In The Matter Of:

Application of NTE Connecticut, LLC v.

Closed Evidentiary Proceeding

December 15, 2016

Redacted

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STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Docket No. 470

Application of NTE Connecticut, LLC for a Certificate of Environmental Compatibility and Public Need for the Construction, Maintenance and Operation of a 550-megawatt Dual-Fuel Combined Cycle Electric Generating Facility and Associated Electrical Interconnection Switchyard Located at 180 and 189 Lake Road, Killingly, Connecticut

Closed Evidentiary Proceeding held at the Connecticut Siting Council, Ten Franklin Square, New Britain, Connecticut, Thursday, December 15, 2016, beginning at 1:02 p.m.

H e l d   B e f o r e:

ROBERT STEIN, Chairman

A p p e a r a n c e s:

Council Members:

SENATOR JAMES J. MURPHY, JR.,
Vice Chairman
PHILIP T. ASHTON
ROBERT HANNON
LARRY P. LEVESQUE, ESQ.
DANIEL P. LYNCH, JR.
ROBERT SILVESTRI

Council Staff:

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Executive Director and
Staff Attorney
MICHAEL PERRONE,
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For NTE Connecticut, LLC:

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A p p e a r a n c e s: (Cont'd.)

For Not Another Power Plant and the Wyndham Land Trust:

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For the Sierra Club, Connecticut Chapter:

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Closed Proceeding Participant List:

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LYNN GRESOCK
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JOHN GULLIVER
MARK MIRABITO
MARY MINTEL
ETHAN PATERNO
CHRIS POLLAK
CHRIS REGA
FRED SELLARS
SETH SHORTLIDGE

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CONFIDENTIAL SESSION

2:01 P.M.

M I C H A E L B R A D L E Y,

E T H A N P A T E R N O,

called as witnesses, being previously duly sworn, were examined and continued to testify on their oaths as follows:

THE CHAIRMAN: Good afternoon, ladies and gentlemen. This closed hearing is called to order, today, Thursday, December 15, 2016, at approximately 2 p.m.

This closed evidentiary hearing is a supplement to the public hearings held on October 20, 2016; November 3, 2016; November 15, 2016; and December 15, 2016 for the parties who have executed a nondisclosure agreement pursuant to the protective order issued on November 1, 2016 to cross-examine NTE on the responses to NAPP's interrogatories 1, 3, 4, 5, 8, 10, and 11, consistent with the Council's response to Question 4 of NAPP's request for clarification dated October 31, 2016. And rebuttal testimony of Ethan Paterno; and the rebuttal testimony of Michael Bradley, both dated December 8, 2016. And to cross-examine NAPP's expert, Mr. Fagan, on portions of his prefiled testimony, dated November 15, 2016, related to the confidential information that is subject to the protective order issued on November 1, 2016.

Pursuant to Connecticut General Statutes 1-210(b), the information to be discussed is confidential and exempt from public disclosure. No participant in this closed hearing shall use or disclose the confidential information for purposes of business or competition, or for any other purpose, other than for the purpose of preparation for and conduct of this proceeding, and then solely as contemplated herein, and shall in good faith take all reasonable precautions to keep the confidential information secure in accordance with the purposes and intent of the order.

A verbatim transcript will be made of this hearing, but is subject to NTE's protective order issued on November 1, 2016.

And I'll ask Attorney Bachman to add some clarification.

MS. BACHMAN: Thank you, Mr. Chairman.

With regard to the transcript for this protected session, it's inevitable that perhaps some public responses to questions may pop up for which some of the parties and intervenors, and even the Council, may want to cite to in briefs in our final decision.

So in thinking about that, I devised somewhat of a plan that perhaps what we could do is, we've asked that this particular hearing session transcript be expedited, so that we can get it as soon as possible. And then with the indulgence of Attorney Bashaw's witness, Mr. Fagan, and also Attorney Baldwin's consultants from PA Consulting, could go through the transcript and redact the portions of the transcript that those entities, whose information is to remain confidential, should be confidential, and then submit the redacted portion to all the parties and intervenors that signed the nondisclosure agreement, that they could review it.

And then at a subsequent hearing -- possibly January 10th might be a little early, given the holidays -- but at the January 26th hearing, if we could just get everyone on the record to indicate that they've agreed that the transcript from this proceeding, as redacted by their respective consultants, is acceptable. And what we'll do is we'll take those redacted portions, we'll post them on our web site, and make it available to everyone else with the redactions, and retain the actual unredacted transcript here in our office. And, of course, anyone who signed the nondisclosure agreement is entitled to have a copy of the confidential transcript. If that seems to reasonable to everyone, or if anyone has any objections, please let me know.

Thank you, Mr. Chair.

THE CHAIRMAN: Thank you. We'll now begin the cross-examination of the applicant, first starting with Council staff, Mr. Perrone.

CROSS-EXAMINATION

MR. PERRONE: Thank you, Mr. Chairman.

Beginning with the unredacted version of the NTE responses to NAPP interrogatories, Question 1 has attachment 1 towards the end where it has the additions and retirement data. The first question, is COD the commercial operation date?

THE WITNESS (Paterno): That is correct.

MR. PERRONE: Approximately when was

the data in these two tables gathered?

THE WITNESS (Paterno): It would have been around the time the application was filed, which would have been mid August.

MR. PERRONE: Summer capability data for plants, that changes monthly, generally?

THE WITNESS (Paterno): It can, yes.

MR. PERRONE: Turning to the retirements table, further down, I see Bridgeport Harbor 3 has a projected retirement date of May 2020. Are you aware that pursuant to a community environmental benefits agreement that Bridgeport Harbor 3 could operate until July 2021?

THE WITNESS (Paterno): Yes, we are. And we've since taken that into consideration and moved Bridgeport Harbor's retirement date to a likely -- based on the agreement there, of July of 2021. However, I would note that Bridgeport Harbor is one of the 6,000 megawatts of at-risk retirements, as identified by ISO New England, and is, in fact, the only one that is a retirement within the PA analysis.

MR. PERRONE: But would the one-year difference make a material difference in your model?

THE WITNESS (Paterno): All else equal, no, I don't think it would. And here's why. So all else equal, 400 extra megawatts, which is basically what happens if you remove the retirement from the analysis, would add more capacity, all else equal, and decrease the need for Killingly. However, we know that there were 1,622 megawatts that submitted after the application -- I believe that was in mid October -- what's called a static De-list bid, or price sensitive De-list bid. And that, in layman's terms, is their indication that at a given capacity price they would be willing to drop out of the market or retire. Those 1,622 megawatts are not reflected. And because of that, all else equal, if you added the 1,622 megawatts, it would increase the need for Killingly.

MR. PERRONE: In terms of the KEC projected net CO2 reductions, if you assume that Bridgeport Harbor retires a year early, if it actually runs for another year, how does that affect your net C02 reduction?

THE WITNESS (Paterno): It would actually increase them slightly. Bridgeport Harbor Unit 3 doesn't run a lot, to be honest.

Its capacity factor is very low, certainly less than 20 percent, and probably less than 10 percent of the time. But to the extent that Bridgeport Harbor 3 remains in the market for one additional year, it would be displaced or operate less for one additional year and would increase the CO2 emission savings from Killingly.

MR. PERRONE: So with that, you could say your savings are a little bit conservative or slightly understated with that?

THE WITNESS (Paterno): Yes, I would agree with that statement.

[redacted]

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[redacted]

[redacted]

So we take into account the individual load forecasts on behalf of the individual independent system operators. ISO New England, PJM, CAISO, and the like, that at the end of the day PA's clients rely on us to come up with our view of what we view is a reasonable net peak demand forecast over time.

MR. PERRONE: Is Block Island the only currently approved offshore wind project that you're aware of in the area?

THE WITNESS (Paterno): Subject to check, yes, I believe so. But I can say it is the only operating wind project in the U.S.

MR. PERRONE: Mr. Bradley, on November 3rd, I believe you testified that the at-risk plants have a high probability of retiring by 2020. Would you have anything more to add to that? Could you be more specific about the probability or any further information on that?

THE WITNESS (Bradley): Really the further information that we would have would be based on projections from ISO New England. And ISO New England does very detailed studies looking at the economics, and therefore they are the ones who have performed the detailed study and labeled those at risk. I would say just from a knowledge of ISO New England's rationale for them to be on that list of at risk, there is a very high probability from a reliability standpoint that those units will retire.

MR. PERRONE: Is the KEC project necessary for the development of a competitive market for electricity?

THE WITNESS (Paterno): Most certainly, yes, in my professional opinion it is.

MR. PERRONE: Could you elaborate on that and tell us why?

THE WITNESS (Paterno): Absolutely. I

mean, KEC is the type of project the competitive markets were developed to create. And the competitive markets stretch back to the late 1990s and really go back to an idea by an MIT professor, Paul Joskow, in the late eighties where he said maybe we can reduce electricity costs by opening them up to competition, similar things, what you've seen with railroads and the like. And why that is, is because KEC is not relying on contracts with electric utilities in order to get built. It is relying on market signals primarily for capacity and energy, as well as ancillary services. And it is responding to those market signals and identifying a need to build the plant. And it's, again, to reemphasize, not relying on electric utility contracts, which is what these markets look like before the wholesale construct took into effect in the late nineties.

THE CHAIRMAN: Could I just -- I'm not clear. So you said the competition would allow for reduction in prices?

THE WITNESS (Paterno): That was the idea behind it when the wholesale markets were originally created. And I'm paraphrasing here, but it was Professor Joskow who hypothesized that deregulation efforts in other industries leading up to the late eighties had resulted in competition and lower pricing within that particular market. And he hypothesized that if you were to do that within the electricity market, you could see a similar effect.

THE CHAIRMAN: Has that, in fact, happened in Connecticut?

THE WITNESS (Paterno): I haven't done the analysis, Mr. Chairman, so I cannot say definitively one way or the other. It's difficult to say what that would actually result in, because when you run an economic analysis to identify a particular change in a variable, you try and hold all else equal. But unfortunately, you're not in an environment where you can hold all else equal. You've got fluctuations in commodity prices from year to year, gas, oil, and the like, you know, fluctuations in peak demand from year to year. So it is not easily discernable whether it has or not, but I would say within the framework of how the wholesale markets were created, it was exactly created to attract facilities like Killingly and, in particular, transfer the financial burden and risk of power generating plants from ratepayers to private developers.

THE CHAIRMAN: I understand that. I guess where I'm stuck is -- and I don't know where -- well, I've seen it a number of times. I think Connecticut is somewhere like in the top three from cost of electricity among the 50 states. So it doesn't seem to have been a very successful result or the hypothesis was -- I can understand the hypothesis, but I'm just somewhat at a loss as to why --

THE WITNESS (Paterno): Why prices are so high?

THE CHAIRMAN: Yes.

THE WITNESS (Paterno): It's a great question. So to use Mr. Bradley's home state of Georgia which enjoys, I believe, some of the lowest electricity prices in the United States, a big reason of that is coal, I would say. And, in particular, if you look at the resource mix within Georgia, as opposed to, let's say, Connecticut, obviously, Connecticut has very low coal capacity. In fact, it's Bridgeport Harbor Unit 3. However, Georgia enjoys, or realizes, a tremendous amount of coal generation with very low variable operating costs, which contributes to the low electricity prices realized by Mr. Bradley and other ratepayers in Georgia. That's not the sole answer, but that is but one component of talking about the electricity price differences in Connecticut versus other regions that you've heard of with cheaper costs.

THE CHAIRMAN: So this is not a question, but I can't resist. So we should welcome the resurgence of coal --

Mr. Silvestri.

MR. SILVESTRI: Thank you, Mr. Chairman.

The price of electricity is very lucrative. You know, the way I look at a utility bill, it's generation, it's transmission, it's distribution, it's add-on costs for community benefit, if you will, and there's also a base price that's there. The focus of late has really been on reducing generator cost, as opposed to doing anything with transmission and distribution.

So you have this much of a pie that's there, and we're kind of working on this part that's already going down because of the price of natural gas and other types of factors that are involved. So I have a hard time struggling to get an overall, yes, this is beneficial, because it's only affecting that little part of the pie.

THE WITNESS (Bradley): To add a little bit to Mr. Paterno's as well, kind of going back to the New England versus other region example. If you look at has it been effective, I think if you look at where pricing would have been without ISO New England, I think it is. Because when you look at a bilateral market design, such as Mr. Paterno mentioned in Georgia, you have individual utilities operating as a stand-alone system, where in New England you've got -- the utilities now are under a total dispatch. So I think if you took all of the generating resources that are in ISO New England, and just from a pure economic dispatch perspective, dispatched those resources in their inherent control areas, you're not going to have as an efficient dispatching utilization of those resources as you do in the combined pool.

Now, going back to, say, to the Georgia example, if you look at why is that not the case there, well, it's an economy of scale situation, because ISO New England, when everything is combined, is around 30 megawatts -- 30,000 megawatts. And approximately the one incumbent utility that covers, say, Georgia, for example, Southern Company, is about 30,000 megawatts. So even though it's stand-alone, you've still got that economy of scale. So you're much better off with the joint dispatch.

MR. ASHTON: I think you made a mistake in referring to Southern Georgia's 35 megawatts. It's 35 gigawatts.

THE WITNESS (Bradley): It's 35,000 megawatts.

MR. SILVESTRI: But the point, when you get to ISO dispatch, it's economic.

THE WITNESS (Bradley): It is economic.

MR. SILVESTRI: Right. So reference was made to Bridgeport 3, for example, which is a very labor intensive unit to run. It's probably operational on a day like today, possibly because the demand is there, and normally that would run on a very, very cold day, I think, at this point. The forecast will be there. But again, that's incrementally more expensive than some of the new units, particularly the gas ones, that have come in. So, again, I think you're looking at Georgia as being economically dispatched, but ISO is as well.

THE WITNESS (Bradley): Absolutely.

MR. SILVESTRI: So why is there the big difference in prices?

THE WITNESS (Bradley): I think, as Mr. Paterno mentioned, a lot of reason for the big differential in pricing is fuel cost and availability of fuel. As Mr. Paterno mentioned, there's a lot of coal in the southeast, the midwest. The new resources that are coming in have a natural gas price, even though there are natural gas fired resources, that is significantly lower than a natural gas price that you would get in New England. And so that, as well, is another major driver.

For example, a facility that NTE is building in North Carolina in the wintertime is going to have a projected natural gas price of, right now, $3 to $4 an MMBTU. The natural gas price that we're seeing in New England for Killingly for that exact same winter month is as high as $8 or $9 an MMBTU simply because of the supply and demand and the deliverability difference. So that's a big piece.

I think the question going back to the do the competitive markets work or not, I think you really need to look at the joint dispatched and the joint planning for resources compared to a number of individual small utilities planning those on a separate basis. Your overall asset utilization is more efficient.

MR. ASHTON: Could it also be affected by the fact that we tend to have a lot of small units in New England versus the larger units that are, my perception is, on the Georgia system 500 megawatts, typical, 300 common; we're 400 and below?

THE WITNESS (Bradley): Yes, sir, that is true.

MR. ASHTON: So they're getting thermal efficiencies -- working on it. There's a number of belt and suspenders, at least.

THE WITNESS (Bradley): That is another good point to finish up that comparison. We won't belabor the point. But, for example, Killingly here in New England is a 1-on-1 combined cycle that fits this market size. The coal units here in New England are fairly small. Going back to the southeast units, as a partial example, there are two generating units within probably 30 miles of where I live. One is a coal unit that's approximately 4,000 megawatts, and the other is a combined cycle unit using technology similar to Killingly. Where Killingly has 1-on-1 combined cycle, this has six units for about 2,000 to 3,000 megawatts. So the economy of scale, because of the much larger market, is significantly different as well.

MR. ASHTON: They also can buy some power from TVA, can't they?

THE WITNESS (Bradley): Yes, they can.

MR. ASHTON: And that's subsidized by New England.

(Laughter.)

THE CHAIRMAN: Okay. Mr. Perrone.

MR. PERRONE: Beyond what you have here in your addition summary, are there any other projects proposed for construction in the ISO region that would increase capacity?

THE WITNESS (Paterno): I have not reviewed their interconnection queue as of yesterday. However, as of the time of our analysis, which, again, concluded mid August when the application was filed, there were no other projects, in our view, that were likely to come into the market.

MR. PERRONE: In the 2016 regional electricity outlook -- and I'll refer to that a few times -- on page 10 there's a chart for existing and proposed wind, existing and proposed solar, and existing and proposed energy efficiency. Would any of those three, or a combination of those three, be able to meet the 6,000 megawatts of at-risk retirement, or some portion of it?

THE WITNESS (Paterno): It certainly could. But without knowing what facilities are behind these propositions, it's tough to speculate as to how well or at what cost that need could be fulfilled at the end of the day. In particular, some of PV or EE could be prohibitively expensive, just hypothetically and, in fact, the proposed wind as well, and not be deemed to be a cost effective reliable resource based on the FCA mechanics. So, in theory, yes, it could.

MR. PERRONE: Could you tell us about any present or possible future renewable energy subsidies, particularly for Connecticut?

THE WITNESS (Paterno): Yes, absolutely. The biggest subsidy, obviously, that we currently have is the ITC or PTC, investment tax credit, or production tax credits, which are basically tax rebates to renewable developers to offset their capital costs. Those were renewed last year, and are set to expire over the next couple years. The PTC being fully extinguished, I believe, by the late teens, early twenties, and then the ITC stepping down to a value of approximately 10 percent by the early 2020s. And what that means by stepping down to a 10 percent value would mean, let's just say hypothetically in 2022, if I was to build a wind plant, my capital cost would be offset by 10 percent from a tax rebate.

MR. PERRONE: As far as energy --

THE WITNESS (Paterno): Apologies, Mr. Perrone. Just to correct my previous example, that would be for a solar plant, not for a wind plant associated with the ITC.

MR. PERRONE: Okay. Moving on to energy storage. Is most of the existing energy storage in New England pump storage?

THE WITNESS (Paterno): Yes. And the biggest one would be Northfield Mountain, which I believe Mr. Ashton has referred to previously.

MR. PERRONE: As far as upcoming energy

storage, I see on page 22 of the regional electricity outlook, it notes 94 megawatts of battery storage is being proposed. Are you aware of any other storage?

THE WITNESS (Paterno): I am not. And I would note there's been two recent RFPs held in New England, one a tristate RFP, of which Connecticut is a member, along with Massachusetts and Rhode Island, as well as an RFP held by DEEP for small resources, renewable resources. And battery storage was not selected in either of those two particular RFPs, which just concluded this fall. Though, they still have to negotiate contracts with the short list of bidders.

MR. PERRONE: And just one technical clarification. I know we have extensive discussion on capacity factor. Does that utilize the summer rating of the plant for the megawatts when you calculate capacity factor?

THE WITNESS (Paterno): It depends. Really, when you calculate capacity factor, you can either do it off of the nameplate, the summer, or summer/winter average. Typically when thinking about thermal generation resource, or really any kind of resource, you want to do it off your summer capacity, because that's what's being used to meet peak electricity demand, which is what keeps the lights on at the end of the day.

MR. PERRONE: Mr. Paterno, on page 3 of your rebuttal testimony it talks about power purchase agreements. Generally speaking, if a power plant participants in the FCA, they don't seek a PPA. Is it generally one or the other?

THE WITNESS (Paterno): No. I think you could certainly see both and, in particular, just using a wind plant as an example, I don't think it would be imaginative to assume that a wind plant could receive a PPA, yet still seek to bid into the forward capacity auction to realize the capacity of revenues that would result if it was to clear.

MR. PERRONE: If NTE does not clear the FCA auction, and I understand, if approved, they would still build a plant anyway; if you haven't cleared FCA, are you still eligible to participate in the energy and other ancillary markets of ISO?

THE WITNESS (Paterno): Yes, you are. You just do not have a commitment to. It is your option.

MR. PERRONE: Would there still be a

public benefit to participate in those markets absent the FCA?

THE WITNESS (Paterno): Yes, absolutely they would. All else equal, if you were to see Killingly bid into the day-ahead electricity market, you would see, all else equal, lower electricity prices resulting.

MR. PERRONE: ISO notifies sponsors of new resources engaged in the qualification process, whether its resource has been accepted to participate into FCA no later than 127 days before each FCA. Does that sound correct?

THE WITNESS (Paterno): I believe so, yes, subject to check.

MR. PERRONE: Have you received notification from ISO that you've been accepted for participation in FCA 11?

THE WITNESS (Bradley): Yes, we have.

MR. PERRONE: Did you receive that around early October? If you have a date on that, that would be great.

THE WITNESS (Bradley): It was either September 30th or October 1st. I don't quite remember.

MR. PERRONE: I understand FCA is a

descending clock auction, and your projected final clearing price is about $6.19. How is the initial starting price determined, generally?

THE WITNESS (Paterno): The initial starting price would be a function of what the ISO determines is the net cost of new entry, or net CONE, basically what monies are needed by what the ISO deems to be the marginal capacity plant in order to make it whole, or make it profitable to enter the market, and the starting price would be a multiple of that. I think for FCA 11 the starting price is somewhere in the neighborhood $15 to $20 per kW month.

MR. PERRONE: So they start out with that number, and they gradually lower it until they've reached the lower possible price where you meet or exceed NICR?

THE WITNESS (Paterno): They lower it until the supply curve intersects with the downward sloping demand curve, which can be at or in excess of NICR, and has been in excess of NICR for FCA's 9 and 10, which are the first two auctions to use the sloped demand curve.

MR. PERRONE: And I understand the projection of $6.19 per kilowatt month, so that would be multiplied by the summer rating of the plant, about 500,000 kW?

THE WITNESS (Paterno): That would be correct, yes.

MR. PERRONE: Just to briefly revisit that cost issue. So as you move to the right on the demand curve, my understanding is the megawatts goes up and the price goes down. Is that correct?

THE WITNESS (Paterno): That is correct. And as you increase the megawatts and you move downwards on that demand curve to the right, you're actually decreasing the loss of load expectation. So that demand curve -- I don't know if you guys want to revisit my terrible drawing from this morning -- but where that demand curve intersects with the x-axis has a loss of load expectation or probability number assigned to it, and that is 1-in-87, which basically means one day in 87 years you would have a loss of load.

MR. PERRONE: So if you end up higher than NICR, how is that lower cost for the ratepayer? Is it just lower on a per kW basis or in total?

THE WITNESS (Paterno): If you ended up

less than NICR, all else --

MR. PERRONE: Greater. I'm sorry.

THE WITNESS (Paterno): I'm sorry. Greater than NICR, you would be increasing the reliability for the ratepayers, all else equal.

MR. PERRONE: Now, I'd like to get into reliability relative to FCA. I understand there may be some possible disagreement about whether a plan is quote/unquote reliable if it clears FCA, but yet you still have a surplus in excess of NICR. Is it NTE's position that if more megawatts clears than NICR, any plant that clears is still needed, even though the total went over NICR?

THE WITNESS (Paterno): Yes, because you're making the system more reliable, and that is inherent within the downward sloping demand curve construct, which was approved by FERC and put forth by ISO New England.

MR. PERRONE: So even though you exceeded NICR, it's a binary question. It's not saying, oh, this plant may be 85 or 90 percent needed, it's more binary, it's needed or it's not?

THE WITNESS (Paterno): That's correct, yes.

MR. PERRONE: How would the annual

reconfiguration auction affect need? For example, if you clear FCA, could the results of ARA potentially reverse that?

THE WITNESS (Paterno): I'm not sure I entirely understand the question.

MR. PERRONE: The annual reconfiguration auction, is that like, essentially, a truing up process of what was done in FCA?

THE WITNESS (Paterno): Yes. The primary purpose of the annual reconfiguration auctions, of which there are three, and they're held at various points preceding the capacity commitment period, or when the actual FCA deliverability happens, is primarily a balancing market to true up, more or less, power plants that either have less capacity than they committed to sell in that FCA, or have excess capacity that they can try to sell to power plants that have less capacity. But it is a balancing market, in my opinion.

MR. PERRONE: What I was asking is, so if you cleared FCA, would there be any risk of the ARA procedure showing the plant is no longer needed?

Redacted

THE WITNESS (Paterno): No, not in my view. If you clear FCA, you are determined to be needed. And more importantly, the ISO will hold you to that. And by the time you arrive at that capacity commitment period, you'll be required to honor that FCA commitment by bidding into the day-ahead energy market.

MR. PERRONE: Also, Mr. Paterno, on page 15 of your rebuttal testimony you discuss the Northern Pass project. What is your position on the likelihood of the Clean Energy Link going forward?

[redacted]

[redacted]

MR. PERRONE: Next, I'd like to get into a little bit where the ICR comes from. One item that I see in the integrated resource plan -- and it's covered in the Siting Council forecast as well -- is resource unavailability. Is it your understanding resource unavailability is based on maintenance outages?

THE WITNESS (Paterno): And it could also be -- the technical nomenclature is EFORd, or equivalent forced outage rate of demand. So you turn on a plant, and it does not turn on, which can and does happen.

MR. PERRONE: So how is such resource availability figured into ICR?

THE WITNESS (Paterno): All else equal, it's what I would say is an inverse relationship. So as resources become more unavailable, the ICR needs to increase to offset for their unavailability. Conversely, as resources become more available, i.e., have a lower EFORd, your ICR would decrease.

MR. PERRONE: But does ICR take into account a projection for that?

THE WITNESS (Paterno): It is a forward-looking projection for the purposes of the FCA, but it's based on historical actual operations in the market.

MR. PERRONE: Another question about ICR. Looking at this a few times, it appears to include a 50/50 forecast. Is that correct?

THE WITNESS (Paterno): That is correct.

MR. PERRONE: Could you explain why they use a 50/50 versus a more conservative 90/10 in the ICR calculation?

THE WITNESS (Paterno): I don't know the exact reason why. It's been a little while since I've read, sort of, ISO New England's view on that. I think it's actually varied, sort of, when they first set the ICR, which goes back eight to nine years. But what I can say on that is using a 50/50 forecast is not unique to ISO New England, and is the forecast of choice in determining ICR or the equivalent of other power markets in PJM, NYISO, and all the other independent system operators.

MR. PERRONE: Is it perhaps because it's the most likely scenario?

THE WITNESS (Paterno): Yes. I think that as well. It has an equal chance of being higher or lower, so it is the mean, if you would, or the range of potential outcomes. You said it much better than I did.

MR. PERRONE: Back to the regional energy outlook, page 9 -- I'm sorry, 11. Page 11 is where we have the closed or retiring versus the at-risk. I was looking at these, and I'd like to square that up with a table in the Fagan report, so that we have the unit numbers and the megawatts.

THE WITNESS (Paterno): Certainly. Let me just pull up Mr. Fagan's testimony.

MR. PERRONE: Sure. That is page 26 in the Fagan report. So look at that vis-a-vis with page 11 of the regional electricity outlook. And I went through here, and all the ones that are in circles, the at-risk generation, that appears to be on this table. And my understanding is, you could neglect Brayton, because that's already x'd. So other than Brayton Point, is it correct that everything on table 4 shows up as at-risk on the regional energy outlook?

THE WITNESS (Paterno): Yes, it does

appear so. That would be the one thing that I would want to check a little bit more would be the -- so there's no unit numbers here, obviously. But from an aggregate megawatt standpoint, if you removed Brayton Point from Mr. Fagan's Table 4, you'd get about 6,000 megawatts. So, yes, I think that's a fair characterization.

MR. PERRONE: The 6,000 is kind of rough, right, because you've got about -- so you're going to take the 7,047 and take out the 1,473?

THE WITNESS (Paterno): Yes. And you get to about 5,500 megawatts, with roundings 6,000.

MR. PERRONE: Okay. On page 7 of the Fagan report, it notes that this at-risk generation has already indicated their participation in FCA 11 and, thus, assuming they clear, they're not expected to retire before then. Does NTE agree with that?

THE WITNESS (Paterno): Yes. All else equal, I would agree with that. I would note that of the 6,000 megawatts of at-risk retirements, 1,622 megawatts has indicated the potential to retire at a certain capacity price. And those would be the price sensitive static De-list bids that I mentioned a little bit ago.

MR. PERRONE: Okay. So of the 6,000, you have about 1,600 that you expect to retire and another approximately 4,400 that could potentially be on until 2020, 2021?

THE WITNESS (Paterno): That's correct, yes. I would note that the capacities above the NICR in FCA 10 was only 1,400 megawatts. So all else equal, using that same capacity in excess of the NICR in FCA 11, and you take out 1,600 megawatts, you are now 200 megawatts deficit of the NICR.

MR. PERRONE: One of the Fagan exhibits, the analysis group report, it was identified as Exhibit 7. On page 5 of that report, it indicates an EE solution set with new transmission of renewable resources could generate wholesale electric price savings to the extent that imports displace higher priced marginal resources, and such imports would need to be backed by firm capacity commitments, including delivery at the time of winter peak.

So the question is, would KEC be more cost effective than imports due to its firm contract for gas at the time of winter peaks?

MR. RAY: I just want to make sure that he's got the document you're referring to.

MR. PERRONE: Sure.

THE WITNESS (Paterno): Sorry, Mr. Perrone. Is there a page number to that?

MR. PERRONE: Page 5 on the analysis group report. They started with the Roman numerals so it will be V.

MR. RAY: Roman Numeral V or --

MR. PERRONE: Yes, Roman Numeral V, yes.

THE WITNESS (Paterno): Mr. Ray, do you recall what exhibit that was?

MR. RAY: Seven.

THE WITNESS (Paterno): Thanks. I only have five through this book.

MR. PERRONE: And, I'm sorry, Mr. Perrone. Could you repeat again where you're referencing on that?

MR. RAY: Maybe you could let him know what section you're referring to.

MR. PERRONE: Absolutely.

(Pause.)

MR. PERRONE: I'll restate the

question. So it indicates an EE solution set with new transmission of renewable resources could generate wholesale electric price savings to the extent that the imports displace higher priced marginal resources and such imports would need to be backed by firm capacity commitments, including delivery at the time of winter peak. Would KEC have the potential to be more cost effective than imports?

THE WITNESS (Paterno): Yes, absolutely. Sorry for how long it took to answer.

MR. PERRONE: No problem. It was a complicated question. Now, as far as NTE's firm gas contract, is that year-round or seasonal?

THE WITNESS (Bradley): It's year-round.

MR. PERRONE: As far as the 2015 ISO regional system plan, page 162, it notes that solar PV will eventually have an impact on system operations, such as the need for increased reserve, regulation and ramping. How would KEC factor into that?

THE WITNESS (Bradley): KEC factors in, because KEC provides all of those services to ISO New England due to its quick ramp rate, flexible operation, et cetera. It's a very responsive, quick start, quick ramping unit.

MR. PERRONE: As far as ISO's solar PV forecast, I understand for solar PV they estimated their capacity factor at about 14 percent. Does that sound about right?

THE WITNESS (Paterno): Yes, I believe that's correct.

MR. PERRONE: So with that capacity factor, how could the region rely on solar as the dominant resource to provide 50 plus percent of its capacity in 2050?

THE WITNESS (Paterno): You would need a tremendous amount of solar, would be sort of the short glib answer, at the end of the day. And just to build that point out, I believe last time we were all here we discussed an exhibit in Mr. Fagan's testimony, but also from a Connecticut DEEP presentation, that talked about the mitigation, the pie charts. And if the Council can recall, there was a very large yellow section in one of those presentations. And long story short, that particular forecast, just taking into account the 14 percent capacity factor, contemplated over 100 square miles of solar PV.

So it would involve a tremendous amount of solar PV, at the end of the day, at a 14 percent capacity factor, which would be more efficient for facilities like Killingly with their 60-plus percent capacity factor for energy, but their nearly 100 percent capacity value for the contribution that the facility contributes towards meeting electricity peak demand.

THE WITNESS (Bradley): And to add to Mr. Paterno as well. Looking at the 14 percent capacity factor and 50 percent of the energy, 50 percent of the energy does not occur in 14 percent of the hour. So, in addition, there would have to be a tremendous amount of energy storage in place in the market, which today is just not there and not available and not commercially viable in that large quantity. So that's the other piece of that as well.

THE WITNESS (Paterno): And just to clarify. It's figure 13 in Mr. Fagan's testimony that I was referring to the large yellow slice.

MR. PERRONE: On page 11 of the Fagan report it notes that NTE does not assert that the proposed plant would enable or enhance transmission security. Is that correct? Is KEC not intended to enable or enhance transmission security?

THE WITNESS (Bradley): I don't recall anywhere in the application or our testimony that we addressed specifically transmission security, per se, but a facility such as KEC inherently places capacity on the system, which fundamentally strengthens the overall system from a reliability perspective. So from that aspect, I think it would increase the overall reliability of the system, which should inherently have some benefits to the transmission system as well. Does that answer your question?

THE WITNESS (Paterno): I actually have something to add to that.

MR. PERRONE: So it could potentially have some transmission reliability benefits?

THE WITNESS (Paterno): Absolutely. If I could paraphrase Mr. Fagan's testimony on page 11, in particular lines 7 through 9ish. "Transmission security means having a system that can withstand contingencies, such as the loss of a transmission line." Virtual underscore there. Killingly, by being built in Connecticut, would add more native generation within the Connecticut supply pool, and therefore decrease its need from imports from adjacent states. And because of that, it would reduce the potential impact of a transmission line going down importing power into the state.

THE WITNESS (Bradley): And one thing to add to that as well that's key, but goes back to one of your previous questions regarding the potential retirements of the static De-list units that are for FCA 11. We don't know the exact generators, but we do know the entity that filed for the static De-list, and the vast majority of that 1,600 megawatts is actually located in Connecticut.

THE WITNESS (Paterno): And the reason we know that is because the entity that filed those static De-lists is NRG Power Marketing, which, as the Council, I'm aware, is aware, owns quite a bit of generation within Connecticut and, in particular, owns the Montville and Middletown facilities, which are amongst the 6,000 megawatts that's at risk identified by ISO New England.

MR. PERRONE: Would NTE need to apply to the ISO New England reliability Committee for a determination of no significant adverse impact to the transmission system?

THE WITNESS (Paterno): Yes, absolutely.

MR. PERRONE: Is that associated more with the plan itself, or is that more of a switchyard and interconnection issue?

THE WITNESS (Paterno): I believe it's both at the end of the day. I think the way that physically manifests itself is you need an executed system impact study. And to the extent ISO New England identifies any issues with the Killingly plant operating, such as transmission security, it would identify those to Killingly, and Killingly would need to remedy those.

MR. PERRONE: Also, going back to the Fagan report, page 20, it's another table I'd just like to go through. Does NTE generally agree with the data on this table, on Table 3, or if there's any that you disagree with?

THE WITNESS (Paterno): The one thing I -- couple things I would note, but amongst the biggest ones would be the install capacity requirements, or ICR, as of October 2016. So what that reflects is not the ICR that was actually used in that forward capacity auction, but is a reflection of the current load forecast from ISO New England.

In addition to that, Mr. Fagan does not identify what new demand or import resources could come into the FCAs. He provides a range in the second to last row on this table.

And perhaps, most importantly, Mr. Fagan admits that if this existing -- I'm sorry. He admits that if the 1,622 megawatts of price sensitive De-list bids were, in fact, to retire, that you'd have a surplus in the market of 317 to 540 megawatts. I don't necessarily agree with that exact number, but what I did do in my rebuttal testimony is to calculate what the estimated capacity price would be at those values. And perhaps, unsurprisingly, the capacity prices that would result from that little of capacity and greater than the NICR, is well in excess of the capacity price that would result from Killingly being in the market.

I believe we forecasted $6.19 per kW month with Killingly in the market. And if we are going to use Mr. Fagan's analysis, I believe that cost would be somewhere between $7 to $9 a kW month, which is thereby increasing wholesale capacity costs, and therefore retail electricity rates for Connecticut ratepayers, while simultaneously resulting in a less reliable electricity system, because it would have less capacity on the system.

MR. PERRONE: Mr. Bradley, on page 3 of your rebuttal testimony it's noted that increased demand for natural gas can reduce or perhaps eliminate, at times, natural gas supplies to plants with interruptible contracts. Are most natural gas fired plants in New England using interruptible service?

THE WITNESS (Bradley): Many of them are. We don't know exactly which facilities are, but we do know that many of them do use interruptible service.

MR. PERRONE: Has firm gas been traditionally uncommon?

THE WITNESS (Bradley): Firm gas has been traditionally uncommon with electric generators.

MR. PERRONE: Was that because of a cost issue?

THE WITNESS (Bradley): I think it was a combination of both a cost and an availability issue.

MR. PERRONE: On page 8 of Mr. Bradley's rebuttal testimony it notes that KEC's operations and thus its capacity factor would decrease over time as new, more efficient forms of generation enter the market in the 2020 to 2050 time period.

What types of generation does NTE foresee in that time period that could potentially be more efficient than a combined cycle plant?

THE WITNESS (Paterno): It's really a mix of things at the end of the day. It could be the utility scale solar, as well as wind, as well as behind the meter PV, all of which are reflected in PA's analysis. Those obviously being zero dispatched cost resources, which as more of those are added to the market, would decrease operations from Killingly, therefore decrease CO2 emissions and the like, and it could also be new, more efficient combined cycles as well. As you add more combined cycles out in time, I don't think Mr. Bradley, nor anybody from NTE, would disagree that turbine efficiency is likely to improve, perhaps not to the improvements we've seen over the past ten years, but certainly probably better than what we see today, not dissimilar to mileage on cars. So it's a combination of both, more efficient, better technology thermal resources that aren't going to get added tomorrow, but, again, we're talking 2020 to 2050, over a long time horizon, as well as more renewable resources coming in as well.

THE WITNESS (Bradley): It goes back to the same discussion that we had in one of the earlier hearings regarding as newer, more efficient facilities come online, that older, existing facilities step up. Thirty years down the road Killingly will be higher in the dispatch stack, certainly, than it is today.

MR. PERRONE: Pages 59 and 60 of the Fagan report indicates concerns about greenhouse gas reductions associated with KEC beyond the 2020, 2024 time period. Would KEC still provide net CO2 reductions after 2024?

THE WITNESS (Paterno): Yes, absolutely. And it would come from displacing more inefficient forms of power generation in the market, which could be older, combined cycles, as well as older coal, older steam gas, older oil, and the like. When KEC enters the market, I believe it will be one, or two, or three combined cycles using the latest and greatest Siemens H-class turbine technology, and it will continue to enjoy CO_2 savings because of that.

THE CHAIRMAN: After 2024 will there even be any coal or oil plants in New England?

THE WITNESS (Paterno): So there's really three coal plants right now that operate. You have, obviously, Bridgeport Harbor Unit 3 here in Connecticut, but you also have Schiller and Merrimack, which are up in my home state of New Hampshire. ISO certainly thinks that they'll be retiring between now and 2020, 2021, and the like. Those facilities have not currently announced whether they're going to retire or not, but that could be perhaps posturing, because Eversource is currently in the sale process to divest those assets.

But even if those come out of the market, those facilities don't operate a lot today, and Killingly still realizes CO_2 savings to the region even by displacing other combined cycles, and combined cycles make up about 8,000 megawatts of the 35,000 megawatt systems within New England so --

THE CHAIRMAN: But your initial answer mentioned all three. You're really talking after 2024 about the older combined cycles, you're talking about coal and oil.

THE WITNESS (Paterno): I think the older combined cycles, as well as the older steam gas, would contribute to that. Mr. Chairman, you are right, probably by, if not 2024, 2030, most of the coal will be gone. I'm sorry. By "most," it will be gone at the end of the day.

MR. PERRONE: On page 69 of the Fagan report there's some questions regarding the heat rate of the plant, because there's a range where they're using duct burners, or were not using duct burners. Could you explain why NTE uses the approximately 6,500 as more of a typical value?

THE WITNESS (Paterno): Because that's going to be the primary operating state for the facility is that 6,500 heat rate. Duct burner, Mr. Bradley, please feel free to weigh in, is really during peak system conditions, I would say, for the most part, which should be either peak summer electricity conditions, or peak winter electricity conditions, like very cold temperatures we're about to experience here in the next hour or two. But yes, so the majority of the operating state is going to be at that 6,500 heat rate, which is why we show Killingly's heat rate at that 6,500.

THE WITNESS (Bradley): And from a simplistic point, you can really look at it as almost two power plants in one, a baseload combined cycle, and a peaking facility, thus, the reason for the lower heat rate over the vast majority of the time.

MR. PERRONE: The Fagan report also mentions possible effects due to startup and shutdown. Is it fair to say that while your heat rate may vary slightly during startup and shutdown, you're taking more of a long-term average with that number of 6,500?

THE WITNESS (Bradley): Yes, that's correct.

MR. PERRONE: Page 58 of the Fagan report states that the PA modeling methodology is flawed because it only considers the change of one variable, that is, with KEC and without KEC, and there's the potential that without KEC another resource could take its place in the capacity market. Could you respond to that?

THE WITNESS (Paterno): Yeah, absolutely. So I would not say that that is a flawed analysis to only change a single variable. My Econ 101 classes back when I was an undergrad, that's exactly what you do is you change one variable at a time to assess the impact of that one variable.

So in the particular case of KEC, we removed KEC from the market to figure out what was the impact from KEC. And I would say to the point of whether there could be somebody else in the market that could take KEC's place, if it was absent, well, those benefits would accrue, the benefits to the system, I'm sorry, the lower wholesale electricity costs and CO2 savings would accrue to that particular facility. But at the end of the day, they need to accrue to somebody, and KEC is here making the commitment to enter the market, and therefore our model reflects the benefits that derive from that.

MR. PERRONE: One conceptual load forecasting question. I understand also in the report there was some comparison to peak load data in ISO forecasts. In general, when you compare historical peaks to a 50/50 forecast, do you need to weather normalize the historical peaks?

THE WITNESS (Paterno): Yes, absolutely. It is crucial when evaluating historical peak demand that it be weather normalized.

MR. PERRONE: And my final question for NTE. Regarding the Massachusetts Energy Storage Initiative, it mentions an energy storage initiative RFP. Are you aware of that RFP, or do you know the status?

THE WITNESS (Paterno): I am aware of it. I do not know the status of it.

MR. PERRONE: Is it NTE's position that the 600 megawatts of proposed energy storage would require such an RFP to go forward?

THE WITNESS (Paterno): Yes, absolutely. And I would also note that of the 600 megawatts -- and this is actually kind of interesting -- of the 600 megawatts, that is not a capacity value rating. So that isn't 600 megawatts of battery storage that can contribute to peak electricity demand, at least the way the current forward capacity auction works. And the reason is this. Within the forward capacity auction, you need approximately a two-hour operating duration to have a claimed capability report, which is the ISO checking up on you and saying can you provide the megawatts that you've sold into the forward capacity auction.

Approximately 72 percent of the battery or energy storage contemplated in that report on Figure 4.4 is short duration, which is approximately zero to one hour of discharge, and therefore would be precluded from the forward capacity auction, as the way it currently operates. Therefore, the capacity value, 600 megawatts -- I'm sorry. Therefore, of the 600 megawatts, the capacity value will be significantly less.

MR. PERRONE: Thank you. That's all I have for NTE.

THE CHAIRMAN: Okay. We're now going to go through questions from the Council members, again, related to the redacted portions.

Senator Murphy.

SENATOR MURPHY: I have no questions, Mr. Chairman.

THE CHAIRMAN: Mr. Ashton?

MR. ASHTON: No.

THE CHAIRMAN: Mr. Hannon?

MR. HANNON: One. This is a question, I'm not even sure you can answer it.

THE WITNESS (Paterno): I'll try.

MR. HANNON: There's been a lot of discussion about solar and where that may be going into the future. And looking at a recent article yesterday, maybe, where there's talk about the General Assembly in Connecticut looking at taking some of the money from the Green Bank, which is used to try and promote solar. The Chairman raised this issue earlier, so I can't be blamed for it. Based on the current scenario that is going on in D.C. where it seems to be more of a promotion of oil, gas, and coal, and not so much solar, and given the fact that there are tax incentives, things of that nature, for solar, what do you see happening with the solar market in general?

THE WITNESS (Paterno): So speculating here, obviously, but it is an excellent question. And probably you're the tenth person I've had ask that since President Elect Trump was elected last month. The arrow is certainly not pointing up on solar from a growth standpoint. That is not to say that you won't see more solar enter the market, absolutely, but I think you can say under a President Trump administration, a Mr. Rick Perry EPA administration, that renewable forms of generation are probably not going to get the same promotion that coal, oil, natural gas, and sort of your hard natural resources will be, which will likely retard both solar and wind growth to a certain extent over time. But you will still see more come into the market, but probably not at the same rapid rate that you would have otherwise seen.

MR. HANNON: Because I'm looking at it from the perspective of having solar panels on my house. And two of the reasons why we went that way was, one, because of the grant that was provided by the state; and second, was the tax incentive.

THE WITNESS (Paterno): Yes.

MR. HANNON: Otherwise, I probably still would have been saying, you know, it would be nice to some day do that. But it's because of some of the incentives. So I'm just curious if the incentives dry up.

THE WITNESS (Paterno): Absolutely. And you can actually see that in my home state of

Colorado -- well, my new home state. I'm originally from New Hampshire -- adopted state. Colorado has seen a tremendous amount of proliferation of rooftop solar, not unlike what you're contemplating, Mr. Hannon, probably in the 2010, '11, '12 time frame. And that was primarily driven by Xcel Energy rebates, which is the local electric utility up there. Once those rebates were cut, guess what happened to solar rooftop installation? They severely decreased.

And it was interesting in that once those rebates were originally proposed to be cut by Xcel Energy, all of the solar installers got up in arms and said you're going to destroy my business, because I'm not going to be able to install these facilities anymore because nobody is going to want them because there's no rebates. So Xcel actually came back under pressure from the PUC and increased the rebates. So less of a cut, and sort of grandfathered that in over time. But the proliferation of rooftop solar in Colorado really peaked three or four years ago because those rebates, as you know, aren't there with the same proclivity that you had before. And rooftop solar in and of itself, without any rebates, doesn't make economic sense, in my opinion, which is why I don't have those on my house today, much to my wife's protesting.

MR. HANNON: The only reason I'm asking is because there's some pretty interesting numbers in terms of where solar is being projected to be several years out. So that's why I'm asking the question.

THE WITNESS (Paterno): Absolutely. And I would wage you that the majority of forecasters are probably going to be lowering what they view as long-term solar penetration. We probably haven't seen that yet, because people are still figuring out what the Trump presidency and the Perry EPA means at the end of the day -- department of energy. I'm sorry -- at the end of the day, but it is going to come down.

MR. HANNON: It's not much better at EPA.

(Laughter.)

MR. HANNON: I'm only saying that because my former boss is still the administrator down there.

THE CHAIRMAN: You referenced the poor chairman at the beginning of your statement. For some of us four years may seem like a long time, but for the life of the planet a lot of things could change after four years, hopefully.

Mr. Silvestri.

MR. SILVESTRI: Yes. Thank you, Mr. Chairman. I have one topic.

Mr. Bradley, I want to go back to your rebuttal testimony, if I can, specifically on page 6 where you have a chart there, or a table, about the winter capacity for ISO. I've been looking at this, and a recent press release that ISO came out with, regarding the winter 2016/2017 reliability forecast. At that point with the release, they came out and forecasted about 21,340 megawatts at what they call normal temps of 7 degrees fahrenheit, or roughly 22,028 megawatts at what they call an extreme temperature of 2 degrees fahrenheit. That's their forecast for the winter.

Now, when they compared that to the 2015/2016 winter peak, that demand was 19,000 change. So you look at that and say it's higher, but it's also below the old time peak of about 22,800 megawatts that happened back in 2004.

So I'm looking at numbers where you have on your table 33,015 megawatts winter capacity. I'm looking at ISO's forecast, which is coming up before you round it off at about 22,000 megawatts. So I'm looking at that, and I'm saying we've got an 11,000 megawatt excess for the wintertime, at least going forward to 2016/2017. First of all, would you agree with that?

THE WITNESS (Bradley): I think the question -- and I'm going to refer this question to Mr. Paterno, actually -- is the basis for the ISO's 22,000 number. That's the piece that I'm not familiar with.

THE WITNESS (Paterno): The 22,000 was their purported winter electricity peak demand?

MR. SILVESTRI: The 22,000 megawatts that were in their press release, if you will, was a forecast for this winter at extreme temperatures of 2 degrees fahrenheit. Their all-time peak was 22,818 that they experienced on January '15 to 2004.

So, again, I'm looking at what we have right now for winter capacity. I'm looking at we had for either projected peak, or an all-time peak, I'm saying we have about 11,000 megawatts excess, unless I'm reading something incorrectly.

THE WITNESS (Paterno): So one point of

that would be, there's a reserve market at the end of the day. So the 22,000 is the electricity demand, but there's approximately that 15 to 17 percent cushion that the ISO would want to operate under, given the plant availability and the like. Obviously, that doesn't bridge the 11,000 megawatt gap that we're talking about, but it chews away at it, if you understand what I'm saying.

And then from there, what we also see is there's some more retirements coming out of the market as well. So we currently see here in 2016 is Brayton Point, which is about 1,500 megawatts, is still in the market. Pilgrim, which is about 700 megawatts, is still in the market. Noting that neither of those two fuels burn gas. Obviously, Pilgrim, in particular, and then Brayton Point, is primarily coal. So that chews up your margin, as well, at the end of the day.

And then -- this is obviously the million-dollar question -- when you think about system operating conditions at 2 degrees fahrenheit and the like, and the electricity peak demand, but also the potential unavailability of interruptible gas supplies, is really where Killingly, and dual fuel units like Killingly, benefit the system in that they are able to pivot away from their natural gas supply and burn FO2 or ultra low sulfur diesel, thereby freeing up those gas supplies to go to otherwise interruptible gas units that could then operate. Obviously, there needs to be ISO system conditions for that to happen, as Mr. Sellers pointed out in the last hearing, due to Killingly's air permit, but that is the primary benefit at the end of the day.

MR. SILVESTRI: Again, I'm looking at the raw numbers, and to me I see 11,000. I hear what you're saying about contingencies, if I could use that expression, but to me that's a big number.

The other thing I'm looking at, though, there's a slight difference in what we have for winter capacity in that table and what ISO kind of calls generating capacity. They're talking 31,000 megawatts, as opposed to 33 that we have in the table, whatever number you want to use. But they're also mentioning that they have 11,500 megawatts of proposed generating capacity. So now I'm starting to look at, if you take the 31,000 megawatt number, take this 11,500 number that they have, and then put in all the 4,200 non-gas units that are expected to retire, and anything else that might be going out, plus, roughly 1,200 megawatts, that I know of, coming into Connecticut with Bridgeport 5 and Towantic, and I'm having a hard time balancing that there's a need.

THE WITNESS (Paterno): So part of the 11,000 megawatts is obviously the Killingly facility. And what they're looking at, I would imagine, ISO New England, is just the interconnection queue, and not necessarily facilities that have an executed system impact study, but just those facilities that have paid whatever the charge is to get into the intersection queue, which I don't think is a tremendous amount of money.

So the proposed facilities is an interesting one, because you can chart this through the history of ISO New England. Very little of the actual proposed list will ultimately get built. It's indicative of interest in the market, to a certain degree, but not necessarily indicative of how many facilities will physically put iron in the ground at the end of the day.

And I realize, all else equal, you're talking about big numbers, 10,000 megawatt deltas and the like. I guess I would -- and this builds off of what Mr. Bradley and I talked about at the last hearing, there's comments being made by the ISO that there is a winter reliability need, and I don't think you see that need for 2016, as you correctly point out, but I think once you see Pilgrim retire, Brayton Point retire, you will start to see that need.

And Mr. vanWelie I believe, president and CEO of ISO New England, has reiterated that need most recently in his November 17th presentation, as well as various presentations he made in October and September. So that's a part of the need that we are seeing, at the end of the day, is you have the president of ISO New England saying that things are going to get difficult. And I believe he used the word "precarious" winter reliability after 2019.

MR. SILVESTRI: I know also there's been ISO's move for strengthening the winter reliability with assuring that, say, dual fuel units that have oil have sufficient oil on site to carry them through that part of it. But, like I said, I am wrestling with these numbers, because I see a surplus.

THE WITNESS (Bradley): Right. And I think if you just look at the pure math, you do see a surplus. But when you look at the operations side of the math, for example, units that are included in that total that doesn't have firm natural gas supply, they have interruptible gas but don't have dual fuel, so those units are listed but may not be available.

You've got coal units, which although they're going to be retiring, could have issues with frozen coal piles. So those may not be available. So in the wintertime, there are a lot more contingencies for resources that may not be operational at 2 degrees, or zero degrees, that would be very reliable during, say, the time of the summer peak. So that's what causes in the wintertime, especially somewhere like New England, that you need a much larger buffer of capacity to ensure system reliability.

And then also in the very large number of planned, as Mr. Paterno said, those are just units that are in some point in the interconnection process that may drop out. For example, that 11,000 megawatt number, the Panda unit that was recently canceled may very well be included in that 11,000 megawatt number. So I think anything that's planned through the interconnection queue is included in that 11,000 megawatt number.

MR. SILVESTRI: Thank you. That's all I have, Mr. Chairman.

THE CHAIRMAN: Mr. Lynch?

MR. LYNCH: No questions.

THE CHAIRMAN: We'll continue with cross-examination of the applicant by the grouped parties.

MR. BALDWIN: Mr. Chairman, while they come up, could we take a two-minute bathroom break?

THE CHAIRMAN: I was going to hold off till 3:30, but I was going to make it at least five. But I guess now we'll take a five-minute break.

MR. BERMAN: Mr. Chairman, I was actually going to say, since Mr. Fagan came down, I'm not sure how late you're planning on going. If it makes sense to the Commission, perhaps it would make sense to do cross-examination of Mr. Fagan while he's here. I worry that if we do additional cross-examination of the applicant's witnesses now, it may push him into January and he'll have to come back.

THE CHAIRMAN: Well, that was one of my questions to you --

MR. RAY: He's going to have to come back anyway.

THE CHAIRMAN: -- if you wanted to have an opportunity to cross-examine your witness. And you're saying that he will not be coming back?

MR. RAY: We expect to only cross-examine Mr. Fagan on the confidential portions of his testimony.

MR. BERMAN: We understood this session to be --

THE CHAIRMAN: I don't have hours of cross-examination, but I do have questions, and maybe other members of the panel do too.

MR. BERMAN: So I think I wasn't part of these conversations. It sounds like there was a misunderstanding. Our understanding was that Mr. Fagan is here to be cross-examined on his testimony, not on specific portions of his testimony today. And we thought that having this in the context of the confidential session made sense because his testimony incorporates a number of references to confidential material that was provided to him.

THE CHAIRMAN: The memo apparently that was sent out said it would be on the closed portions of his testimony today and not the full --

MR. BERMAN: Okay. That's fine. I still think, just to ensure that he is able to get out of here, I'm going to get through, at least, the confidential portion. I don't know, it's up to you guys how you want to do this. I'm happy to do my cross now. Again, I defer to you guys.

THE CHAIRMAN: Let's take a five-minute break and try to figure this out.

(Whereupon, a recess was taken from 3:22 p.m. until 3:29 p.m.)

THE CHAIRMAN: Just, again, to try to make it clear. We really want to see if we can finish the closed portion of the hearing today, so then when we go back, the public gets a chance. Plus, we've got that out of the way. That's why we're trying to do it this way. So we, also, therefore, want to keep the subject matter to the redacted portions.

MR. BERMAN: Understood. Thank you.

Josh Berman on behalf of the Sierra Club. Good afternoon, again.

So picking up on a comment that was just made, Mr. Paterno, you mentioned that in response to a question from Council staff that you changed your assumption regarding the retirement date for Bridgeport Harbor Station Unit 3. Is that correct?

THE WITNESS (Paterno): That is correct. And to be clear, we have not rerun the analysis of Killingly. But if I was to, that would be one important assumption that would change.

MR. BERMAN: I understood. That's what I wanted to confirm. So you have not conducted updating modeling reflecting that changed assumption?

THE WITNESS (Paterno): No, I have not.

MR. BERMAN: Just another point of confirmation. In response to the interrogatories from NAPP, which requested information for a number of parameters for all years model, you provided modeling results through 2024. Did your modeling end at 2024?

THE WITNESS (Paterno): Yes.

MR. BERMAN: If you could turn to attachment 1 of the confidential discovery response to NAPP interrogatories?

THE WITNESS (Paterno): Yes.

MR. BERMAN: Great. And there's three tables. The third one is net imports, demand side resources, and generic renewable summary. Correct?

THE WITNESS (Paterno): That's correct.

MR. BERMAN: In this third table you identified incremental summer capacity additions by year for imports, demand side resources and generic renewables. Correct?

THE WITNESS (Paterno): That's correct.

MR. BERMAN: And what was the basis for your assumptions regarding the incremental renewable additions between 2020 and 2024?

THE WITNESS (Paterno): Sure. That was our view of renewable additions coming into the market to meet various state-level renewable portfolio standards within ISO New England.

MR. BERMAN: So with these additions, are all of these state renewable portfolio standards in New England fully subscribed through 2024?

Redacted

[redacted]

Redacted

[redacted]

[redacted]

MR. BERMAN: Okay. Can you turn to your response to NAPP interrogatory number 3?

THE WITNESS (Paterno): Yes, sir.

MR. BERMAN: And that interrogatory requested the source and date of the load forecast used in the Aurora Modeling, and you stated that the load forecast used in the Aurora Model was based on the 2016 ISO New England CELT Report. Is that correct?

THE WITNESS (Paterno): That is correct.

MR. BERMAN: And did it update in any ways the January version of the 2016 CELT? There may be no update to that. I just want to confirm. It is using a January 2016 version of the ISO New England CELT. Is that correct?

Redacted

THE WITNESS (Paterno): Yes, it's using -- the basis of our load forecast is the latest and greatest view of ISO New England's load from ISO New England.

[redacted]

MR. BERMAN: Can you turn to attachment

3 of your confidential responses to NAPP's interrogatories?

THE WITNESS (Paterno): Yes.

MR. BERMAN: Thank you. Can you tell me what the third column in this table represents?

THE WITNESS (Paterno): Sure. It represents the capacity value contribution, or the capacity contributing to electricity peak demand from passive demand response across ISO New England, passive demand response in the technical nomenclature for energy efficiency within the forward capacity market.

MR. BERMAN: And I don't know if you have in front of you Table 1.1 from the 2016 CELT, but, if not, I have a copy.

THE WITNESS (Paterno): I do not. Would you mind providing it?

MR. BERMAN: This one is not highlighted.

THE WITNESS (Paterno): I like the highlight.

MR. BERMAN: Sorry.

MR. RAY: This was included in Mr. Fagan's report.

MR. BERMAN: That's also an

administrative noticed item. He did include, I believe, some version of it.

You have Table 1.1 from the 2016 ISO New England CELT in front of you. Correct?

THE WITNESS (Paterno): I do.

MR. BERMAN: And if you look at line 1.2.1, it says "Passive DR (PDR) used in system planning." Is that correct?

THE WITNESS (Paterno): Yes, that's correct.

MR. BERMAN: And is that analogous -- those values analogous to the values that are in attachment 3, third column -- I mean, do they represent the same thing? Whether or not the numbers are the same is a separate issue. But do they represent the same thing in your modeling?

THE WITNESS (Paterno): Yes, they do.

[redacted]

Redacted

[redacted]

MR. BERMAN: Thanks. Did PA Consulting conduct any sensitivities to its modeling?

THE WITNESS (Paterno): No, we did not.

MR. BERMAN: So your modeling relied on a single set of assumptions about resource additions. Correct?

THE WITNESS (Paterno): That is correct.

MR. BERMAN: And also about retirements. Correct?

THE WITNESS (Paterno): That is correct.

MR. BERMAN: And also about fuel prices. Correct?

THE WITNESS (Paterno): That is correct.

MR. BERMAN: And about load. Correct?

THE WITNESS (Paterno): That is correct.

[redacted]

Redacted

[redacted]

MR. BERMAN: Okay. In your rebuttal testimony I believe you reference the Massachusetts act to promote energy diversity. Is that correct?

THE WITNESS (Paterno): That is correct.

[redacted]

Redacted

[redacted]

[redacted]

MR. BERMAN: In turning back to attachment 1 again for a moment, attachment 1 to NAPP's interrogatories, looking now at the second table, retirement summary. Tell me when you're there. I think this was covered, to some extent, by the questions you were asked by CSC staff, but I just want to confirm. Are the retirements that are identified in this table an output of the model, or are they a preselected input?

[redacted]

Redacted

[redacted]

MR. BERMAN: Thanks. That's all I

wanted to ask for now.

THE CHAIRMAN: Does Connecticut Fund for the Environment have any additional cross-examination?

MR. LOONEY: Our cross-examination is scheduled for the 10th of January, so I'll defer to that date.

THE CHAIRMAN: Do you have any questions on the confidential information?

MR. LOONEY: No, sir.

THE CHAIRMAN: Okay. Now we can start the cross-examination of --

MR. RAY: Mr. Chairman, may I interrupt for one moment? May we ask just two brief redirect questions on the confidential to the panel?

THE CHAIRMAN: Okay.

REDIRECT EXAMINATION

MR. RAY: Thank you.

[redacted]

Redacted

[redacted]

Redacted

[redacted]

MR. RAY: Thank you, Mr. Chairman.

THE CHAIRMAN: Thank you.

I believe, Mr. Fagan. Attorney Berman.

(Witnesses excused.)

THE CHAIRMAN: We have to start by swearing in your witness.

R O B E R T M. F A G A N,

called as a witness, being first duly sworn by Ms. Bachman, was examined and testified on his oath as follows:

DIRECT EXAMINATION

MR. BERMAN: Mr. Fagan, do you have in front of you a copy of the direct testimony of Robert Fagan, Synapse Energy Economics, which was filed in this proceeding on November 15, 2016, together with 18 accompanied exhibits?

THE WITNESS (Fagan): Yes, I do, the confidential version. I don't have all of the exhibits in front of me, but I have the testimony.

MR. BERMAN: And did you prepare, assist in, or supervise in the preparation of this direct testimony?

THE WITNESS (Fagan): Yes.

MR. BERMAN: And do you have any corrections, modifications, or revisions to offer to your direct testimony at this time?

THE WITNESS (Fagan): Yes.

MR. BERMAN: Please go ahead.

Redacted

THE WITNESS (Fagan): I have three minor typos, and then one single sentence correction. The minor typos: On page 15, at line 8, add the phrase "three-year forward" in front of "FCM."

The second typo is on page 23, at line 8. At the very end of the line, add the word, in quotation marks, "normal."

The third typo on page 27, line 2, where it currently says, "offshore wind," add the word "onshore and" prior to the word "offshore."

And lastly, at page 58, lines 6 and 7, [redacted]

[redacted] corrections, is the information contained in your direct testimony true and accurate to the best of your knowledge?

THE WITNESS (Fagan): Yes.

MR. BERMAN: And are you able to speak to the content of the exhibits that were attached to your direct testimony?

THE WITNESS (Fagan): Yes.

MR. BERMAN: At this time I offer Mr. Fagan's direct testimony and accompanying exhibits for admission.

THE CHAIRMAN: Is there any objection from any of the parties or intervenors?

(No response.)

THE CHAIRMAN: Hearing and seeing none, this exhibit is admitted.

(NAPP and Sierra Club Exhibit III-B-9: Received in evidence - described in index.)

MR. BERMAN: Thank you.

Mr. Fagan, have you had the opportunity to review the rebuttal testimony of Mr. Paterno and Mr. Bradley?

THE WITNESS (Fagan): Yes, I have.

MR. RAY: Mr. Chairman, isn't it time for cross-examination?

MR. BERMAN: We would respectfully

request we believe it would be expeditious and efficient for the Council if Mr. Fagan had the opportunity to give a concise response to the rebuttal testimony that was filed.

MR. RAY: We object, Mr. Chairman.

THE CHAIRMAN: We have to do the cross-examination. So hopefully through the cross-examination he will be able to provide the material you want, but that's just the way we do it. We'll start with the cross-examination by staff.

CROSS-EXAMINATION

MR. PERRONE: Thank you, Mr. Chairman.

THE CHAIRMAN: You can still provide it in writing, or redirect.

MR. BERMAN: Thank you.

MR. PERRONE: Mr. Fagan, on page 9 of the report, the report notes, "KEC is a relatively ineffective resource for greenhouse gas emissions mitigation."

Are you saying that broadly across the whole projected life of the plant, or just the first five years, or later?

THE WITNESS (Fagan): Across the whole life of the plant, certainly. This specifically refers to table 9 of my testimony.

MR. PERRONE: As far as import of Canadian Hydro, for example, if Northern Pass or the Clean Energy Link project is completed and put into service, would that affect the formula for NICR, would it affect the tie benefits, or would NICR stay the same, and those could potentially be capacity resources?

THE WITNESS (Fagan): That would depend on how they account for that, but it's easy to notionally think of it as not affecting NICR, as just being a source of additional supply that can meet NICR.

MR. PERRONE: Next, I'd like to talk about reserve requirements. On page 5 of your report you note a reserve margin of 15 percent. Would that 15 percent remain fixed for, say, the next ten years, or would that be expected to increase?

THE WITNESS (Fagan): That would be expected to change slightly, depending upon different parameters, mostly around forced outage rates, for example, but generally that number is in the right ballpark. It's not going to change significantly.

MR. PERRONE: And I had asked NTE about this. Regarding 600 megawatts of battery storage to be installed in Massachusetts, there's mention of an energy storage initiative RFP. Would you know the status of that RFP?

THE WITNESS (Fagan): I think the RFP is scheduled to be released next year. That's my understanding.

MR. PERRONE: Is it your position that the 600 megawatts would depend on the results of that RFP?

THE WITNESS (Fagan): Most likely for next year, to the extent that there's going to be more storage resources in New England, that will probably come about as a result of an RFP. At this point in time, although, and currently the capacity market construct is undergoing evolution at FERC, as it always has been, and likely always will, and FERC has just begun a process of revising the rules to make it easier or more fair for energy storage resources to participate in all of the New England wholesale markets. So at some point in time, and it's hard to say exactly when, the presence of that notice of proposed rule making will lead to changes in the ISO New England wholesale markets.

Now, at the same time, commercially energy storage resources are undergoing transformation where their costs are getting lower, so they may be able to participate in ISO New England's capacity market even before the next evolution of the capacity market occurs that might give them fairer treatment.

MR. PERRONE: And just jumping back to the reserve margin again, the 15 percent, roughly how is that determined? Does it depend heavily on the largest generating unit in New England?

THE WITNESS (Fagan): Reserve margins are based on -- there's two major things that go into reserve margins, uncertainty around the load forecast, and uncertainty around the availability of resources, or forced outage rates. So to the extent that forced outage rates sort of in aggregate for the fleet change, the reserve market can change. And to the extent that load forecast uncertainty changes, those things can change. That's the reserve margin for planning purposes for NICR for how much capacity do we need.

That's sort of different from operating reserves, which is sort of the day-to-day what do

Redacted

I need to have available if we lose a generating unit. So 15 percent of the peak load in New England is significantly greater than the day-to-day operating reserve that they need to hold in case you lose a unit, like last year when you lost Millstone -- last summer. Excuse me.

MR. PERRONE: And also I had asked NTE this, but I'd like your opinion on this too, why the 50/50 forecast is used in NICR?

THE WITNESS (Fagan): NTE's response was incorrect. NICR uses a probabilistic load input to compute the capacity requirement. So the capacity requirement reliability need for resources in New England takes into account directly the probability distribution associated with load, that 10 percent of the time it might be more than a certain amount, 10 percent of the time it might be less than a certain amount, and 50 percent of the time it's going to be at that 50/50 level. But it's incorrect to say that the 50/50 forecast is what drives NICR. NICR is based directly on the probability of distribution of what the peak load might be.

MR. PERRONE: On page 14 of your report you talk about the annual reconfiguration auction or the ARA. In order to participate in the ARA, do you have to be selected in the FCA?

THE WITNESS (Fagan): No, you can enter into the ARA even if you haven't been selected as a resource in the FCA. So, for example, if one of the new resources from Canada missed the deadline for participating in the FCA, or they were uncertain if they were going to be in for a particular point in time, they can still jump into the ARA. Now, they're likely not going to get as much money for a given year. And then the following year they would participate in the FCA. But you don't have to have cleared in the FCA to participate in subsequent reconfiguration auctions.

And, you know, an important point, if you're a resource that tends to -- you don't need much of a lead time to be available for a particular summer year's capacity needs, you might only be able to come in closer in time. You might not be able to have that certainty three years out that you're going to be able to grab 100 megawatts of demand response, but you might get that certainty one year out, depending on conditions.

MR. PERRONE: How historically has the

ARA process, how has it impacted FCA results? Has it significantly changed those results?

THE WITNESS (Fagan): I've not analyzed the results of the ARA auctions since they've been instituted. They wouldn't change the result of the FCA. What they would just do is they would rebalance, and they would use revised input assumptions on NICR, for example, which is an important point.

So, for example, when Footprint Power Plant in Massachusetts, which is a roughly 600 some-odd megawatt combined cycle plant that's due to go into operation next summer, when it first won FCA, it was supposed to come into service in 2015, I believe, but it used that ARA process and other ISO New England processes to effectively be able to become a resource two years later than it had first thought it was going to be a resource.

MR. PERRONE: Could you explain the basis of your statement that the region already has enough capacity for the FCA 11 commitment period?

THE WITNESS (Fagan): Sure. In short, it's Table 3 of my testimony, but let me take a moment. The existing resources available for FCA

11, as this table indicates, is 34,505 megawatts. That number is greater than the requirements that are projected right now for 2020. It's 430 megawatts greater. But even that level of resources, the 34,505, as I have in Table 3, doesn't include what's likely to clear as new import and demand side resources in FCA 11.

And, traditionally, those resources, they're not uncertain. ISO New England has on the order of 4,000 megawatts of intersite capacity, and that intersite capacity doesn't find its way into the auction until -- it doesn't find its way in until the auction. So it's a fairly certain increase that you're going to get, you know, the import amounts that show up in each of these forward capacity auctions.

MR. PERRONE: At page 37 when you talk about energy efficiency, does that refer just to passive resources like light bulbs and appliances, generally?

THE WITNESS (Fagan): Energy efficiency is certainly a lot more than light bulbs. That refers to ISO New England's accounting of the effect of energy efficiency resources on both peak demand and actual energy requirements. That's what I'm referring to. This is information that is sourced directly from ISO New England's database, public.

MR. PERRONE: And on page 40 when you have the 40 percent of the nameplate AC rating for solar, so basically that de-rates the nameplate to compensate for the fact that when the sun is to the west and not really overhead, that coincides more with the peak?

THE WITNESS (Fagan): Yes, it's a function of the characteristics of the sun's path across the sky, absolutely. But I'll note the applicant used a much lower value, and it's somewhat inexplicable. ISO New England uses a 40 percent number now, and they're projecting that that number will slowly decline over time. That number of 40 percent, if you think about it, in the summertime at 3 or 4 p.m., the output of solar PV resources won't be as high as what the output would be at solar noon or 12 or 1 p.m. That's why they have a 40 percent number in there, because they know that the peak occurs at 3 or 4 o'clock; it doesn't occur when the sun is highest in the sky.

And they know that over time the

presence of all the PV on the system is going to change the nature of when their system peaks. So the more people who put solar PV on their roofs, the lower the net load is that is seen by ISO New England. So while we have historically the peak has occurred between 2 and 4 p.m., that will gradually shift over time to 3 to 5 p.m., eventually 4 to 6 p.m., and the projected progression of that capacity credit value from 40 percent to, on the order of 35 percent, reflects that.

I'm sorry. And that number is not to be confused with the average annual capacity factor of solar PV resource, which just reflects how much energy you get out of a solar panel given -- with respect to its maximum output. Those are two different numbers. One is important for energy reasons. This one is important for capacity accounting reasons.

MR. PERRONE: And also, would it be fair to say taking 40 percent is also based on the assumption that most solar are fixed panels? Do you expect --

THE WITNESS (Fagan): I believe that ISO New England does that. I mean, yes, if you had more solar resources that were on tracking devices, that number would be a little bit higher.

So to the extent that future solar tends to be utility scale solar, or a lot more of it, you might begin to see, or they already have begun to see this in California, much greater use of tracking devices, because it just extracts a little bit more of the value if you use tracking to basically get more energy from the solar panels that you install.

MR. PERRONE: Page 51 of your report. It talks about, Table 7, the winter capability. And the footnote down at line 10, "Gas/oil units are not necessarily fully operable on both fuels." Could you explain what that means?

THE WITNESS (Fagan): Sure. This is taken directly from ISO New England. This is ISO New England's table with some aggregation by me, but then the notes are word-for-word from ISO New England CELT. And it means exactly what it says. They won't necessarily be fully operable on both fuels. If there is a situation where gas is restricted, or they don't have a firm capacity to gas, it might not be fully operable on gas. It might need to turn to oil. And it will make the choice to turn to oil, depending on what it has committed to in terms of ISO New England's winter reliability policy for the next couple of years, and then in terms of what it intends to commit to for ISO New England's market-based mechanism, the so-called pay-for-performance mechanism, that will kick in beginning the winter of 2018/2019.

MR. PERRONE: Are there also some cases where you have multiple units on one site and maybe only two of the three have dual fuel?

THE WITNESS (Fagan): Oh, I presume that that's possible. I would have to look at the data.

MR. PERRONE: Sure.

THE WITNESS (Fagan): It's a pretty straightforward issue. ISO New England is concerned about fuel availability to you and to New England. They're not concerned about the amount of megawatt generating capacity we have sitting in units all across New England. And all of their work over the last few years, more than that, has been geared towards making sure those units that would have the capability to burn oil secure oil supplies in order to do that, or secure LNG in order to do that. I mean, it's very straightforward. It's a fuels concern.

And they would love to see an expanded natural gas pipeline system in New England, but that's not before the Council in this case. It's just understanding that the basics of this is what is ISO New England doing to have a market structure that makes sure that units have oil in their tanks. And if there are other units that don't have tanks and they need to get tanks, well, they better put them in and get some oil, or they're not going to clear in the capacity market.

And that's what the analysis group winter reliability report, which I attached to my testimony, basically reflects. You don't need new megawatt generating capacity; you need fuel security. And as one of the Council members pointed out, and I pointed out in my testimony, there's a very significant reserve margin in the wintertime right now, electrical generating capacity reserve margin far in excess of the requirement.

MR. PERRONE: Just going back a little bit. Between page 41 and 42, your report discusses that solar PV costs have dropped dramatically and are expected to continue. Could you explain why that is happening?

THE WITNESS (Fagan): Sure. Technological improvement. Various outfits report on the improving technological characteristics and cost improvements on solar PV resources. Their costs have continued to decline, and are projected to continue to decline, and it has nothing to do with the presence of the ITC or the PTC.

The presence of the ITC and the PTC was particularly valuable in the early portion when solar resources were initially $15 or $20 a watt, but now they're $2 to $3 to $4 a watt. Cost improvements have been made. Those policies are phasing out based on a congressional action last year. That doesn't change the market environment for installing additional solar resources, because the fundamental cost of them has declined so dramatically.

And I think someone may have pointed out on the Council, oftentimes it's state policies that drive some of the perturbations in how much solar gets installed when, but it's a bit of a stretch to think that a new administration is going to have a significant impact on that general market trend of the much lower cost resource.

MR. PERRONE: So it's more about producing them at a lower cost, not so much an effect of subsidies or other incentives?

THE WITNESS (Fagan): Absolutely. I mean, there's tombs of material written on this. Yes, they have been subsidized on this past, just like fossil fuel resources and nuclear resources have been subsidized in the past. But what's happened, in particular, over the last five to six years or so is that the technological improvements have borne fruit, and now the resource is just a lot less expensive. And I cite that in my testimony.

MR. PERRONE: This is just a very minor possible technical correction. Page 67, footnote 91, "One US ton is equivalent to 1.1 metric tons." Would it be vice versa?

THE WITNESS (Fagan): It might be, but subject to check. I'd be careful with that.

MR. PERRONE: Sure.

THE WITNESS (Fagan): I will check that out.

MR. PERRONE: In the RGGI report, Exhibit 14, it basically predicts 2030 CO2 emissions about 23 percent lower than 1990 emissions. Is that roughly consistent with the goals of GC3?

THE WITNESS (Fagan): I'm sorry. Could you repeat the beginning portion of that question, please?

MR. PERRONE: The RGGI report, page 4, it predicts in 2030 the CO2 emissions will be 23 percent lower 1990 levels. Is that roughly consistent with GC3?

MR. BERMAN: Is that the reference case?

MR. PERRONE: Yes, just pure reference case.

THE WITNESS (Fagan): Can I have the report to look at that? And you said page 4?

MR. PERRONE: Yes.

MR. BERMAN: Is your question whether 23 percent decline off of 1990 levels is consistent with the range of scenarios that the GC3 is considering?

MR. PERRONE: Yes.

THE WITNESS (Fagan): I would have to put this side by side with the GC. It sounds reasonable, but I need to look at it a little bit more carefully and take some time to do that comparison properly.

MR. PERRONE: That's okay.

MR. BERMAN: Just to clarify, because I don't know if he's answering the question you're asking. Are you asking about the reference case assumptions that the GC3 is using, or about the policy scenarios that the GC3 is going to be recommending?

MR. PERRONE: If the baseline reductions in RGGI would be roughly comparable to what's being recommended in the GC3.

MR. BERMAN: I see. So you're asking whether a 23 percent reduction off of 1990 levels is consistent with the range of policy scenarios that the GC3 may recommend in 2030?

MR. PERRONE: Yes.

MR. BERMAN: Okay. Sorry. I don't know if that was the question you were answering.

THE WITNESS (Fagan): The GC report at a high level, Connecticut's GWSA, Global Warming Solution Act, requires a decline to 2050, such that your emissions in 2050 are dramatically lower. That trajectory is definitely steeper than the current RGGI targets. RGGI would need to be tightened up significantly in order to bring those in line with the 2050 targets.

MR. PERRONE: That answers my question. Thank you. That's all I have for Mr. Fagan.

THE CHAIRMAN: Okay. There's a follow-up question from Mr. Hannon.

MR. HANNON: While we're talking about RGGI, in Exhibit 7 on page 67, about halfway down the page, it talks about emission costs. And I believe this is from Massachusetts. It says, We developed a base case CO2 price forecast using the most recent RGGI auction results of $6.02 a ton, and assumed that the price has increased 2 and a half percent real term. I just was looking at that, an article, and the most recent RGGI results came in at 3.55 a ton. What impact will that have?

THE WITNESS (Fagan): The most recent RGGI results came in at $3.55 a ton?

MR. HANNON: Yes.

THE WITNESS (Fagan): For which RGGI case?

MR. HANNON: I'm reading an article that basically came out the other day. "RGGI Carbon Auction Prices Dropped 22 Percent." Nearly 14.8 million allowances were sold at a clearing price of 3.55, down from the 4.54 they netted in September in the last quarterly auction."

THE WITNESS (Fagan): That's indicative of the current RGGI targets, which were tightened up a few years back. They did a readjustment. That number, that's a particularly low number. That doesn't come close to what you're going to need to see in order to reach your 2050 goals. I mean, that's reflective of RGGI now, which is trending down to 2020, and then stops. When RGGI gets tightened, if RGGI gets tightened up to -- if it gets tightened up and it gets extended beyond 2020, you would need to see carbon prices that are most likely higher than that. But I should be careful. This country has found a way to sort of meet emission cap type requirements at much lower levels than was first projected. So while it's easy to say, you probably need $20 or $30 or $40 a ton in order to reach your targets in 2050. That may not necessarily be the case.

MR. HANNON: So the 3.55, so if you're seeing the price going down instead of the price going up, that's not going to be a good thing. You're saying, in essence, that the requirements really need to be ramped up in order to try to meet the 2050 goals?

THE WITNESS (Fagan): Yes to the latter part. That the price went down, that's not necessarily a bad thing. That means that the market is responding and is able to provide the amount of carbon reduction at a lower price than the previous auction. What's important is the degree to which that target gets changed so that the region can be working on a steeper downward slope in actual emissions. And that price is just an artifact of the current construct for what the emission reduction targets are.

MR. HANNON: Because the reason I bring it up is because in the supporting documentation you provided, it talks about the 6.02, assuming the prices are going up. So with that being the case, it seems like we're going in the opposite direction we're supposed to.

THE WITNESS (Fagan): Well, we're going in the opposite direction right now, because the targets need to be much tighter. That price is going to be determined by what the targets are, and then what the technologies are that are meeting those targets. If energy efficiency and solar PV finds its way onto the grid much more quickly, as we have seen, which is documented in my testimony, that means it's going to be a lot cheaper to meet the rest of the load, so there's not going to be nearly as many allowances that are going to have to be procured by generators that are meeting the net load. If the net load in New England and New York is a few percentage points less for a given year than was projected, all of that folds into the accounting. So it's this combination of what's the need that has to be met by the wholesale level generators that have to buy allowances.

If that need is lower, the allowance price is going to drop. And then another variable that you toss into there is, well, how about if we ratchet these emission limits down further, what will that do? Well, it will raise the price. The price will bump up until the price is able to equilibrate, depending on what's coming on in the market with the resources that are used to reduce emissions.

MR. HANNON: Thank you.

THE CHAIRMAN: Now, questions from any of the commissioners?

SENATOR MURPHY: I have no questions.

MR. ASHTON: One quick question. In looking at your future, do you anticipate any presence for fuel cells? I'm not trying to make it complicated for you.

THE WITNESS (Fagan): Yes, yes. My analysis and testimony is not necessarily addressing the whole -- well, I guess, in short, no, I have not --

MR. ASHTON: Okay.

THE WITNESS (Fagan): -- thought about fuel cells at all. You're talking about natural gas-fired fuel cells?

MR. ASHTON: We're seeing a ton of them come into Connecticut here, 400 kW units. They have to be made here, but there are others that are made elsewhere that are coming in also. And one of the questions that raises is, A, what is the forced outage rate of these units; and B, then how does this affect your install reserve, which I well understand? If you've got a high forced outage rate, that means maybe you're going -- I mean, if you've got a high forced outage rate of the fuel cell, conceivably that could bump up your forced outage reserve in the future.

THE WITNESS (Fagan): It depends on how

ISO New England treats fuel cells. It's possible that a lot of the fuel cells you're seeing are behind the meter at industrial sites, for example. To the extent that they are sort of wholesale grid connected, ISO New England probably has a set of forced outage rates that it applies to them.

MR. ASHTON: No question that they are eliminating central station supply for onsite supply, and many of them are taking advantage of the heat aspect too. It's unclear, in my mind, yet, how this is going to play out in 2020, or especially 2030. And like it or not, the judgment we apply has got to recognize the realities of those 10 to 20-year futures.

THE WITNESS (Fagan): A fuel cell is a type of distributed resource. My testimony is focused on the capacity value of solar PV as a distributed resource, and certainly ISO New England directly looks at that. I don't know, offhand, what sort of capacity value is given to fuel cells by ISO New England. It would fall into the mix.

MR. ASHTON: Okay.

THE WITNESS (Fagan): And it certainly is -- you know, it's a relatively --

MR. ASHTON: My point is the mix is going to change, depending on who you are and where you are, and I just wonder if you had any insight. It's not right or wrong. We're still at the stage of trying to understand it.

THE WITNESS (Fagan): Well, fuel cells are a relatively small part of the overall capacity profile in New England. So they will have an effect when you do the accounting, absolutely. I don't know that they are -- I mean, beyond that, that's really all I can say. I haven't done sort of a careful analysis on how fuel cells --

MR. ASHTON: They're going into schools; they're going into businesses; they're going in at retail establishments, at restaurants, and they're going in all over the lot. So I suspect, it's my guess, that we're probably putting them in at a faster rate than we are megawatts of solar.

THE WITNESS (Fagan): Then in that case, what they'll do is they'll contribute to a net peak load reduction in the regions where they're going in. So it's just that much less that has to be supplied from the wholesale level grid.

MR. ASHTON: Thank you.

THE CHAIRMAN: They also emit CO2.

THE WITNESS (Fagan): They do, indeed.

THE CHAIRMAN: Mr. Hannon.

MR. HANNON: Thank you, Mr. Chairman. I've got a couple other questions.

In looking at the report that you submitted, there's a lot of comment about the storage. This is going to be, hopefully, a new thing. The article from Massachusetts that you also provided, energy storage is recognized as a game changer in the electric sector.

And I guess the question I have is, also in that Massachusetts report, it talks about the optimized amount of storage is estimated to cost 970 million to 1.35 billion. It's on page 9, Roman Numeral IX -- I'm sorry, Roman Numeral XI on that. But then it says considering the Massachusetts ratepayer benefits alone of 2.3 billion. I'm lost on what you're trying to say or what this report is trying to say.

THE WITNESS (Fagan): All that I was doing by including references to the storage situation in Massachusetts and the presence of that report is to indicate that within the industry storage is a resource that has begun to gain commercial traction, and is now available, will become probably more commercially available over time, and can serve as a resource for meeting peak load needs, or meeting some ancillary service needs.

I think the thrust of my testimony does not depend on storage becoming, you know, a particularly cost effective peak-shaving resource, because there are renewable resources and energy efficiency available that, based on the accounting that I've done and analysis that I've done, are more than sufficient to maintain reliability. But I think given the trend in the industry, it would be important to take into account, especially when we're looking out four, five, six, ten years and beyond, to take into account the fact that this is a very important resource. It is beginning to be installed in different parts of the country. It's actually been in place in the PJM region, and it's certainly in place in the California region, and continuing to be installed in greater amounts in California. And it's beginning to show up, at least in the interconnection queues, in New

England. And FERC has taken notice of it, and gives it quite a bit of attention and saying make sure your market rules fairly treat this resource and all of its capabilities.

So it's just important to keep that in mind when you think about what are the resources that would be available to ensure reliability. It's there, and it's becoming more commercial, and the rules are beginning to, at least the authorities that make the rules, are beginning to realize that they have to make sure that those rules reflect the characteristics of that resource and don't present a barrier to access into the wholesale markets.

MR. HANNON: I do have one other question. On page, the bottom of 77, and top of 78 there's a comment, "The current fleet of combined cycle generation in New England is already relatively fuel efficient, and when considered with the new plants coming online, they are more than sufficient to meet the declining natural gas generation needs expected in New England." But then you say, "The KEC plant, whose emissions were modeled only out to 2024, will not be an effective contributor."

And, I guess, where I'm having a problem with that statement is if some of the new plants that are coming online are supposed to be highly sufficient and help meet -- if this plant is basically being constructed in the same vein as some of those other new plants, why would this one be singled out as not being an effective contributor?

THE WITNESS (Fagan): Well, those other plants are likely not effective contributors also.

MR. HANNON: That's not what the statement says, because it says, "and when considered with the new plants coming online, they are more than sufficient to meet the declining gas needs." But now all of a sudden, out of I'm not sure where, you're saying this one would not be.

And so, I mean, granted you're dealing with greenhouse gas emissions, but you don't say anything about that in the earlier part of the sentence. So I'm not sure what you're comparing. It's apples and oranges to me.

THE WITNESS (Fagan): Let me parse it, if I can. The first sentence is not passing judgment on -- it's just showing that there are a set of existing resources that are -- well, they're more than sufficient to meet whatever the need might be. I mean, generation, if you think that New England is truly going to meet its GWSA goals for 2050, what you need is you need to see a dramatic increase in the level of renewable energy and the level of energy efficiency in New England. That's what the ISO New England economic studies show that I include in here.

So you start from the premise that in order to get to where we need to go in 2050, we need to put a lot more carbon free resources onto the grid. So starting there, that directly implies, and the DEEP information about what the gas generation -- natural gas generation in Connecticut needs to do, decline out to 2050, it basically means that we're going to be producing less electricity from gas over the coming decades. That's what that first sentence is saying.

What I'm saying in the next sentence in reference to a plant that has not yet been built, is I'm saying it will not be an effective contributor to emission reduction, and that's based on the information I have in my testimony that relative to energy efficiency and renewable energy, it does a very poor job of reducing greenhouse gas emissions.

So what I'm saying in the second sentence is just that. I mean, if we're at a point where we need to be reducing over the next few decades electricity that's generated from natural gas-fired generation, then we shouldn't be putting in a resource that's relatively ineffective compared to the other options that we have in front of us. That's what those two sentences are saying.

MR. HANNON: Shouldn't that second sentence really be referring to maybe all of the recently-approved power plants, rather than singling one out when they're all basically operating under the same principles? You know, they're kind of all lumped together to start with, and then --

THE WITNESS (Fagan): That's a different analysis. That's not an analysis that I did. It's true, you can begin to compare this to Towantic, Bridgeport Harbor 5, Burrillville, but where you start with is those are further along the road. I mean, Towantic is under construction. Bridgeport Harbor, I understand, already has its approval from the Siting Council. Burrillville has its capacity supply obligation from ISO New England. It does not have its approval from Rhode Island yet. Footprint in Massachusetts will be starting operation next summer.

So there could be a separate analysis about we've got four or five new plants coming online, and we have a whole slew of existing plants that have been in operation for 5 to 15 and 20 years or so. That's a different analysis looking at where do we go from here.

What I'm looking at is on the margin do we need this plant? No, absolutely not. You can ask me the next question. Well, do we really need Burrillville? And I could think about it, and I probably would answer the same question, no, we don't need Burrillville for all the reasons that I talked about when I went before the Rhode Island Siting Council. And then the next question would be, well, do we need CPV Towantic, do we need Salem Harbor? And the answer changes, as you walk your way down the stack. I don't think it's the right question. I think the question is, what do we have to do to move forward? Well, we certainly don't have to build new gas-fired combined cycle plants. We don't need them for reliability purposes, and they don't support our greenhouse gas emission goals.

So what should we do? Well, let's make sure we get renewable energy installed on the grid, and let's make sure that the energy efficiency policies that are in place throughout New England, pretty much among the best in the nation, continue or expand over time.

MR. HANNON: Thank you.

THE WITNESS (Fagan): Am I missing something? Because this is an important point. I mean, I did not address whether or not CPV Towantic should be built. I'm addressing KEC.

MR. HANNON: This is how I read it. It's just how this is phrased where you lump in everything else, but then single this one out. You have very similar facilities. That's all I'm getting at.

THE WITNESS (Fagan): Okay. I mean, I lumped in everything else because they're online and they're operating.

MR. HANNON: But they're not online. That's okay. You gave me the answer I needed. Thank you.

THE WITNESS (Fagan): Okay.

THE CHAIRMAN: Mr. Silvestri?

MR. SILVESTRI: No questions, Mr. Chairman.

THE CHAIRMAN: Mr. Lynch?

MR. LYNCH: No.

THE CHAIRMAN: Now we go to the --

MR. ASHTON: Does the Chair have any questions?

THE CHAIRMAN: I actually do have questions, but that's why you're coming back, because we want to finish this closed portion, hopefully.

Attorney Baldwin, are you ready for cross-examination?

MR. BALDWIN: We are, Mr. Chairman. Mr. Ray is going to be handling the cross-examination of Mr. Fagan.

THE CHAIRMAN: However you want.

MR. RAY: Thank you, Mr. Chairman. And good afternoon, everyone.

Good afternoon, Mr. Fagan.

THE WITNESS (Fagan): Good afternoon.

MR. RAY: My name is James Ray. And, along with Attorney Baldwin, I represent NTE.

Before preparing your testimony, you

reviewed the application. Correct?

THE WITNESS (Fagan): Yes.

MR. RAY: And you reviewed the PA Consulting reports that were included in Appendix B?

THE WITNESS (Fagan): Yes, I did.

MR. RAY: And your clients here are Not Another Power Plant and the Sierra Club. Is that correct?

THE WITNESS (Fagan): Yes.

MR. RAY: And Not Another Power Plant submitted interrogatories to NTE asking for, among other things, information about the assumptions and input that went into PA's model. Right?

THE WITNESS (Fagan): Yes, that's correct.

MR. RAY: And you reviewed a copy of the complete responses to those interrogatories. Correct?

THE WITNESS (Fagan): Yes, I did.

MR. RAY: And one of the things that you take issue with is the input assumptions that PA used in its model. Right?

THE WITNESS (Fagan): Yes, that's correct.

MR. RAY: Now, for example, in your original testimony that was provided on November 15, you stated that the input assumptions do not include any new Maine Wind resources. Correct?

THE WITNESS (Fagan): Yes. That's correct.

MR. RAY: And that's the subject of your changed testimony today. Correct?

THE WITNESS (Fagan): That's the subject of the one sentence that I changed, yes.

MR. RAY: And in making that change, you're acknowledging that the initial report was incorrect. Right?

THE WITNESS (Fagan): No, I'm not acknowledging that the initial report was incorrect. I'm acknowledging that, yes, there was an oversight on that specific thing. The report did not indicate specific Maine Wind; it said generic Maine Wind. But I did miss that. There's a lot of stuff to look at in all of this. The fact that I did miss that doesn't change any of the conclusions that I draw. In the broad, the critical assumptions are still flawed. There's no sensitivity testing done.

MR. RAY: I haven't asked you about

sensitivity testing. I just asked you about the Maine Wind resources. And in the responses to the interrogatories there was a column for generic wind. Correct?

THE WITNESS (Fagan): That's correct.

MR. RAY: And that showed additional wind resources being added from one year to the next, with the possible exception, I believe, of the first or second year. Correct?

[redacted]

MR. RAY: I'm just asking what -- I'm not asking you to --

THE WITNESS (Fagan): -- of Maine Wind. I know, but the context of this --

MR. RAY: If your attorney wants to ask you about the context, he can do so. Okay.

Now, you also stated in your initial report that PA did not appear to include any new utility scale solar PV resources. Right?

THE WITNESS (Fagan): Yes.

MR. RAY: And, similarly, that was incorrect and is the subject of the change you made today. Correct?

THE WITNESS (Fagan): That's correct.

[redacted]

MR. RAY: And you were here this morning -- or were you here when Mr. Paterno was testifying this afternoon?

THE WITNESS (Fagan): I've been here since about -- yes, this afternoon, after lunch, 2 o'clock.

[redacted]

MR. RAY: Did you read Mr. Paterno's

rebuttal testimony?

THE WITNESS (Fagan): I did read his testimony.

[redacted]

[redacted]

MR. RAY: And the bill you're referring to, is that the act to promote energy diversity, the Massachusetts state law?

THE WITNESS (Fagan): Yes, I believe so. I actually can't tell you that that's the exact phrasing for it.

MR. RAY: And that law provides for entering into -- distribution companies entering into contracts with offshore wind. To the extent they receive reasonable proposals, then they shall enter into cost effective contracts. Correct?

THE WITNESS (Fagan): Yes. In the main, yes, that's what the law says.

MR. RAY: Now, can you point out to me in your report anywhere where you discuss the economics of offshore wind?

THE WITNESS (Fagan): No, that's not the thrust of my testimony. My testimony is focused on reliability and emissions.

MR. RAY: Okay. So your testimony doesn't have anything to do with the cost of those -- some of the capacity resources that you talk about?

THE WITNESS (Fagan): The cost of capacity resources and the capacity market construct in New England is part of the context of my report, but my report was not an assessment of is offshore wind cost effective. The point that I'm making here is that when you are modeling what might be going on in the New England system in 2024, you need to take that into consideration regardless what you might believe about the cost effectiveness with or without externalities of offshore wind. You need to recognize that there's a law in Massachusetts, and that's what they're trying to do, get more offshore wind installed. So, at a minimum, you do some testing and see, well, what happens to my modeling results if they do indeed have a portion of their offshore wind in place by 2024, and PA did not do that.

MR. RAY: You're familiar with the

Clean Energy RFP that was put out by the States of Connecticut, Rhode Island, and the Commonwealth of Massachusetts. Right?

THE WITNESS (Fagan): Yes, at a high level I'm familiar with it.

MR. RAY: And those three states solicited bids for Clean Energy. Right?

THE WITNESS (Fagan): That's my understanding, yes.

MR. RAY: And in October of this year, they selected seven projects for a total of about 460 megawatts of Clean Energy for the New England market. Right?

THE WITNESS (Fagan): Sure. Subject to check, sure. I don't remember the number offhand.

MR. RAY: And there were no offshore wind projects selected as part of that. Correct?

THE WITNESS (Fagan): No.

MR. RAY: And the Connecticut Department of Energy and Environmental Protection also issued what it called a small resources Clean Energy RFP. Correct?

THE WITNESS (Fagan): That's correct.

MR. RAY: And they were looking for -- they received over 100 bids for projects under 20 megawatts. Right?

THE WITNESS (Fagan): That's correct. I think that's correct. I should be careful. I've only glanced at the material.

MR. RAY: And late last month DEEP announced that it selected 25 projects as a result of that RFP. Right?

THE WITNESS (Fagan): If you say so. My testimony does not address that. My testimony is addressing other things.

MR. RAY: I'm just asking if you're familiar with it.

THE WITNESS (Fagan): Yes. I know that they -- absolutely, they selected a whole bunch of solars, and I believe there's some wind resources in there. They did not select anything from Canada. And that's the gist of it.

MR. RAY: They didn't select any offshore wind either. Correct?

THE WITNESS (Fagan): They did not. I don't know to what extent an offshore resource --

THE CHAIRMAN: I have a question just for clarification. Are we talking about -- I know a little about the RFP. Is that for projects for the period 2020 to 2024, or is that for projects to move forward now?

MR. RAY: I don't know the exact timing of them. And they may differ for some of the different projects, depending on the scale and so on. I think the three-state projects were larger projects, which would likely have a larger lead time involved.

THE CHAIRMAN: Okay.

MR. RAY: There were no battery storage projects selected as part of the three-state RFP. Correct?

THE WITNESS (Fagan): I don't know. That doesn't sound unreasonable that that would be the outcome.

MR. RAY: And no Canadian Hydro either. Right?

THE WITNESS (Fagan): That's correct.

MR. RAY: Mr. Chairman, that's all I have with respect to the confidential portion. Obviously, we'll have, as you will, additional questions in the next open session.

THE CHAIRMAN: Okay. Thank you.

Do you have redirect?

MR. BERMAN: I have no redirect.

THE CHAIRMAN: My boss says that I'm

allowed to say that we will close this portion of the hearing, and that we'll continue the evidentiary session of the hearing, which will be the open portion, at the same location here on, Tuesday, January 10, 2017, at 11 a.m. Copies of the transcript of this closed hearing will be filed in accordance with the protective order and with the information that Attorney Bachman provided at the beginning of the hearing.

And I hereby declare this portion of the hearing closed. Thank you all for your participation and get home safely.

(Whereupon, the witness was excused, and the above proceedings concluded at 4:47 p.m.)

Redacted

CERTIFICATE

I hereby certify that the foregoing 133 pages are a complete and accurate computer-aided transcription of my original stenotype notes taken of the Closed Council Meeting in Re: DOCKET NO. 470, APPLICATION OF NTE CONNECTICUT, LLC FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A 550-MEGAWATT DUAL-FUEL COMBINED CYCLE ELECTRIC GENERATING FACILITY AND ASSOCIATED ELECTRICAL INTERCONNECTION SWITCHYARD LOCATED AT 180 AND 189 LAKE ROAD, KILLINGLY, CONNECTICUT, which was held before ROBERT STEIN, Chairman, at Ten Franklin Square, New Britain, Connecticut, on December 15, 2016.

Lisa Warner

Lisa L. Warner, L.S.R., 061

Court Reporter

I N D E X

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ETHAN PATERNO

EXAMINERS:

Mr. Perrone

Mr. Silvestri

Mr. Hannon

Mr. Ray

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EXAMINERS:

Mr. Berman

Mr. Perrone

Mr. Hannon

Mr. Ashton

Mr. Ray

The Chairman

NAPP AND SIERRA CLUB EXHIBIT

(Received in evidence.)

EXHIBIT	DESCRIPTION	PAGE
III-B-9	NAPP and Sierra Club's Unredacted testimony of Robert Fagan (subject to NTE's Protective Order, dated November 3, 2016), dated November 15, 2016, and accompanying attachments 1-18	776

Redacted