply the
11 cost of some of the other externalities around
12 fishing, but also permitting. So, I mentioned it
13 before, I think we're all saying it's easy to get
14 3,500 megawatts. There's zero megawatts now.
15 Right? So, I don't know that permitting is going
16 to be as much of a lay up on that side either.

17 And, then, I think lastly on the cost
18 efficiency side. I know they're contemplating two
19 thousand megawatt platforms that are DC in Europe.
20 Those are a substantial cost. You do wonder at
21 some point there is probably a tipping point with
22 the cost efficiency piece. So, I'm not suggesting
23 that it is absolutely mission critical to get the
24 first project or two on there. But, I also don't
25 think it's -- it's not something that's worth

1 examining.

2 MR. SILVERMAN: Josh, thanks. Because
3 I thought we solved all the problems before you
4 spoke.

5 MS. PATNAUDE: I'd like to get some
6 audience questions at this time. We have about
7 twelve minutes left.

8 MR. TABRIZI: Mike Tabrizi. Just a
9 question for Sue of PJM. You talked about two
10 different approaches for the transmission planning,
11 interconnection queue or the state policy. In your
12 view, or in PJM's view, given the aggressive target
13 and the mandates here, which of these two could be
14 more efficient or more optimal in the long term?
15 Does PJM have any view on that?

16 MS. GLATZ: Do we have an opinion? I
17 don't know that I would say we have one that says
18 yes, one's better or worse, or preferred. But,
19 rather, there's a number of factors to be
20 considered. And, there's certainly some that could
21 be some potential advantages. And, I think several
22 people talked about some of those in terms of using
23 more effective, cost-effective, to bring the grid
24 closer to the shore.

25 A lot of this would really require

1 some analysis to do that. And, certainly PJM is
2 available to perform those studies. And, I think
3 just an aspect that if we were going to do any real
4 extensive analysis, of course we would have to make
5 that transparent to all stakeholders so others
6 would be able to weigh in as to whether or not that
7 one approach is more effective than the others.

8 There's certainly, like I said, pros
9 and cons. It's also a question of what the state
10 would like to accomplish in terms of maybe, you
11 know, cost is obviously, as we all talked about,
12 trying to do something sort of cost-effective.
13 But, there maybe other factors in terms of
14 minimizing impacts, minimizing revisiting stations.

15 And, so, I can't speak for all of the
16 things that New Jersey wants to accomplish. But, I
17 can say that probably the best way to do that would
18 be to really do those kinds of studies. And, they
19 would have to take all those in effect.

20 MR. TABRIZI: And, my last question
21 from anybody from the staff from the panel. I
22 heard that everybody was talking about the existing
23 stations on shore. Now, I'm not familiar with the
24 permitting challenges in the area, but are you open
25 to the use of stations if that is more optimal from

1 a cost standpoint?

2 MR. SILVERMAN: I don't know that
3 you're allowed to ask us questions. That's a
4 great question. Frankly, I don't know that we
5 necessarily have a view. I think we can all be
6 open to any of the various solutions, depending
7 what's permissible and what's going to be the least
8 cost solution. But, I turn it over to the panel,
9 if you all have views on whether we're better
10 looking at sort of upgrading existing stations, or
11 building something from scratch.

12 MR. DEMPSEY: I think it would
13 probably be a mix of both. But, if you're talking
14 about a much higher voltage along the coast line,
15 it would likely require a new station, or the
16 expansion of one that would be akin to just
17 building a new one.

18 MS. GLATZ: Eventually you're going to
19 have to get to the grid, so whether you need one
20 or -- you know, it's going to be very specific to
21 the sites, where you're bringing the power in to in
22 terms of what's available, not only electrically
23 but also in terms of the physical area what's
24 possible to do there.

25 MR. COPELAND: And, I think the other

1 part that goes into that analysis is is it better
2 to -- by better, I mean is it better for the
3 ratepayer to upgrade a substation that's further
4 inland, and bring the wires closer to the shore so
5 that you connect to those wires as opposed to a
6 whole substation. That would be part of the
7 analysis with the TOs, as well.

8 MS. PATNAUDE: Any additional
9 questions from audience members?

10 MR. SILVERMAN: I think we're ready
11 for a lunch break.

12 (Whereupon the luncheon recess was
13 held at 12:33 p.m.)

14 (Whereupon the morning session is
15 concluded.)

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C E R T I F I C A T E

I, CHRISTINA RESTUCCIA, a Court Reporter of the State of New Jersey, authorized to administer oaths pursuant to R.S.41:2-2, do hereby CERTIFY that the foregoing is a true and accurate transcript of the testimony that was taken stenographically by and before me at the time, place and on the date herein before set forth.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am not financially interested in the action.

Christina Restuccia

Notary Public of the State of New Jersey
My Commission expires November 14, 2021

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