STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

June 13, 2017 - 1:33 p.m. DAY 15
49 Donovan Street Afternoon Session ONLY
Concord, New Hampshire

{Electronically filed with SEC on 06-28-17}

IN RE: SEC DOCKET NO. 2015-06
Joint Application of Northern
Pass Transmission, LLC, and
Public Service Company of
New Hampshire d/b/a Eversource
Energy for a Certificate
of Site and Facility.
(Hearing on the merits)

PRESENT FOR SUBCOMMITTEE/SITE EVALUATION COMMITTEE:
Chrmn. Martin P. Honigberg Public Utilities Comm.
(Presiding as Presiding Officer)

Dir. Craig Wright, Designee Dept. of Environ. Serv.
Christopher Way, Designee Dept. of Resources &
Economic Development
William Oldenburg, Designee Dept. of Transportation
Patricia Weathersby Public Member
Rachel (Whitaker) Dandeneau Alternate Public Member

ALSO PRESENT FOR THE SEC:

Michael J. Iacopino, Esq., Counsel to the SEC
(Brennan, Caron, Lenehan & Iacopino)
Pamela G. Monroe, SEC Administrator

(No Appearances Taken)

COURT REPORTER: Susan J. Robidas, NH LCR No. 44

{SEC 2015-06}[Day 15 AFTERNOON SESSION ONLY}{06-13-17}
## INDEX

**WITNESS:** FRAYER:

**INTERROGATORIES BY SEC COMMITTEE AND COUNSEL:**

<table>
<thead>
<tr>
<th>Witness/Interrogator</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Cmsr. Bailey</td>
<td>3</td>
</tr>
<tr>
<td>Mr. Way</td>
<td>77</td>
</tr>
<tr>
<td>Mr. Oldenburg</td>
<td>116</td>
</tr>
<tr>
<td>Dir. Wright</td>
<td>130</td>
</tr>
<tr>
<td>Ms. (Whitaker) Dandeneau</td>
<td>142</td>
</tr>
<tr>
<td>Ms. Weathersby</td>
<td>152</td>
</tr>
<tr>
<td>Chairman Honigberg</td>
<td>170</td>
</tr>
<tr>
<td>Mr. Way (cont'd)</td>
<td>179</td>
</tr>
<tr>
<td>Mr. Iacopino</td>
<td>181</td>
</tr>
</tbody>
</table>

**EXHIBITS**

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committee 39 Canadian tariff prices</td>
<td>27</td>
</tr>
</tbody>
</table>
AFTERNOON SESSION

(Hearing resumed at 1:33 p.m.)

CHAIRMAN HONIGBERG: We're going
to pick up the questioning from the
Subcommittee members, and we'll start with
Commissioner Bailey.

INTERROGATORIES BY SUBCOMMITTEE MEMBERS

BY CMSR. BAILEY:

Q. Good afternoon, Ms. Frayer.
A. Good afternoon.

Q. I'm going to -- I'm not an economist, so I'm
trying really hard to understand all of these
things. So some of my questions maybe really
basic, so bear with me, okay. A lot of my
questions are just to understand what has
been said.

So if I offered to give you $20 million
today, and I gave you the choice of taking
$20 million today or $20 million ten years
from now, which would you pick?

A. As an economist -- maybe I shouldn't preface
it as an economist --

Q. Yeah, as an economist.

A. There's a time value of money. So a dollar
in my pocket today is worth more to me than a dollar in my pocket at some time in the future.

Q. Okay. Can you look at Page 4 and 5 of your updated testimony, Applicant's Exhibit 82?

A. This is the February or the March 2017 report?

Q. The March testimony.

A. Testimony. Okay.

Q. Yeah. I'll use all the March information. I took February out because I understand March has been updated -- some of the numbers were updated in the March report.

A. That's true. There was a typographical issue on a couple of things.

Q. Okay. So on those pages, bottom of Page 4, the top of Page 5, you say that over the 11-year modeling horizon, the net present value of $602 million in annual savings translates to $4.5 billion in 2020 dollars using a 7-percent discount rate. You see that?

A. Yes, I see it.

Q. Okay. Can you tell me how you calculated
that? Not the discounted cash flow model, but how did you get -- where did you do the present value calculation in that analysis?

A. So this is talking about wholesale electricity market benefits. And we have a year-by-year forecast of those. If you don't mind, I can take you to the report to just show you a figure.

Q. Figure 1?

A. Well, Figure 1 has, again, just a summary, several statistics. Figure 1 has kind of what I would call to be annual averages. But we have another figure, and I just want to refer to it just so everybody's clear.

Figure 10. And I know the figure itself is confidential, but its existence isn't.

Q. Right.

A. That shows the year-by-year wholesale electricity market benefits. And what we've done is, instead of just doing a raw sum in Excel of all those columns, bars, we did a net present value calculation. So it's a discounted sum of those bars.

Q. But the bars are nominal?
A. The bars are nominal.

Q. So that's what I'm trying to understand. So why wouldn't you take the bars and put them in present value terms and then add them together?

A. So that's a step in the calculation. But in Excel, you don't need to do that, so --

Q. That's essentially what it does?

A. Yeah.

Q. Oh, okay. So then why -- I don't understand why all these tables are entitled "nominal," because it seems like they've been put in present value terms.

A. Well, when we show annual results, we want to specify it's nominal because we don't want there to be confusion about the appropriate level of the discount rate to be used, because there's others in the industry that sometimes do their forecast in real dollars. So, for example, in today's dollars, they would do so by taking the inflationary element that's naturally present, let's say in gas prices, taking it out before they put that input into the model, and so what
they're producing would be annual effects in real dollar terms. And if you're already presenting results in real dollar terms, you wouldn't use a discount rate that is associated with nominal dollars. So it's just for clarity so that there is no confusion that there's inflation present in our numbers.

Q. Okay.

A. So the Figure 10 numbers are nominal. They're not in 2020 dollars or today's dollars, 2017 dollars. They are in future dollars. So the big value in, say, 2025, that's in future 2025 dollar terms.

Q. So when you calculate the savings that New Hampshire's going to get from the capacity market, tell me again how that gets translated into present value terms.

A. So, basically the calculation would start with these nominal dollars by year, and there would be an interim step that frankly Excel does for us, where each of these annual values get converted to whatever you choose to be the starting point. We did 2020
dollars into 2020 dollars. And then there is
a summation of those individual bars.

Q. So let's look at Figure 1 and see if I'm
getting it. Again, these columns are titled
Millions of Dollars Nominal. And this
Figure 1 is not confidential, right, so we
can talk about it publicly?

A. Yes. And here what we've done is we haven't
done any discounting. So these are basically
an annual average sum of each of those
columns we were just looking at in the prior
chart.

Q. Oh, so these are not in present value.

A. No. We were very clear when we talked about
present value, we would say it's "net present
value."

Q. Okay. And the difference between net present
value and present value is just if there's
revenues and costs, you take the net?

A. No. The difference between net present value
and nominal is essentially whether you've
discounted it --

Q. No. Sorry, not the difference between net
present value and nominal. I'm talking about
the difference when you say net present value
or present value.

A. Oh, I think it's a semantic, yes, in my mind.

Q. It's the same thing.

A. Yeah.

Q. All right. So these numbers in savings,
then, are all nominal numbers.

A. Yes.

Q. And, you know, you started with as an
economist you would want to take the -- you
would want to know -- a dollar today is worth
more than a dollar ten years from now. So
why wouldn't you present the savings for
these in present value terms?

A. Well, we do. So when we talk about
cumulative sum, we make sure that we include,
where appropriate, references to the net
present value, the discounted total. But
when we're talking about annual averages, we
wanted to present it in its raw form that
comes out of the model because this is a
multi-year analysis. And we don't want to
say to a customer, you know, ten years from
now you'll be paying -- just as an example --
let's start with a premise that today's
price, round numbers, is $40. And you don't
want to give them the false impression that
in real dollar terms, ten years from now
you'll still be paying $40, because really
ten years from now they'll be paying a
nominal, they'll be paying whatever is the
price with all that inflation that has built
up over time. So we didn't want to undermine
the impression that inflation has an impact
on the cost that we see recorded and we
observed that are reported by ISOs, by
utilities on the bills. Those are in all
nominal dollars terms.

Q. Okay. But the numbers in this table are
talking about the savings that New Hampshire
is going to get.

A. On an annual average basis, yes, without
discounting. And other places where we did a
sum, we wanted to discount it to a specific
starting point, 2020.

Q. Could you redo this table to show me what the
savings would be in present value terms?

A. I could.
Q. Will you?
A. We'd be happy to do that, yes.
Q. Okay. Thank you.
A. We would use the same 7-percent discount rate.
Q. Okay. That's fine.

All right. Now, Mr. Quinn testified that of the $3.8 billion in savings projected over the life of the Project -- and I believe that the energy and capacity savings were only for ten years -- of the $3.8 billion, $800 million was from electricity wholesale market savings. And I don't think he updated his number after you updated your number, so those are based on probably old numbers. So I don't know if you can do this translation in your head, but I was wondering if you could show me how you get to that $800 million for New Hampshire savings from these numbers in this table, how you would do it. Do you take the average nominal number and multiply it by 10 for the capacity market and by 11 for the energy market and you add them together?
A. So the energy market and the capacity market savings are additive.

Q. I understand.

A. Yup. So if one were to -- again, if we go to that same figure, just to have a grounding, if you will --

Q. Thirteen?

A. I was going to use --

Q. Or Figure 1?

A. -- Figure 10.

Q. Oh, sorry. Ten, yeah.

A. Because Figure 13 is just capacity markets. But Figure 10, there's a blue part of each bar. That's the energy market. And then there's the yellow or orange bar, depending on your printer, and that's the capacity market portion. Now, this is one for all of New England, but of course New Hampshire is roughly 10 percent.

Q. Right.

A. So, again, behind this aggregate New England number, we do have a New Hampshire number. So I'm happy to provide it if that's helpful. But as a rough check, I would say that even
on a net present value basis, probably that
10 percent -- sorry. I should step back and
say on a New England-wide basis, energy
market benefits on an annual average basis
without discounting are about 10 percent of
the total wholesale electricity market
benefits. A little bit more, but in that
ballpark. And you can tell that from
Figure 1 because wholesale electricity market
benefits, annual average in nominal terms for
New Hampshire is 61.6, and energy markets are
8.6, and capacity markets are 58.3. There's
a little bit of a distinction here because we
have different years we're modeling. But if
you have the underlying data, it basically
gives you about a 10-percent portion. So
energy market benefits are about 10 percent
of the wholesale electricity market benefits.

Q. Okay. So then let's go back to Figure 1. So
if the energy markets benefits are 10 percent
of the wholesale market, why is -- I mean,
8.6 isn't 10 percent of the 61.

A. Because we're talking slightly different time
frames. And this is why in parentheses we
unfortunately added 10-year, 11-year. As soon as the Project begins operations, it's electrified, energy flows will start going down the Project, and that will start creating energy market benefits. But because of the timing of the capacity auctions, those won't be immediate. There's a little bit of a gap between start of operations and when the capacity supply obligation will begin, and that's causing the annual average disconnect. It's not a rounding error. It's just a disconnect. But there's no disconnect in the underlying year-by-year numbers.

Q. And that's why the number for the capacity market plus the energy market doesn't equal the number --

A. Correct.

Q. -- in the wholesale market.

A. In this table, just for presentation.

Q. Yeah. Okay. So, again, getting back to how much we think we're going to, New Hampshire is going to save from this project, in nominal terms, it's $61.6 million a year.

And you're going to tell me what it is in
present value terms.

A. Yes. And actually, in present value terms, it'll be a little bit less because the benefits accrue over multiple years into the future.

Q. Yes. Okay. And why isn't that a more reasonable way to look at it?

A. It is. I just -- it is a reasonable way to look at it. Again, the reason we like to present everything in nominal is because our forecast is done in nominal. And I think there's a -- for us, it's important for folks to understand it's done in nominal intentionally because we want people to understand what they're paying tomorrow in tomorrow's dollars, not what they're paying tomorrow in today's dollars.

Q. Okay. Okay. Now I'm going to switch to specifically capacity market savings or -- yeah. So would you agree that the capacity market is designed to have the necessary amount of capacity available purchased at a competitive price? Is that what it's all about?
A. I think so.

Q. To get the amount of capacity needed at a competitive price.

A. Yes. And the reason we’re getting capacity is because we want resource adequacy.

Q. Yes.

A. We want reliable service.

Q. Right. Okay. So, ultimately, the market is designed to procure capacity at the net cost of new entry because that would be the competitive price. I know it doesn’t happen exactly that way every year. But the market sort of balances out; is that right?

A. I would agree that in the long term the market is geared towards kind of achieving that on an equilibrium average basis, that is the intention.

Q. Okay. So if we get savings from Northern Pass in one or two years, wouldn’t that likely balance out? I mean, I don’t understand how we can count savings in the capacity market for more than one or two years.

A. So the capacity market savings, as we’ve also
demonstrated in our analysis, aren't going to last forever. They're going to eventually go away because the market will re-balance back to that equilibrium point where it's targeting or trying to converge with the cost of new entry. But there are nevertheless savings over some time frame because we are introducing new supply, new supply that's lower cost on an all-in basis that creates that supply shift to create a lower price. So I would agree with you that you can't have capacity market savings forever, and that's demonstrative of that convergence. But I don't think the convergence principle undermines or obviates the fact that we can create savings. We will have lower capacity prices when we first introduce the new supply.

Q. When you first introduce the new supply.
Yup.

If Northern Pass causes retirements which don't occur in the Base Case, would the capacity market savings be less than you predicted?
A. We had a bit of a discussion I think on this at one point, and my answer is: If we were doing a static analysis and we said Northern Pass causes a retirement and that's it, there's nothing else, then that retirement is a form of re-balancing of the market in response to Northern Pass. So in isolation, that piece alone would reduce the capacity market benefits. But we can't do that in isolation.

Q. So what else would offset it?

A. So the retirements may actually offset other potential delists or changes in supply that were happening but for the retirements, because what the retirements do is they raise price --

Q. Right.

A. -- in the capacity market, and that has its own set of consequences.

Q. But if they -- well, we'll get to that in a minute.

Why didn't you include retirements in your model under the Project Case?

A. We didn't include it because the model didn't
predict or project that there would be any
retirements. So it wasn't an assumption; it
was an outcome of the model.

Q. So, according to the model, adding 1,000
megawatts to the capacity market isn't going
to have any impact on retirements other than
what's in the Base Case.

A. It did not trigger retirements. And that's
actually consistent with the last auction.
We added 1,000 megawatts of new supply and we
didn't have any retirements.

Q. We had a lot of surplus, which we're going to
talk about.

A. And I would completely agree with you that
that is how we're getting the lower price,
because of the surplus.

Q. Okay. Last week you say one particular
plant -- I think it might have been in the
confidential records, so I'm not going to say
what plant it is, but hopefully you'll
remember what you were talking about -- that
retirement was not included in your update
because a new plant was being built at that
location that would supplant the capacity of
the old plant.

A. Hmm-hmm.

Q. Do you remember that?

A. Yes.

Q. Wouldn't the new plant have to bid in the capacity market?

A. It did. It bid in the --

Q. Oh, this already happened. Okay. Go ahead.

A. So there was a timing issue where the plant, the new plant bid in and the prior FCA cleared, so in the next FCA they removed the existing plant to make sure there was the ability to actually do all the construction, because they actually, literally had to take some facilities offline at this larger facility to make room for the new asset.

Q. So the effect on the capacity market, if any, has already happened.

A. Yes, it's a timing issue.

Q. Okay. Thank you.

Okay. I looked at the TSA because there's been a lot of, I think, conflicting information, but maybe it's just a misunderstanding of terms in the record about
who's going to pay for what. So,
Hydro-Quebec TransÉnergie, that's HQT; right?

A. Yes.

Q. Okay. And they're going to build and own the
transmission line from Des Cantons to the
U.S. border.

A. Yes, because they are the entity responsible
for all things transmission in Quebec.

Q. Okay. And HQP buys the transmission service.
And is it HQP who has the surplus energy to
sell?

A. That's correct. They're the operators of all
the generation and exporters of it from out
of Quebec.

Q. So how is HQP going to pay for the Quebec
line?

A. HQP will be viewing -- no. Let's step back.
I think you had said just a second go,
so HQP will pay a tariff. Right.

Q. We didn't talk about tariffs yet.

A. Okay. So maybe if I can explain it, it
might -- I hope I can get to your answer, but
I want to explain it in maybe a little bit of
a linear fashion.
Q. That's what I -- I would love linear.

A. Okay. So like we just discussed,

Hydro-Quebec Production is the entity that
operates generation and is essentially the
exporter, the ones that -- the entity that is
scheduling and making transactions to
external markets outside Quebec. And it
makes revenues on those sales. It is not
considered technically as closely regulated
as HQ Distribution. HQ Distribution, which
we haven't talked about, is the entity that
operates within Quebec to service customers
within Quebec.

Q. And that has nothing to do with this at all.

A. No, not really, but I wanted to raise it
because I think there's a lot of confusion
about that.

So, HQP, in the normal course of
business, because it's already exporting
power to other markets outside Quebec, has to
pay a standard transmission tariff for access
to HQT system in Quebec, because all of their
exports, the power for the exports originates
somewhere in Quebec. So they need to use
already the Quebec system to take that export capacity outside of Quebec.

Q. Okay. So HQP has surplus energy at the dams in Quebec, and they pay HQT to deliver it to the converter station in Des Cantons under a tariff, a HVAC transmission tariff?

A. Yup. Actually, the way they take transmission service in Quebec is that they buy like it's basically a point-to-point service anywhere on the Quebec system, and it's the same rate anywhere on the Quebec system. So they basically tell HQT, I need transmission service for this many megawatts at this time, and HQT has a public tariff and says, yes, you can use it, here's what you have to pay.

Q. And that's AC.

A. Yes.

Q. Okay. And --

A. AC, although I think HQ might actually in Quebec have -- HQT in Quebec might have DC components to their system in other places, too. But it's access to their entire system. It's kind of a single transmission-use tariff
that they apply to any sales that HQP wants
to make outside of Quebec.

Q. Okay. So I have a lot of questions. Sorry.

So if they're buying point-to-point
service, HQP is buying point-to-point service
to get the energy to the substation just for,
you know, like in the beginning of the line
because we're going linear. They're buying
point-to-point service. Then they have to
know which dam the energy is coming from.
It's not just the swoosh surplus.

A. Yes, in the normal course of system
operations, they will need to be specific in
their scheduling. But the tariff itself is
not specific to individual nodes on the grid.

Q. Right. Okay. So, ultimately, somebody in
HQP -- and I think it's HRE -- is going to buy
capacity and energy from HQP and sell it at
the U.S. border.

A. There might be this relationship where
there's an exchange, I guess, of legal
ownership. But essentially, the first thing
we've been talking up to this point is the
fact that HQP, to make any sales on existing
interties or new interties, has to pay a charge to HQT for the Quebec portion of the system, for using the Quebec system.

Q. Okay.
A. And then there are a variety of other tariffs that may be applied to those export sales in those other destination markets once they cross the border between Quebec and that other market.

Q. But the DC line that goes from Des Cantons to the U.S. border is not part of the Quebec transmission system.
A. It is not.

Q. So it's not in the tariff today.
A. It's not in the tariff. But my understanding is HQT is treating it as an incremental cost that they're adding in to the tariff.

Q. So doesn't that socialize that cost over all Canadian customers?
A. It socializes the costs. But in that -- and I think we pulled it up when we were doing this discussion. HQT actually did a financial analysis, because it is regulated by the Quebec regulator, to show that on a
net present value basis it anticipates that HQP's payment of the overall just generic tariff will allow it to recover the cost of this incremental project.

Q. So you don't think that the tariff price is going to change for the piece that goes from Des Cantons to the U.S. border?

A. No.

Q. So we know what that tariff price is today.

A. Yes.

Q. Can you tell me what it is?

A. Yes, if you bear with me. I printed a screenshot from the HQ web site.

(Pause in proceedings)

A. The tariff today for point-to-point transmission service in Canadian dollars is... and they have different ways to represent it, but the numbers mathematically are the same thing. On a yearly basis, it would be $76.13 per kilowatt per year. On an hourly basis, it would be $8.69 per megawatt hour. Would it be useful if I give you this?

Q. Yes, that would be great. We can make that an exhibit.
CHAIRMAN HONIGBERG: Yeah,
mechanically, how can we make that an exhibit,
Pam?

MS. MONROE: In fact, we just
had Mr. Oldenburg's exhibits from his
presentation scanned and loaded up to the
ShareFile. So we could do the same thing here.

CMSR. BAILEY: Do we know what
Committee number we're on?

MS. MONROE: We can find out.

CHAIRMAN HONIGBERG: I'm
informed it's 39.

MS. MONROE: Committee 39.

(Exhibit Committee 39 marked for
identification.)

BY CMSR. BAILEY:

Q. So do they pay more -- once the DC line is
built, are they going to have to pay more
than the $8.69 per-megawatt-hour price? It
seems like they're moving energy from the
dams to the converter station, which they
would pay $8.69 per megawatt hour today to
do, and then they're moving that energy from
the converter station to the U.S. border, and
they’re still only going to pay $8.69 a
megawatt hour.

A. Yes, that’s my understanding, notwithstanding
that HQT does need to go through cost of
service rate applications once in a while, as
would be expected from a regulated entity.
And down the road, if it determines that it
needs higher costs, it may change its tariff.
So the tariff isn't set in stone forever.
But it is a cost of service tariff. And if
you think about it from HQT's perspective,
what they're saying is we've identified from
our system studies that in order for your
interconnection requests to be granted, we
need this upgrade. They're very happy to
make that upgrade because their original
asset base for their entire network is slowly
depreciating over time, and they're
essentially adding a new increment and
upgrade to their rate base in order to -- or
as part of this investment. And as a
regulated entity, increasing your asset base
or replenishing your asset base against what
was already depreciated allows them to
maintain that same tariff, because in
actuality one could argue but for this
project, over time their tariff should
actually go down. But their tariff is what
it is, and it hasn't changed in many years.

Q. That's remarkable.

A. There is a bit of a division, if you will, of
entities within the Hydro-Quebec family, and
it's important to understand those. So they
all do something different and think a little
bit different.

Q. All right. So HRE then buys the capacity and
the energy from HQP, and they'll probably pay
that tariff rate, or maybe a little bit of a
mark-up to HQP. But they're going to pay the
tariff rate and the capacity from HQP.

A. So the entity, if you want to think of it as
the entity that's going to be doing the
entire transaction, would have to pay the
tariff in Quebec. And the agreement that we
talked about last week that Counsel for the
Public had marked as their Exhibit 275
actually does say that HQP also owes them a
little bit more above and beyond the tariff,
but it's --

Q. HQP does?

A. HQP owns HQT. -- a little bit of a bigger contribution. Based on my math, I thought it was about... if I can just check my math again. But I believe in that agreement it was about, in U.S. dollar terms, about $5 million that they owe as an additional contribution above and beyond the commitment to buy transmission service, just as it does today. So there is that little $5 million additional capital contribution for this Quebec line that will be payable by HQP to HQT once I believe construction is complete.

Q. Okay. So what gets included in the IMM's calculation of the ORTP for all of these costs that we just talked about?

A. So if we can step through them linearly, first and foremost, all the construction -- I believe all the construction costs that serve as the foundation for the cost of transmission service that HQP will be taking on Northern Pass, those go into the calculation.
Q. And that's the $5 million that you just said
or --
A. No, that's the $1.6 billion.
Q. Oh, no, no, no. I'm talking about -- we're
just in Canada now, linearly.
A. Okay. I think in Canada, what will likely --
the only piece that should be represented in
the minimum offer price calculations for the
Project would be this additional contribution
that HQP will need to make to HQT for the
Quebec line, that $5 million.
Q. And what about the tariff cost of the
transmission services?
A. They will essentially be netted out. And the
reason they're netted out, that means zero,
is because this is a system-backed import on
the Northern Pass Project. And we've
incorporated the fact that those energy
sales, if they were redirected to another
market, would have value. But if they were
redirected to another market, they would pay
that same transmission tariff. So we could
have taken into count the $8 transmission
tariff point-to-point that's payable on one
side of the ledger, but we would have also
had to take it out on the other side of the
ledger when we're counting those opportunity
sales, and therefore they would have been
netted out. So that's why we say they don't
get included, because HQP will sell the
surplus energy somewhere. And from a
transmission service perspective within
Quebec, there is no incremental cost for the
Quebec system.

Q. Except for the $5 million.
A. Except for that contribution that they do owe
funding for.

Q. So the cost of the supply that goes into the
ORTP, I think you testified that that's based
on the opportunity cost?
A. Yes.

Q. And would you, so that we're talking about
the same thing, agree that you could define
"opportunity cost" as the los of potential
gain from other alternatives when one
alternative is chosen?
A. Yes, I think that sounds reasonable.

Q. Okay. So are you saying that the loss of
potential gain is from selling power to Ontario during off-peak?

A. For the purposes of these surplus energy volumes, yes.

Q. If HQP could receive more revenue from selling the 1,000 megawatts to Northern Pass, then the loss would really be them not selling it to Northern Pass.

A. Well, I think that's the same thing. It's consistent with the prior statement, in the sense that what would happen in a world -- this is what the opportunity cost analysis is trying to do -- what would happen in a world where Northern Pass wasn't built. And we've established that HQP has surplus energy, so HQP would sell it to another market, would have to sell it into another market where they have the transmission capacity on those interties to deliver it. And we've done a full examination of all the other, what we call "destination markets" for HQ's surplus energy, and it's inter-temporal. It's not just saying, oh, Ontario or New York or New Brunswick. You have to actually look at if
they could sell it because of the transmission interties and how they would be utilized. And our analysis suggests the best opportunity, the highest value alternative opportunities in a world without Northern Pass would be Ontario off-peak or Upstate New York, Western New York off-peak.

Q. What about if they could sell it on the TDI line or the Granite State Clean Power Line?

A. But those lines don't exist. It's not an opportunity that is measurable today.

Q. But Northern Pass doesn't exist either.

A. But we're evaluating Northern Pass in the context of Northern Pass showing up to the Internal Market Monitor and ISO and saying, Northern Pass is getting built and I want to be able to qualify to sell capacity so it will exist. And my alternatives, if Northern Pass -- if I can't use Northern Pass, will be all my other existing interties, and here are all my alternatives.

Q. But the alternatives could be to sell it, if Northern Pass doesn't get built, to sell it on another line that doesn't exist yet.
A. I think --

Q. So wouldn't the opportunity cost really be whatever you plan to sell it to Northern Pass for? Or not you, but -- because we've had previous testimony that there's a great demand for this clean energy in New England and that it's going to be sold into New England one way or the other. So if they sold it into New England, if Northern Pass didn't get built, they could probably -- I mean, the TDI line has all their permits, so they might even be able to get it built faster than Northern Pass; right?

A. So, Commissioner Bailey, I agree with your premise hypothetically. But I think from the perspective of the IMM, they can't establish the opportunity cost on the basis of those hypotheticals. They will point blank need to use the existing systems and infrastructures as part of their analysis. And I shouldn't say "they." I think that the way that the process works is that HQP, or the entity that's providing the qualifications packet, the sponsor that's going through the process
with ISO, would basically provide them with a rationale, and they would say, if it's not Northern Pass, then I have to use other projects, other current commercially viable pathways to sell that energy, and it's going to be this, this, this or this point. I can't see how another potential project gets inserted into that equation.

This is, by the way, consistent with how currently imports on the existing interties are also evaluated, because the IMM also has to do a MOPR analysis every year for existing imports, too, and it does this opportunity cost analysis. And in doing so, it doesn't look at HQ's potential future opportunities if another project is built.

Q. Okay. I just don't want to go into confidential information, but if you look at Figure 11 in Applicant's Exhibit 81, that shows the average amount -- and I'm trying to do it without saying the numbers. The average energy price from the Project on the right-hand side of the table in the gray part compares the Base Case to the Project Case
average energy price; right?

A. That's correct.

Q. And that's much higher than the price of

energy that they would get from Ontario

off-peak; correct? A lot higher?

A. It is higher.

Q. Okay.

A. And, again, because they have maximized

opportunities of selling into New England on

existing interties. They are already selling

on Phase II, for example. And our analysis

of the Base Case assumes they continue to

sell on Phase II the existing intertie. So

what spare intertie capacity do they have to

use, and that's why we have to go off-peak to

Ontario or Western New York.

Q. And is the Western New York price higher than

the Ontario off-peak?

A. I think they're generally in the same average

trend.

Q. Okay. And there's no capacity available on

the Phase II line to put some of that energy

over that line?

A. Not significantly. I believe that the
phase -- that the capacity utilization
factor, capacity factor of Phase II in recent
years has been well over 90 percent.

Q. You said something the other day about
something like without Northern Pass, HQP
couldn't sell to Ontario during on-peak. Did
I get that wrong? Do you remember what you
were talking about?

A. So I was saying without Northern Pass. So in
a world without Northern Pass, HQP wouldn't
be able to access Ontario on-peak because,
again, those interfaces tend to be highly
loaded on-peak, and it's off-peak where
there's a lot of spare capacity.

Q. All right. I thought that was a different
point. Thank you.

Okay. Let's talk about the wholesale
capacity market benefits. We have on the
record that the Forward Capacity Auction 11
cleared with a surplus of 1,760 megawatts.

Do you recall that?

A. That sounds right.

Q. Okay. And recently, another 550 megawatts
has given notice that they're going to retire
from FCA 12, like in February. I think somebody said that yesterday. Well, let's just assume for the purposes of the question --

A. Yeah, there are some limited retirements, delists that were requested for the next auction. I'm not sure about the megawatts, though, but --

Q. So you think it's less than that?

A. I think so.

Q. Okay. So let's assume for purposes of the question that it's 500, 550. So that still leaves a surplus of over 1200 megawatts for Forward Capacity Action 12; right?

A. Yes.

Q. And the growth from the CELT report is pretty small.

A. Yes.

Q. So we're looking at 1200 megawatts of surplus that you have to compete against -- that Northern Pass would have to compete against.

A. Yes.

Q. And they have 1200 megawatts at $5.30 per kilowatt month that is over and above what
they need to meet the reliability
requirements; right?

A. Well, the way I like to think about it is
they, ISO-New England, has established that
they are willing to pay certain dollar
amounts for each increment of oversupply.

Q. Right.

A. So they paid $5.34 for a certain amount of
oversupply. If we have even more oversupply,
they will then pay everybody less because
they have come to the determination that if
the system is more and more oversupplied,
it's more and more reliable, and therefore
there's a marginal, a declining marginal
value that's the basis for those demand
curves. But it doesn't preempt that from
happening. You know, the demand curve goes
all the way out for a very long time before
it hits zero.

Q. But then if the price gets much lower, then
you're going to be at the delist price of
several generators; right?

A. Well, the dynamic delisted threshold is
higher than even where we were. It doesn't
mean that they will delist. There is a
threshold set by the ISO for purposes really
of easing its burden on how many requests for
delist bids it needs to review. So,
basically it's kind of like a safe harbor
that tells generators: If you want to delist
above this price, you have to come to me in
advance, and I will review your cost
structure to make sure your delist bid is
consistent with competitive markets. But if
you want to delist in the auction below this
price, you can do so if you want, but --
Q. And then they can't get back in --

(Court Reporter interrupts)

A. You can do so if you want, but you don't have
to. It's dynamic. When somebody dynamically
delists, they can come back in the next
auction. But once you delist in an auction,
you are foregoing any ability to receive any
revenues from that Forward Capacity Auction.

Q. And when that happens, the price goes up --

A. It does.

Q. -- in the capacity auction.

A. Well, it stabilizes. The way I like to think
about it, it goes in rounds. If enough folks
delist at a certain round price, such that
then the total quantity of supply in the
market, the remaining quantity that's willing
to accept that price equals the total
quantity that the ISO wants to buy based on
their demand curve, then that means the
auction has successfully completed and a
price is set.

Q. All right. So with a surplus that has the
capacity greater than what's needed for
reliability, would you agree that the only
way that ISO would purchase 1,000 megawatts
is if the clearing price was to be either
equal or less than the overall cost of
capacity in the FCA 11? So if they bought
35,000 megawatts of capacity in FCA 11 at
$5.30, if you multiply that by 1,000 to get
to kilowatts, and multiply it by $5.30 to get
to kilowatt hours -- kilowatt months and then
multiply that by 12 months, it would produce
the total cost of the capacity for that
auction; right?

A. Yes. So the volume procured multiplied by
the price represents the total cost --

Q. Right.

A. -- to the system operator from buying that
capacity. I agree.

Q. So, then, if you add 1,000 megawatts and you
go to 36,000 megawatts, the price procured
has to go -- it can't -- the total cost has
to be less than the total cost at
35,000 megawatts if they don't need more for
reliability.

A. That's correct. And that's what creates the
capacity market benefit.

Q. Okay. And do you know what right now the
price would have to be to make the result of
FCA 12, the total result if they purchased
36,000 megawatts, what the price per kilowatt
month would be to be under the total cost of
the 11 auction?

A. So the actual specific demand curves, the MRI
curves for FCA 12, I don't believe they're
set yet. They will be set shortly, soon, but
they will probably shift out a little. But
there is some demand growth. We don't know
exactly at this stage. But generally
speaking -- I'm not sure. Maybe I should start with the answer.

I'm not sure I can tell you now what the price would be. I can probably think a little bit and estimate at the next break as to the specific questions you're asking.

But I can at least describe qualitatively what I expect to happen if they procure more megawatts in the next auction and they're starting from an oversupply position today, which I think is your premise. Prices will have to go down further than what they were in the last auction, and prices will go down percentage-wise more than the additional capacity they purchased because the MRI curve is curved. It's not linear. It's not if I increase a lower price by one percent, I'm increasing quantity by one percent. No, it's not how it works. And so for each additional megawatt that they're buying, the unit price they're paying everybody is going to be lower, and that means the total cost of the market will be lower if they buy more.
Q. Unless it forces retirements.
A. Unless it -- so if the price -- unless there's retirements that happen, and then you start the whole story, okay, the retirements. Is there then delist that would have happened that aren't happening? So it's a bit of, I want to call it a daisy chain, but maybe that's not an appropriate analogy. But there's a bit of a daisy chain of consequences that our forecasting models are trying to predict based on what we've observed in other markets from other prior auctions about those daisy chains.

Q. And knowing what you know now from Forward Capacity Auction 11, and the fact that there's a surplus, do you still think that there's going to be savings from the capacity auction? What impact will the next capacity auction have on your savings calculations?
A. I think, knowing what we know now for FCA 11, we would probably get smaller capacity market benefits in the next auction, but bigger capacity market benefits down the road potentially. So what it does is it changes
the time frame. Remember those bar charts we were looking --

Q. Yes.

A. -- it changes the magnitude of the bars and the time frame. But I think that I'm still very confident that the general, overall magnitude of those capacity market benefits on a MPV basis, if you will, over time are very similar to the results that we've presented.

Q. Okay. So if your prediction that there will be no retirements in subsequent years is correct because of the Project, and growth in net installed capacity requirement is very small, won't we be in the same circumstance for several years out? I mean, you said the benefits will increase and the magnitude will be similar to what you showed me in Figure 10. But with those two assumptions, is that really still true?

A. So I think there's... I think you're asking about -- I'm not sure I understood your question, so I'm trying to figure out a way to rephrase it to make sure I understood it.
Q. Okay.
A. I think you're asking about...
Q. No retirements, excess surplus and really
   very little growth in net installed capacity
   requirements.
A. So, given where we are, maybe again you're
   asking about the kind of situation we are in
   today; right?
Q. Right.
A. And if I can expand on my prior answer about
   why I think there is not a significant
   material change in the net present value, but
   maybe in the timing, what I could expect what
   could happen, hypothetically, is that we are
   definitely more oversupplied because of
   FCA 11 than what I had anticipated when I was
   doing my updated analysis. I recognize that.
   When we introduce a new project that further
   reduces the price, it potentially could --
   and we've already reflected this in the
   updated analysis. When I say there's no
   retirements, I really use the "retirement"
   word singularly. No plants are going to
   close their doors as a result of the lower
price consequence of NPT entering, based on
my analysis. But they may decide, and we
have that already present in the updated
analysis, to delist one year, the dynamic
delist we talked about, which is they don't
want to take on the obligation for that year,
for that period. And as capacity prices over
time come back, they may come back into the
capacity market. And when they do come back
into in the capacity market, it creates a
consequence. So let's take it piecemeal.

So if there is a delist, a dynamic
delist, and we've had that, we actually show
those in the updated analysis. And even in
the original analysis, imports, for example,
are very price-sensitive. They can
dynamically delist. We also had a generation
unit delist for a little bit in the updated
analysis. That means that in those years the
capacity market benefit isn't as big as it
would otherwise be, because once they delist,
they stop the price from going down further.
But then, once they return, they keep the
price, the capacity price from going back up.
And what it does is it tends to extend the capacity market benefits. They might be smaller each year, but they will last longer because of the dynamic.

Q. I think that's what I was getting at. If the capacity market savings are smaller this year because of the conditions that we're in and all that happens, the smaller capacity market savings are going to extend beyond the first couple years.

A. Yes.

Q. Okay. Thank you.

A. Sorry if I didn't understand your question.

Q. That's good. Thanks. Okay.

The other day -- this is a shift in gears. The other day you talked about how the Project would provide insurance to reduce the price impact if abnormal weather events occurred. Do you remember that?

A. Yes.

Q. And are you saying that there'll be actually more energy savings from this insurance effect?

A. Yes.
Q. In addition to what you already calculated?
A. Yes, and it's because the way that we calculated the wholesale energy and capacity market benefits that we've been talking about for the last few minutes is on the basis of normal weather, normal conditions on the system. And so we should think of those "insurance benefits," as I call them, as incremental because they're moving away from normal weather.
Q. Okay. But the normal weather that you used to make your predictions takes into account abnormal weather periods. Because isn't it based on historic weather, so it has already the impact from the polar vortex and the high, high temperatures in the past, in the recent past? Wouldn't the "normal weather" have that in it?
A. No, not really. So when we talk "normal weather," I'm actually talking what they call the "P50 demand forecast," which is assume that there is normal weather. And it's actually a forecast that ISO prepares. It isn't based on historicals. It's a
forward-looking outlook, assuming we don't
have polar vortex or heat waves. They do
have a demand forecast. They call it the
"P90" that then says, no, assume that normal
weather has a 90-percent probability of being
ceded. So we have basically heat waves
because we do it on our summer peak. So the
normal weather is not the same as average
historical experience. That's what I'm
trying to make --

Q. Okay. That wasn't my understanding.

A. So our "normal weather," when we talk about
it, is basically, really, weather normalized.
We don't see heat waves. We don't see polar
vortexes which stress the gas transmission
system and creates high gas prices. We use
weather-normalized, again, gas price
forecasts as well.

Q. Okay. This is a question about -- well,
before I go there, there was something I
think I forgot to ask you. See if I can find
it.

When you were talking about who would
have to demonstrate to the IMM the ORTP
calculations, who would that be?

A. It would be the entity that wants to sell the capacity, and I refer to it as a "sponsor."

Q. Okay. And who's the sponsor?

A. I don't know for a fact, but I would assume in the context of this project it would be Hydro-Quebec Production, because Hydro-Quebec Production is the sponsor essentially of the export sales on existing transmission interties.

Q. Or maybe it's HRE.

A. Or a legal entity that has the right to represent.

Q. Okay. Has the IMM ever calculated an ORTP for an elective transmission upgrade?

A. I actually don't know the answer. They may have. But we haven't had an elective transmission upgrade clear -- well, yes, an elective transmission upgrade like this clear. But, again, the calculation that the IMM is doing is very similar to what they do annually already today for existing imports, many features of that. And they do that repeatedly for all the imports that come into
the capacity market because imports
actually -- they don't get the benefit of not
having to do it next year just because they
participated in the prior FCA. They have to
do it annually.

Q. But I mean the IMM has an ORTP for each kind
of generator that is sort of set at some
point in time; right?

A. So it goes through and annually recommends
ORTPs -- think of those as defaults again.
And if a particular new generator in that
technology class wants to get its own
customized offer price that is below that
ORTP, they're welcome to come in and provide
information on that cost workbook for their
technology to get a lower minimum offer
price.

Q. But the IMM hasn't done that for a
large-scale hydro project into New England
yet; right?

A. Well, at least to my knowledge. It may have
done it. But to my knowledge, a project like
that hasn't cleared, so --

Q. But if they had done it, you would know, and
then you would have to argue about why this project was less than the default.

A. Oh, for purposes of default. For purposes of default in the FERC market rules, ISO hasn't established a specific category of elective transmission upgrade with large hydro. They just have one blanket ETU. And what they basically do is they actually make it so high as to essentially necessitate any project that has a transmission upgrade as part of it to come in and do a customized MOPR so that --

Q. Is the default for that ETU that exists today orders of magnitude higher than the number that you calculate in Exhibit 140?

A. Yes, because, again, by definition, it's just a starting price, I believe, of the auction plus a penny. Something like that. So it's meant to trigger a review, really, because they've -- and I think the thinking behind that is those projects are very customized, so they do want them to undergo a review, and they don't feel that they will be overburdened by too many applications for
that review; whereas, for certain generation
technology, they feel that it's easier to set
that generic number, and then if a project
wants to have a specific number, they come.
But not every single new combined cycle unit
would necessarily have to come every year.

Q. Okay. And is the number of years that you
put in your calculation for amortization of
the transmission project, is that
confidential, you know, the drop-down number
in the workbook that you picked?

A. I'm not sure if we talked about it in the
confidential or non-confidential session.

        CMSR. BAILEY: Can we ask
counsel? Is that number confidential? Anybody
know?

A. Can I just check quickly?

BY MS. BAILEY:

Q. Sure.

A. Because it might be in my public version of
my report.

Q. Okay.

(Witness reviews document.)

A. You know what? I would say that it's not
confidential because I have a sentence in my report that specifically refers to that number, and it's not marked as confidential.

Q. All right. Good. I didn't think it was.

The result at the bottom of that spreadsheet is confidential.

A. Yes, and some other line items. The inputs for those line items might be commercially sensitive, but...

Q. Okay. So do you know for sure that the IMM will accept your 40-year amortization period for an elective project?

A. I don't know for sure, but I am extremely confident that they would be willing to accept that. I think it's industry standard. But more importantly, it's very much consistent with what they're trying to do, which is to measure the true economic cost of this capacity. And one element of the true economic cost of this capacity is the transmission cost for service that HRE/HQP would have to pay to get their capacity into New England, and that transmission cost is basically contained within the four corners...
of the Transmission Service Agreement, the
TSA. And the TSA is a 40-year agreement for
transmission service, and it uses -- or it
dictates a tariff that HRE would have to pay
that is based on a 40-year amortization. So
I think with respect to this project, 40
years is just the right number.

Q. And does that include the amortization or the
usable life of the converter station?

A. I don't know the technical answer to that
question. But I would assume that the
Transmission Service Agreement, to the extent
that any components need to be replaced,
those have been factored into the revenue
requirement that determines the tariff.

Q. When you say "tariff," do you mean the rate
that's in the Transmission Service Agreement?

A. Yeah, the cost of service rate that HRE has
to pay. And that has to be paid in order to
have the capacity that HQP would want to sell
into New England, deliverable into New
England.

Q. But for the U.S. portion of that line, that's
not a tariff.
A. I think the technical nomenclature is that it's a "participant-funded" Transmission Service Agreement. It's not a reliability transmission project, but a participant-funded project where a rate for transmission service, if you don't want to use the word "tariff," has been determined based on cost of service.

Q. Okay. And do you know what the useful life of electronic equipment like the converter station usually is?

A. I don't want -- I actually don't know, so I wouldn't want to --

Q. It doesn't seem like it would be 40 years.

A. But again, I think that to the extent any parts need to be replaced, they would be part and parcel of the commercial agreement and the obligation that HRE is taking on. Again, that's a 40-year agreement with a tariff that's based on a 40-year amortization. Again, I think 40 years is quite standard to be using for transmission assets in general, be they composed of just conductor wire, underground, above ground. I don't make that
distinction. And I know that other ISOs have generally agreed. There was a little bit of a discussion that New York ISO, which does something very similar to ISO-New England in calculating what they call their "buyer side mitigation" offer floors, has well recognized that it's just obviously not plausible to assume the same generic amortizations you use for generation for transmission. They use a much longer amortization assumption for transmission projects that come through their door as compared to the generic assumptions being used in the equivalency of ORTP or the demand curve.

Q. Did you assume that the full 1,000 megawatts would clear in your model? Sorry. This is back to the capacity market savings.

A. Yes.

Q. Okay. Can you look at Figure 12 in Exhibit 81 again? If you look at the orange bar and the blue bar in FCA 12, does the difference between those two look like 1,000 megawatts?

A. No, it doesn't because, again, we've been,
I'm going to use the word "conservative."
Everybody hates it. But we've been pragmatic
in our forecast. So we've said that as 1,000
megawatts clears, there might be market
response from other sellers of the capacity
that will decide that they don't want
capacity supply obligation imports, delist --

Q. But wouldn't that be a retirement that you
said you didn't already -- that you didn't
count as a result of Northern Pass?

A. It's not -- again, it's not a retirement.
But I appreciate that from a snapshot looking
at one auction it has the same consequence.
We didn't -- there wasn't any outright
retirements. In my book, a retirement is a
plant is closing.

Q. It's not a dynamic delist. It's a
retirement.

A. It's actually a retirement, yes. And what we
do have is delists. We have market response.
There are generators who may not want to take
on that performance obligation because the
price has fallen, other suppliers leaving.
But they may come back once prices recover if
it's rational and economic for them to do so.

Q. Okay. If only half of your 1,000 megawatts
cleared in the auction, would that impact the
ORTP?

A. The minimum offer price that we've
established?

Q. Yes.

A. So the minimum offer price is done before
anything clears. So may I ask if I can
rephrase your question to see if I'm getting
it correctly? Are you saying if HRE were or
HQF were to only want to offer half for some
reason, 500 megawatts --

Q. No. Actually, I was suggesting that, you
know, maybe -- well, is it possible that HRE
would know that it wasn't likely that 1,000
would clear, so they might bid 500 because of
the surplus just to get some in? Is that
possible?

A. I think it's a legitimate consideration, but
it actually will not work in their favor with
ORTP.

Q. Right.

A. So I don't know. I think it's a legitimate
thought process, probably a consideration
they would think through. But it actually
goes against -- it goes in the opposite
direction by selling less capacity, but
having the same total costs that need to be
recovered on a net basis after consideration
of your energy revenues and so forth. You're
actually going to need a higher capacity
price or higher offer floor.

Q. So what happens if they offer 1,000
megawatts? Is it possible that the ISO would
only want to buy 500?

A. My understanding is that it's non-divisible.
And it starts with not even being divisible
from the perspective of the ORTP.

Q. Okay. So it's all or nothing. If I decide
to bid 1,000 megawatts, I'm either going to
sell 1,000 megawatts in that auction or I'm
not going to clear.

A. Yes, that's my understanding of how the
market rules are currently working.

Q. Okay. All right.

A. Unless there's a reason they could suggest
that it's divisible. So I should correct
myself. We had a combined cycle plant that cleared the auction before last, and it only cleared for one unit of a two-unit project. But it had a concrete reason. It was actually deferring construction of the second unit because of some permitting issues. So I think for that reason the ISO allowed it to divide its bid.

Q. Okay.

A. So it's possible. I just haven't thought of how you would divide a Northern Pass.

Q. Yeah, it doesn't sound like that would be dividable.

Okay. All right. Now I want to talk a little bit about jobs. On Page 39 of your original testimony, Applicant Exhibit 28, you say, "The induced effects of the Project are from local spending of the construction workers at restaurants, hotels and other services." And then last week you pointed us to Footnote 83 in I think the original LEI Report, Appendix 43 to the Application.

A. Yes.

Q. And that defined "total jobs" as the sum of
direct, indirect and induced jobs. And it
says, "Direct jobs are jobs directly related
to construction or operation. Indirect jobs
are jobs created by businesses to support the
workers with direct jobs." And then it says,
"Induced jobs are jobs created as a result of
spending from workers with direct and
indirect jobs."

Are those two things inconsistent, the
induced spending and induced jobs, or were
you talking about two different things?
A. I was intending to talk about the same thing,
so I apologize if the text appears to be
inconsistent. But the way I like to also say
it is direct jobs beget indirect jobs and can
contribute to induced jobs. But indirect
jobs also could contribute to induced jobs.
Is that --
Q. I think so, yeah.
A. So I might have misstated that last piece in
the Prefiled Testimony.
Q. In the footnote?
A. I think the prefiled, because in the footnote
it does talk about both direct and indirect.
Q. Yeah, all right. Does your analysis calculate actual jobs induced by spending, or is it simply more spending in the economy produces more induced jobs?

A. In the model there are very specific linkages between different industrial sectors of the different parts of the economy. So it does matter where the spending is occurring and whether it's just higher compensation for jobs that pre-existed or completely new jobs. All those things matter in how they then ripple through the economy to create the induced jobs. Does that answer your question?

Q. I don't think so.

A. Okay. I apologize. Can you repeat your question again?

Q. So does your analysis calculate actual jobs induced by spending, or does the analysis show benefits to the economy which includes added jobs because of spending? Or is that the same thing?

MR. WAY: Ms. Bailey?

CMSR. BAILEY: Yes.
MR. WAY: This is Chris over here.

CMSR. BAILEY: Chris over where?

Oh.

[Laughter]

MR. WAY: Can I clarify?

CMSR. BAILEY: Yes, please do.

MR. WAY: So I guess one of the questions, and I'm going to have this question as well, is in the REMI model, when you're calculating the jobs that occur and you have the direct jobs that occur and then it will then give you the indirect jobs that occur as a multiplier, Kate, I think what you're asking is does that same model then spin off the induced jobs that might come, as you say, either from the direct or the indirect? Or is that something that you calculate out later, based on another multiplier?

WITNESS FRAYER: Nope. The model is calculating everything simultaneously.

The reason I was a little bit confused with Commissioner Bailey's question is there was words about "jobs inducing more jobs" and
"spending inducing more jobs." And actually in our model, some categories of the expenditures associated with the construction of the Project are represented as spending for materials and services, and some categories of expenditure are represented as jobs. So we have both types of drivers that increase overall economic activity.

But the induced effects are directly being simulated through this, we call it a "computable general equilibrium model" being affected. So the fact is that because we are -- as an example, the compensation rates associated with the Project for some categories of labor are higher than what exists in the economy today, and the fact that they have more money in their pocket induces them to spend on other services, retail services, et cetera, that they wouldn't have otherwise. But we also have more jobs for particular sectors, and if a particular sector has more qualified labor, it also kind of expands, and that kicks off -- it demands other goods and services
that are necessary for that industry sector,
and that expands the economy, too. So there
are multiple channels in the model that
reflect how the actual economy works.

BY CMSR. BAILEY:

Q. And in addition to those, it also includes in
the operational years induced benefits
because of the savings in the energy and
capacity market; is that right?

A. Yes. So, basically the idea, or the laymen's
explanation is a household that doesn't have
to pay as much on its utility bill will be
able to put that money to good use purchasing
other goods and services. That expands the
economy. More importantly, also, commercial
and industrial customers that are saving on
their electricity utility bills may be able
to expand productivity and capital stock and
be more productive and expand output from
their businesses. So that is also a form of
induced effect from those lower electricity
costs.

Q. And that's really -- the savings from the
electricity market are what produces the
economic benefits in the operational years.

A. A majority, yes.

Q. Okay.

WITNESS FRAYER: Does that answer your question, too?

MR. WAY: Yes, it does.

Although, one question I'm going to have is that there are savings that occur during the operational phase. And if I'm a manufacturer, for example, the idea is that I'll pay less in energy costs, and at some point I'll then take that money and I'll spend it in other places.

And for a lot of activities there's a multiplier. There's a tipping point. And I'm just wondering what is that dollar value inside of the modeling where it's assumed that once you reach this amount in savings, a job is created. So, for example, like on some -- you know, it could be federal grants at $50,000. It's assumed that another job is created. Some it's $30,000. What's the tipping point for this?

WITNESS FRAYER: To tell you the truth, I don't know. It's going to be very
sector-specific. I think it depends on whether there's excess capacity, if you will, to expand output or whether -- and at what time that excess capacity materializes. So there's a time element because it is a time-based model. I would need to go into the model, literally sector by sector, and identify where the current model algorithms identify that type of relationship or break point, if you will, because it is a little bit more complex than the typical RIMS multipliers. I've used those, too. But this model is more dynamic and it allows us to model things like these electricity cost savings.

BY MS. BAILEY:

Q. All right. I think this is my last line. How confident would you say you are that this project will clear the capacity market?

A. Based on my research and analysis, I am highly confident.

Q. Okay. Are you familiar with IMAPP, Integrating Markets and Public Policy?

A. I am.

Q. And CASPR? I don't know what that stands
for, but that's -- you know, there's a substitution auction after that allows subsidized resources like Northern Pass, if it has a PPA, to --

A. And if it didn't clear --

Q. And if it doesn't clear, right --

A. -- the base auction, the Forward Capacity Auction.

Q. -- right, that it may be able to buy capacity supply obligation from a generator that may want to retire that did get -- that did clear.

A. Yes, I'm familiar with ISO-New England's proposal. And if you gave me a lot of money and told me to tell you what CASPR stood for, I'd probably get it wrong.

Q. Yeah, we know what we're talking about.

The hope is that that proposal, that some fix to the auction process will go through the Markets Committee soon and the Participants Committee and then get to FERC in time for the auction in 2019. And it just seems to me that the whole program is being designed to accommodate laws in Massachusetts
that require large-scale hydro so they can
recover some of the costs, which seem to me
will have to be subsidized with a PPA from
the capacity market without impacting the
Forward Capacity Market competitive auction.

And so I guess my question to you is:
Why would the ISO try so hard to find a
solution to ensure subsidized capacity
resources can get a capacity supply
obligation in the market if Northern Pass
could clear the market without that?

A. I think of this, I'm going to call it
"substitution auction" because I think it's
easier to say.

Q. Okay.

A. I'm familiar with the proposals that have
been coming up through IMAPP, and I'm
familiar with the substitution proposal that
the ISO-New England presented, I guess it was
earlier this year, actually, they started
presenting it to stakeholders. I view it as
kind of a little bit of a bolt on --

Q. A what?

A. A bolt onto the Forward Capacity Market, like
a little addition on the side, because I think the intent of the ISO-New England is to work very hard to preserve what I would consider to be the fidelity of the current Forward Capacity Market as designed, the Forward Capacity Auction. And that's actually why I also said earlier that I don't feel there's all this upheaval and flux in the capacity market rules going forward as there may have been a few years back.

So they are proposing this "bolt-on." I think what they're interested in doing is avoiding some of the other proposals that have come in from stakeholders that could create lots of unintended consequences in the Forward Capacity Auction. But they are also trying to create a process which they think is value added to the Forward Capacity Market, where they've also heard complaints from existing generators that sometimes it's not so easy to retire a plant in the Forward Capacity Market. And so this would be an opportunity in the substitution auction for a project that clears the FCA but doesn't
really want to continue with its obligation
to exit, to retire. So it's a second bite at
the apple for those projects that may have
not cleared because of the MOPR, and a second
bite of the apple for those projects that got
a capacity supply obligation but don't want
it, to essentially exchange their risks and
obligations to get to a win-win situation.

So I think what they're trying to do is
to create something that they think won't
mess up the price signal that they want to
retain in the basic Forward Capacity Auction,
but also potentially propose something that
would be additive and not necessarily create
a lot of negative, unintended consequences.
I don't think it's going to necessarily be a
big feature, the substitution auction of the
capacity market. And above and beyond just a
Northern Pass-type project, there are other
clean energy initiatives that have been
proposed, resources that I think today
wouldn't pass the minimum offer price rule.

Q. Like what?
A. Like offshore wind, as an example. Just one.
Q. But not like Northern Pass or TDI?
A. Well, I can't speak to TDI.
Q. You haven't analyzed that.
A. But I think that I'm very confident that all the numbers are in the right places. This is the cost workbook, and this is what it is. This is the observations that we're getting from those calculations, and they suggest a lot of cushion in there between what the minimum offer price would be and what we're projecting capacity prices to be with that additional capacity.
Q. Okay. Thank you very much.
A. Thank you.

CHAIRMAN HONIGBERG: All right. We're going to take our afternoon break, ten minutes.

(Brief recess was taken at 3:05 p.m., and the hearing resumed at 3:21 p.m.)

CHAIRMAN HONIGBERG: All right. I think we're going to resume. Commissioner Bailey wants to follow up on one thing she was questioning the witness about.

CMSR. BAILEY: Just one thing.
BY CMSR. BAILEY:

Q. Remember the discussion that we had about the opportunity costs that you said would be based on Ontario and that the transmission services costs would be netted out, and you wouldn't count them in either scenario because they would have to pay them whether they deliver to Ontario or they deliver to New England; right?

A. Yes.

Q. In your line item for variable O & M in the ORTP calculation, is that number net of the transmission costs?

A. Yes.

Q. Okay.

A. Well, it's the variable O & M, so it's the operations and maintenance costs for Northern Pass.

Q. Does that include the opportunity cost of supply?

A. No. I believe the opportunity cost of the energy sales is a different line item.

Q. Oh, okay. So does that line item take the transmission costs out?
A. Yes.

Q. Okay. So it's just the revenue associated with the sale of energy to Ontario off-peak without the transmission costs included.

A. Yes.

Q. Okay. Thank you.

CHAIRMAN HONIGBERG: Mr. Way.

MR. WAY: Thank you, Mr. Chairman.

BY MR. WAY:

Q. Good afternoon, Ms. Frayer.

A. Good afternoon.

Q. I'm over here. I wanted to pick up a little bit on what Ms. Bailey stated earlier and focus a little bit on the jobs, the job creation, and maybe take it from the model and bring it to a little bit more to the real world. And some of the things we talked about I'd like to have some clarification on and maybe just sort of bring it all together. I suspect as we go through this, too, that there will be other panel members that may want to jump in on certain points, and I encourage others to do that.
And I wanted to focus a little bit on
the REMI model. I know in my agency we have
a similar model, but it isn't that one. So I
really wanted to just get more of a sense of
it. And for the record, that's what?
Regional Economic Model International
Initiative?


Q. It was said earlier in one of the discussions
that it's "rented." That's probably not the
right term, is it? It's a subscription, I
would imagine?

A. There's a license fee that we pay to use the
model. The model itself, the software, comes
with the data. And it's customizable. So I
do use the word "rent," or "lease" or
"subscribe" to use the model with the data on
a project-by-project basis, depending on
whether the project here is in New England or
in Ohio or in California or in another
jurisdiction. We'll ask REMI to create a
customized model for that geography for us.

Q. And that's one of my questions. So they
actually will do some customization
specifically upon request. Do they do that customization, or do you do that?

A. They do the customization.

Q. All right. And does it --

A. I should say there have been times where I have also adjusted the base lines of data. But generally they'll do geographical customization.

Q. Very good. And this subscription that you have, it's typically annual, I would assume?

A. It's actually very, again, customizable. So right now we are on a month-to-month arrangement. But usually they would typically do either like a three- or six-month arrangement to start with.

Q. All right. Thank you.

Is there a training that's involved with the REMI model? Did you have to go through training?

A. Yes, extensive training, extensive support to understand and to think about how to use it properly.

Q. And how often have you taken training, updates of training? When was your last
update, I guess?

A. So I think we had REMI staff in our offices even this year, but not in the context necessarily of this project. So they come and visit, and I sit in on the trainings, not all the time. We have new staff that are exposed to it. So they're amazing. They come just kind of on demand. And let's say we've had lots of conversations on the phone when they're not there in person as well.

Q. Very good. How long has LEI used REMI?

A. Good question. I think maybe the first time I used REMI was maybe circa 2007, 2008. Before that we had -- we used other tools that might be in some way similar. There are other software out there. IMPLAN is another tool that's kind of similar. There's a few others depending on the jurisdiction outside of the U.S. and Canada that we've used. It's not -- it depends on the geography and the nature of the project. So it's not consecutive from 2007 onwards. We come to them with specific project requests, and they customize models to those requests.
Q. So, about ten years of experience with the company. The actual model you use is called REMI PI Plus, REMI pi Plus, however you're calling it?

A. Yes, PI+. So, REMI is the name of the company. And I apologize. I use the shorthand as well. But the model itself is PI+, the tool.

Q. What is the benefit of the PI+? That's something special onto the model? What does that add?

A. No, I think it's actually the tool is called PI+.

Q. It's the actual tool.

A. Yeah. I believe they have other types of models as well, but I think we've only used PI+.

Q. So I'm trying to get a sense of how -- and maybe we're going to walk through the process a little bit on how we set out the jobs. We start out with something and at the end we have a job estimate. And I sort of assume that we're going to start with the initial project. And I would assume that you're also
using the NAICS code, the North American Industry Classification System?

A. So their model is customizable in that regard, too. So we were using a 70-sector model for this analysis. They also have, I'm going to get the number wrong, a 26-sector, and then they have a 168-sector version, too. I've used different versions. But we thought the 70-sector model was sufficiently detailed for the task we had at hand and allowed us that flexibility that we needed, given the type of project we were modeling.

Q. So I understand from my limited experience that 70-sector model in terms of because I use NAICS code. Does that employ NAICS codes in that model? Does that employ 70 NAICS codes that it can draw from? Or how does that work?

A. It does, I believe, use the industry classifications. And I believe we list them all on Page 116, 117 and 118 of the Original Report from October 2015.

Q. Very good. So, moving beyond that, once again to recap I think everything we talked
about, the construction team is going to give you an estimate of number of jobs, I would assume, that you then input?

A. So they actually started by giving us a budget estimate by activity, which is in dollars, and then they also gave us a estimate of wages. We call them "compensation rates" for the typical job categories where they have information specific to their project. For example, on construction-related issues, they have some of the services they retained. They have very good information on the compensation rates. And then I think it's from those two data points, that's where we start deriving the direct jobs or additional incremental compensation paid to direct jobs that may be for people that are already employed. But there's different ways to get to the numbers, if you will.

Q. And I would assume that that gets you to the jobs, and then it spits off the indirect jobs that we talked about earlier and the induced jobs.
A. Yes. Yeah. And sometimes we don't enter it as a direct job. In some specific industries we enter it as labor expended in terms of industry sales. But that implies a direct job as well. So there's different ways to model the effects of the spending that Northern Pass would have to be doing locally to construct and install this project.

Q. Very good. I'm trying to -- I didn't see it automatically. It may very well be in your October report. As I recall from your October report, you did provide industry sectors that are impacted by the jobs. What about the actual occupations within those sectors? Was that something that you had provided as well?

A. We didn't, I think, provide this in our report. We did not provide this in our report. I'm trying to think if it was in any of the work papers. I think in some of our work papers it was summarized. For example, there might be a sector like professional and technical services. It's a big enough sector. And different types of categories of
jobs may fall within the sector, like legal expertise, professional, certain professional categories of services for let's say accounting and communications and so forth also fall in that. And we had budget line items that had been broken down to that level of detail, subcategories.

Q. And that was information that you had provided?

A. It was information that we received as input, and it was provided generally as part of our work papers. But it's nowhere near -- it's not documented in the report, per se.

Q. Is that something we might be able to see? Is it ready for prime time or --

A. We can -- it may make sense for us to prepare a list for you because I think opening up one of the work papers here -- we can do it in confidential session. But it's big spreadsheets. So I suspect you want to see it kind of item by item.

Q. Well, for example, if we're looking at occupations, and particularly it could be in a part of the state where you're trying to
match up where the skill sets are and if
those occupations could even be filled in
that area, that might be useful information.
And I guess along the same lines, what I'd be
interested in is that these models allow you
to spit out the demographics as well -- so in
other words, male, female employees, age
groups, ethnicity. Did you do that as well?
A. I will have to check. I'm not sure that
ethnicity or sex is actually part of the
model. I do believe more high-level
demographics, like population, percentage of
population within certain age brackets, like
labor force-qualified population, is
something that it could spit out. But we did
not ask the model to document that. But it's
something, again, that's there behind the
scenes in the model. We simply didn't
document it.
Q. Very good.

MR. IACOPINO: Can we ask, is
that a request for that documentation or --

MR. WAY: If that information is
available, that would be good.
MR. IACOPINO: And what should we call this list? What would you call it?

A. So you were interested in occupations and demographics.

BY MR. WAY:

Q. I'm interested in occupations within the sectors. So when you look at those two pie charts I think in your October 2015 report, the occupations within those industry sectors. And then I'd be interested in the demographics that you might find in New Hampshire, whether it be gender, ethnicity, age groups, if that information is available.

A. Yes. And for purposes of demographics, would you be interested in -- the model is year by year. Would you want to see that data year by year, or aggregated in some way?

Q. I'd like to see it year by year, sure.

A. I've written it down.

Q. Thank you.

A. And I will do --

MR. IACOPINO: We're not going to need an 18-wheeler for that, are we?

WITNESS FRAYER: I hope not.
CHAIRMAN HONIGBERG: So how long do you think it will take to prepare that?

WITNESS FRAYER: I think I need to -- I don't have a working version of the model on my laptop. It's licensed to specific computers. So we'd need to go back to the office and work on it.

CHAIRMAN HONIGBERG: But sitting here, Tuesday, you'd have it early next week, for sure?

WITNESS FRAYER: Definitely.

CHAIRMAN HONIGBERG: All right.

BY MR. WAY:

Q. One thing I wanted -- we had talked about one thing earlier, which was the operation phase. And as I mentioned earlier, I'm very interested in sort of those tipping points that occur where people decide that they can then hire a job, that they can hire someone new. And as you mentioned, that occurs sector by sector. It's more complex than just simply saying one figure equals one job. But I guess I wanted to ask it again.

For a rule of thumb, are you folks
assuming that at a certain amount of savings  
you're more than likely going to see a  
full-time job or a full-time equivalent?  
Because I would have to imagine you're  
thinking of that when you're pitching it to  
the public.  
A. So the relationships are being governed by  
kind of elasticity equations. And I don't,  
unfortunately, have a rule of thumb for you.  
I did over the break try to see if I could  
pull it up, but I don't have a working  
version of the REMI model here. So it's not  
something I could answer off the cuff.  
Again, I could definitely look into it and  
give you a more proper answer if you'd like  
in writing.  
Q. I would.  

MS. MONROE: Could you  
re-articulate that for me, Mr. Way?  

MR. WAY: Who are we talking to?  

MS. MONROE: Pam, down here.  

Hi, Chris.  

MR. WAY: We've got to solve  
this.
[Laughter]

MR. WAY: I'm looking for an approximate amount of savings from energy costs where it is assumed that an employer might entertain hiring a new worker. Now, that does not mean that the employer would go and hire that worker. It just means that there's a certain amount out there that it's assumed that a new worker would be hired.

Well, I don't -- the question posed by Ms. Weathersby is do we need that by sector, and I don't think so. I'm just trying to get a sense of what that amount is. I mean, I'll tell you right now, a big emphasis probably would be on the manufacturing sector because that's been the most vocal about the energy savings that would allow them then to hire. So maybe that is one sector you might use as an example.

A. And is this -- again, our model is New England-wide. Would this be for New Hampshire only? Because I think there are different -- there are different adjustment factors because labor productivity rates are
different across the states, too.

BY MR. WAY:

Q. I would tailor it for New Hampshire.

A. Okay.

Q. The next thing I wanted to get to, and this is the construction phase. And the thing about the REMI or any model is it allows you to find the target area, I would assume. And I think the hard part as we're all trying to figure out the impact of job creation is, say, for example, if we have an underground corridor. That's going to have a footprint of impact in job creation; would you agree?

So in other words, if I'm constructing an underground corridor in Woodstock or Plymouth, chances are that Claremont isn't going to be contributing an awful lot. So when we look at construction statewide, the question would be: Should that, could that, would it have been better to limit that footprint of examination within an effective service area as opposed to statewide? I'm trying to get a sense of how statewide actually contributes.
Well, I don't think -- so when we say it's a job from in New Hampshire -- and you can imagine this. There's construction work being done in, let's say the seacoast area. It won't be just construction workers that live in seacoast areas. It could be construction workers that live on this side of 101 that are traveling during the day, commuting to the job site. I think that's the level of geography that I can attest to. I can't say that it will be jobs for those occupations that are very localized around the physical geographics of the route. So we didn't get down to county-level data. It is possible to do the REMI modeling on county-level data. But the accuracy of that data, in my opinion, is subject to the level of public information on county-level statistics, which I find in this part of the country not to be the best at really linking back the location of the workers that work and the location of the various economic activities. So, for that reason we kept it at state level.
We do know that the Project intends for
construction to use construction labor that
is from out of state, and we were very
meticulous and went back and forth when we
were asking for data inputs to have
Eversource break that down based on where
they think they will pull labor for various
stages of the construction of the Project.
So we have big direct jobs in Massachusetts,
in Maine, a bit in Connecticut, as well. So
those are all also participating on the
Project. But we didn't say what part of the
state do they live in, for example.

Q. And so I wonder if there was consideration
given -- and I think you've addressed this
before. I mean, I see the high level. There
is a statewide impact. And you mentioned
about the county level. And you can really
even get down to the Zip code level if you
wanted to; could you not?

A. You could. And depending on the type of
model, I just -- when it comes to a
computable general equilibrium model, where
you have to model interactions between
different sectors, not just at the state level but locally, I think there's a lot of extrapolation and interpolation done to get those relationships because the I/O tables don't go down to that level.

Q. Right.

A. And it's a question of trade-offs with any modeling tool.

Q. And I'm getting a look from Mr. Oldenburg down there, so I'm going to pass off to him.

MR. OLDENBURG: Thank you, Mr. Way. I had a follow-up question that was basically right down the line you were just talking about with the out-of-state workers.

When you did your report in October of 2015, did you know that the Project had been bid subsequent -- well, yeah, I guess that's the question. Did you know it had been bid?

WITNESS FRAYER: No, not as a fact. It wasn't something that I asked.

MR. OLDENBURG: So now the Project's been bid. And Quanta, it's been testified that Quanta, a holding company that
holds multiple specialty contractors who do this type of work all day within their portfolio. So, some of the testimony we heard, like PAR Electric, Longfellow Drilling M.J. Electric, underground construction company. Subsurface, they all have specialty work to do, like the HDD drilling, the horizontal directional drilling, if they're a foundation specialist, all this. Is it safe to say they don't -- they're not in New Hampshire. They're not in New England. And they're going to come to this state to do the work. So how do those -- how do you separate out those jobs that come from Texas or Alabama or whatever? They come into the state, and those folks are here for a couple years doing this project. Are they considered -- because they're here for a number of years, are they considered New Hampshire-direct jobs? Or how are they captured?

WITNESS FRAYER: So if they're living in the state, even if it's on a temporary basis, not on a permanent basis, yes, they're considered part of, let's say New
Hampshire. And in fact, there's a bit of a rebound effect possible, because once they leave the economy, those jobs -- the jobs that are associated with transplant, though I can't tell and I didn't look, I know that there is migration, labor migration simulated in the model. But we can't go so far as to tell if it's from Texas or California. But we do see that the construction will simulate and attract labor migration generally to the region of New England. The rest of the world isn't dealt directly in the model. It exists, but we don't see it. What we see is the New England states, one by one.

Q. But a lot of these specialty contractors aren't going to come to New Hampshire and find somebody that is a specialty worker. They're going to hire maybe a laborer to help them, you know, hold the shovel. They're not going to say, look, I've just found five guys that have expertise in HDD that live in New Hampshire, because they don't exist. They've gone --

WITNESS FRAYER: And I think
Eversource thought about this when they gave us the budgeted items. If we go back to my Original Report, just to give you a little bit of a feel, there's a big amount of the overall project spending for construction that is outside the region.

(Witness reviews document.)

WITNESS FRAYER: And I'm being slow in finding it. I apologize. If you go to Figure 41 on Page 72, the biggest bar on this chart is outside New England. And that's representing labor and materials spending. So, outside New England it's over $464 million.

MR. OLDENBURG: Thank you.

BY MR. WAY:

Q. So I want to talk a little bit more -- I'd still like to focus in on the micro area a bit, the areas of impact. And we oftentimes talk about Plymouth. We've done that over the last several weeks because that's a good example where they're going to be directly impacted. And there was a couple statements that you had made that I just wanted to delve into a little bit further, that if people
can't get to a certain establishment -- and
it could be, like I said, it could be
Plymouth, it could be Franconia, it could be
Woodstock. If they can't get to a certain
establishment, they'll go to other locations.
That was one statement. And would you agree
that's true for essential services? Would
you agree? Or are you lumping in everything?
And I think even the example was made with
the river this morning. But essential
services, yes, you're going to go to a
different area. But there may be
entertainment and other types of activity
where you don't go to another area; would you
agree?

A. It's possible for the very temporary nature
of that. So I think I would agree that it's
quite possible during construction in a
particular location, which is going to be
very temporary for a very finite period of
time. If there was a customer that wanted
something then and there in a very
particular, let's say in a particular store
or a particular service and didn't want to
live through potentially the traffic delays and so forth, they may forego doing that in that time period. So I agree it's quite possible. I think getting to that level of detail really was beyond the scope of my analysis. And frankly, I don't know if it was done by any party in this case at the right level of detail to represent all those elements.

Q. Okay.

MS. (Whitaker) DANDENEAU: Ms. Frayer, right here. Could you do the analysis at the level you were just describing?

WITNESS FRAYER: The tool that I used, the REMI PI+ model, is not the tool you would do this type of analysis. And I'd have to think back and consider how one would do this objectively and comprehensively. I'm not sure I can give you a scope of work, off the top of my head even, to tell you the truth.

MS. (Whitaker) DANDENEAU: Okay.

Thank you.

BY MR. WAY:

Q. Another statement you had made, too, that
gave me a little pause when I heard it the first time, was that you said that it wasn't -- it wasn't fair to say that someone would necessarily have an economic downturn because they might -- those that are impacted, they might just sell more to existing customers. And once again, I think that -- would you agree that really depends on the type of business? Because certain businesses you know what the multipliers are for a patron. You know how much they're going to spend when they come through the doors. The Flying Monkey was one example. You know how much they're going to spend on tickets, on bars, on foods on average per customer, and there's probably not a lot you're going to be able to do at least in the short term to impact that. Would you agree with that, that that doesn't really apply to a good number of business types?

A. I think it's very much business-specific and context-specific to the situation. I agree there will be circumstances that this will not be applicable. That's why I used the
word "it could." I didn't say it would
definitely be one for one. Just, you know,
hypothetical, silly examples. It's
plausible -- I don't want to make the Flying
Monkey into a banner of illustrative examples
here. But it could be that, again, those --
it was, I believe, traffic delays during
construction that was a concern that started
that hypothetical description. It may be
that the patrons might want to stay longer
and therefore would actually drink and eat
more because of the traffic delays to
out-wait when the construction has ended for
the day. I'm just giving a hypothetical
again. It could be -- the point really for
me is that it's going to be very, very
specific to each and every circumstance, and
it can't be done on kind of a superficial,
ah, this percentage type of basis. I think
to do it well, you have to really look at the
details, and I didn't attempt to look at that
level of detail.

Q. And knowing you didn't get to that level of
detail, what you just said, though, I don't
know if you'd agree with me, that if I'm a
business right in the middle of things,
there's probably not a lot of increased sales
or customer -- increased customer base or
sales that are going to come out of it in the
short term, though.

A. Yes, unless, of course -- I was at the tail
end of the construction panel, and it struck
me as quite interesting when they were
talking about the voucher program. So you're
a business in the middle of the construction,
but a business that could serve to feed or
house those same, you know, construction
workers that are doing the construction, that
might actually be an interesting -- and I've
seen this used in other projects. But that
might actually increase volumes of dollars
brought in. Will there be other types of
effects? Possibly. I don't know.

Q. And that's a good point, although those
workers, as the work zones move down, the
value to the local economy goes -- it shifts
downwards as well.

So I guess what I'm getting to is that
it's -- when you look at a target area, and
I'm trying to reconcile that if REMI can look
at things in a very sort of micro way -- and
let me preface this by saying I'm not asking
you right now to do this. I'm trying to
understand if it could be done -- that REMI
can look at an area, that it's one thing to
say here are the benefits of construction,
here's all the good things, the jobs that
could be created, and then you look at the
testimonials that you might get from business
owners saying that this is how it might
impact their business, and in some cases they
might either lay off people or close down or
have some sort of impact. So there's going
to be positive impacts which you've taken
into account. And I'm trying to reconcile
negative impacts that by the nature of the
modeling can't be taken into account but
certainly have an impact. So on mass
balance, I have this many jobs that are
created, and yet at the local level, in the
affected service area, it's going to take
that number down. Is there a way -- if I
came to you today and I had $600 an hour and I said, "Is this something that you would be able to do?" is that something you would be able to do?

A. I would have to think about it before I gave you a definitive yes. As I suggested to a question earlier from one of your fellow Committee members, I don't think REMI is the right tool to do this. I think that I appreciate the concerns about balance that you're talking about. I think we would want to make sure if we were to do this analysis, that we were objective in understanding it, but also accurate in representing the duration. So the REMI model is an annual model. So when we're talking about a job, although some can be seasonal and part-time or full time, it's actually referred to in statistics literature as a "job year." The construction impacts we're talking about are sometimes days, maybe multiple days, a week, a few weeks, but it's not -- there's a difference of time dimension we would want to make sure we appreciate in doing that.
balance. There's all those nuances we've
talked through in the last ten minutes on
substitution effects that we would want to
take into account. I think I would -- it's
something that you would want to make sure
you're thinking through very thoroughly.

Q. And you brought up the question of the job
year, that job in a year. And I think you
mentioned this before. Is that job -- that
job is created. It's not the employee. It's
the job. If I have that job for eight months
of the year, is that considered a job if I
have that job part time in that year? Or if
it's a seasonal job, am I still considered a
job?

A. You are still considered a job year. And I
think different sectors of the economy will
have naturally more of a preponderance for
seasonal employment than full time. An
example is you go to like the recreational
sector of the economy, which probably
includes ski resorts, which I'm sure
everybody is familiar with. Those are
seasonal jobs, but they will be represented
as one for that sector in the New Hampshire
model of REMI.

Q. And so for those 2300 or so jobs, as I
recall, for construction --

A. At peak, yes.

Q. -- are those -- at peak. In a job year, are
those considered full time, full-time
equivalents? It could be anything?

A. Unfortunately, there isn't a distinction in
the model where I could tell you those are
FTEs or full time. It will be a mixture
because we're mixing in different sectors as
well, which will inherently have different
profiles with respect to typically how much
are full time, how much are part-time and how
much are in that sector of the economy, how
much are seasonal.

Q. All right. And one other question, because
you've mentioned a couple times, and I see
what you're saying in terms of REMI not being
applicable to some of the questions that
we're talking about here.

Does REMI become limited in a rural area
such as New Hampshire? Is that one of the
limitations, that it's more designed for urban settings or stronger urban settings?

A. I don't -- I don't think so if we keep the model on the state level. I think I've had issues sometimes, not here, but in other parts, when we tried to break it down further, because I think the statistics that are inputs that form the base line aren't as good. The agricultural sector, farming is represented as a sector, first and foremost in our 70-sector model. We're capturing the reported economic activity. If there was a sector of the economy, I will call it -- what do they call it? -- the sector of economy that wasn't reporting data to the statistics agencies, like a sector that didn't transact in dollars but was using barter systems, which I don't think really applies to New Hampshire, but it does in some other countries around the world, or Black Market, REMI isn't going to capture it because its statistics are based on reported national statistics and national accounts. And I think in the U.S. I have never had an issue
with the robustness of that data. Other countries, we need to think more carefully about that.

Q. One other point that was brought up last week was sort of that evaluation of the projections, the job projections. That's difficult to do; would you agree? In other words, if I say there's going to be -- particularly if we talk about induced jobs, it's very hard to verify the calculations that have been put forth in REMI after the fact. Or maybe you could refresh me, because you had said "back study."

A. So I had talked about doing a backcasting analysis where I could compare my forecast to actual, but that's for the electricity market simulation models. We don't typically do back studies or backcast studies on REMI PI+ as a platform. But I think your question is very important, and it's how do I trust these projections coming out of REMI PI+. At least that's how I'm interpreting the question.

Q. Well, for example, you had numbers there for
I think 2016. Refresh my memory, did you go back -- and you also had a year of 2015 planning-type jobs and --

A. Yes, but that was assuming that some of the work that may have shifted now with time had occurred then. But I did.

Q. Right.

A. There was a planning period and then a construction period.

Q. But even right now, so with all the jobs that have been devoted to this project to date, I'm assuming that there's a good number of induced jobs that have already been predicted to occur. How do we know -- do we have any evaluation of that year? How do we know these numbers are actually going to bear out what we've done on paper?

A. So I haven't tried to go back to the specific data points in this study, the 2015 data points, but I have gone over the years very confident and comfortable with the REMI PI+ tool because I have compared it to other data points.

For example, you mentioned the concept
of a multiplier or multiplier effect. Although this model isn't using multipliers, it's simulating what's happening instead of calculating in a closed form the number of indirect and induced jobs. It's simulating how the economy would work. But we can compare it to the multipliers that the U.S. Government publishes, the RIMS II multipliers, which then you'll say, well, that's another forecasting tool. Yes, but it's actually based on actual historical data. So in some ways I think the results that you're seeing here, if you think a little bit about this many direct jobs then create these many indirect and induced jobs, the implicit multiple there, multiplier, is very consistent with what we've observed historically with other types of policies and spending and infrastructure. I'm not suggesting Northern Pass is in any way very unique here from other infrastructure investments we've made in the economy.

Q. So what I hear you saying is when you look at the back case study, you would look at those
modeling-type activities that use multipliers that are based on historical data.

So the question would be: That historical data, is that verified-after-the-fact data? So, in other words, someone else has done the modeling and they verified that and that's historical data? Or is it historical forecast data?

A. So my understanding is the RIMS II data set, the multiplier data set from the Bureau of Economic Analysis, is based on actual national accounts.

Q. National? I'm sorry?

A. Based on actual national accounts. So, actual data on economic activity. So you can, in other words, impute the effects by looking at this, capturing through snapshots the relationships between different sectors of the economy: As this sector of the economy does this, how much additional direct jobs and direct induced jobs are created in response. So my understanding is those numbers are computed by actual data, actual historical data.
Q. Because I would have to imagine, then, as people look at this -- you know, and this is a multi-year project, so this question that I'm asking now, it will be asked next year and the year after and the year after. People are going to want to know where they're at with the job creation. Now, the induced jobs, I think everybody probably understands, or at least I consider them to be kind of ethereal. It's hard to sometimes figure out where the induced jobs are. But the direct jobs and the indirect jobs, do you see a mechanism going forward where you're going to be able to answer that question? I think at the planning phase it's harder to do, but as we get to the construction phase, that question, I would imagine, will have to be asked -- answered.

A. Well, I think the direct jobs could be measured through census-taking through the construction process in some form or fashion. I'm not sure that we've necessarily prepared anything right now to do that. But it's something that could be done. And in some
ways even indirect jobs, too, because the
suppliers that support the construction
process will be known. It'll just be a
little bit more difficult for them to
necessarily isolate impact of their services
and provisions to this project if they’re
also providing services to many other
clients. But it’s plausible that you could
create some sort of census survey that tracks
that information.

Q. And here I am making the assumption that
induced jobs can’t be tracked. So let me ask
you this: Is it -- can induced jobs be
evaluated in these studies?

A. I think the best way to track induced effects
is to, for example, ask how much disposable
income is being spent by the workers locally
and how much is being saved and not spent.
That tends to create some clarity, I think,
on what the induced effects are on the
economy. Tracking the specific induced jobs
is probably a lot more difficult.

Q. All right. And then one last thing. I think
a question I had going back to the
occupations we talked about, those occupations will land within a certain footprint of the Northern Pass construction area, and I'm talking still about the construction phase. I mean, obviously the construction jobs are going to be right on the work zone sites. But, you know, as we talk about the legal analysts, as we talk about the accountants, all those other jobs, does your modeling attempt to regionalize those locations and impacts? I know there's some other modeling that actually does do that. Or does yours just simply say, look, in New Hampshire you'll have a legal analyst and it will be somewhere?

A. So I just want to clarify part of your question. The way I like to think about it, the construction-related jobs during construction, the activity itself is occurring let's say between 8 a.m. and 6 p.m. in a very geographically, localized area. But the job doesn't have to reside -- the worker that's doing the job doesn't have to reside specifically in that area.
Q. That's true. Although, another way to look at it is if I'm a community and I want to know what jobs -- you're right. There's the job and there's the employee. The employee could come. But if the job is located in that area, as you said, they're spending their money, vouchers and everything in that area. So that would be information that a municipality might want to know is whether those jobs are located somewhere in the footprint, the defined footprint of the effective service area.

A. I could appreciate that. And then I would just clarify it's the activity itself that they're interested in because that then creates that person, if you will, that job, within specific hours in that geographical area. But again, I think the REMI model is really, when we're talking jobs, it's not at this level. The form of model that we're using right now isn't that geo-targeted in its reporting of the results. So I didn't want someone to think that our results are that geo-targeted either that we're
But I agree with the conclusions you're making, for example, in relationship to, you know, a construction worker, if they're working in this part of New Hampshire, when they need to go buy a sandwich at lunch, they're probably not going to go a hundred miles to the north or a hundred miles to the south to get that sandwich. So I totally agree and understand that. I just wanted to clarify the distinction between what the model is showing and the geographical detail of that versus what intuitive conclusions we can draw ourselves from that result.

Q. All right. Thank you.

CHAIRMAN HONIGBERG: Mr. Oldenburg.

MR. OLDENBURG: Thank you very much.

BY MR. OLDENBURG:

Q. I'm going to continue the exact same line of questioning for ease and so everybody can see what I'm talking about.

MR. OLDENBURG: Could we bring
up Applicant's Exhibit No. 1, Appendix 43?
It's actually your report of October 2015.
It's Figure 47, and the Bates number is
APP27513. Just for reference, it's the chart
that shows the estimated number of new jobs in
New Hampshire from the Project. It's actually
the top chart there. I don't know if you can
zoom in to it or not.

BY MR. OLDENBURG:

Q. So, one of the things that we repeatedly kept
hearing that's in the Application and we've
heard in testimony here and in some of the
public hearings, and I'll quote it right out
of the Executive Summary, that the Project
will, quote, Create more than 2600 New
Hampshire jobs at the peak of construction,
end of quote.

So, under 2017 in the table, the total
jobs listed is 2676; correct?

A. Yes.

Q. But if I understand this chart correctly, in
2016 it shows creating 136 jobs, and then in
2017 it shows creating 2676.

A. Yes.
Q. Now, those 136 jobs in 2016 don't go away. Is this chart cumulative?

A. So, the way I like to describe it is that this chart is showing each year, year by year. But I would agree that there is an element of a job that's in 2016 -- you can't just add 136 to 2676 and then add that to 2238 and 427. So you shouldn't do a cumulative sum of year by year. That's why I also report just the average. So you need to either focus on a single year or you look at the average over time, because a job in one year may not discontinue; it may actually be part of the count of new jobs the next year, too. Does that address your question?

Q. Yeah, but it just makes me more confused, because when I read "estimated number of new jobs," I would have thought that was a job created in 2016 is a job created in 2016, and it wouldn't be counted again in 2017. But you're saying that is.

A. So this isn't incremental jobs year over year to the prior year. This is the total number of jobs in that year. And again, we didn't
want to leave the wrong impression by summing up these into a total sum of total jobs over these many years because that would, I think, give the wrong impression. So that's why we showed them year by year individually and then did an annual average.

Q. Okay.

A. So, some of the jobs, the jobs at construction peak from the Application, more than 2600 jobs at construction peak, that includes some jobs that may have started on constructing the Project the year prior.

Q. Okay.

A. Maybe that's a better way to also explain that.

Q. Okay. And we've just talked about, so I'll summarize, that the direct jobs includes those out-of-state workers who come in and temporarily live here, the seasonal jobs that are created, temporary part-time jobs?

A. I think the answer is yes to all the above.

So it wouldn't include somebody that's coming in and leaving, right, commuting back and forth. That's why we have actually jobs in
other states, too.

Q. In other states.

So is it correct to assume, or do I understand it correctly that the indirect jobs that are created by the construction project, so the second line, are no longer needed after the construction's completed in most cases?

A. Yes, I think it's reasonable to say that the direct and indirect jobs are temporary in the nature of the construction itself. The induced jobs, too, I would say one would say is temporary because once the construction -- that spending during construction is over, that also doesn't continue. Doesn't mean that those jobs will all go away overnight. Those jobs might stay for some time. But we haven't tried to estimate for how long they stay. That's why we're showing the construction phase precisely and only for the period of construction.

Q. Okay. The next figure I'd like to go to is Figure 49 in the same report. It's the Bates number 27515. It's like two pages down in
the report. This is the estimated number of new jobs -- the top graph. Exactly. It's the estimated number of new jobs in New Hampshire created during the operation. So this is -- we talked about induced jobs for the construction. And if I understand right, we just had this discussion. I didn't want to butt in, but the induced jobs that you see here, the big green bars, are different, though; right?

A. The driver for them, the catalyst is different. It is because primarily, not in absolute, but primarily because electricity costs are lower for various customers, for industrial and commercial customers and for residential customers. And each of those categories of electricity consumers, when they have a lower electric utility bill will deploy those savings in different ways, and that creates those induced effects.

Q. So when you calculated -- this is really out of my wheelhouse here. So when you calculated the whole rate, the electric rate that Northern Pass could bid on in the market
and you came up with that, I don't know if it's a dollar amount or whatever, that directly relates to the number of induced jobs you're going to create. So Northern Pass sells their electricity. It lowers the electric rate to all consumers, and that lowering of the rate creates these induced jobs. Is that --

A. Yes, you are correct.

Q. -- a simplistic view? Am I correct?

A. Yeah.

Q. So I think we've heard three days of people poking holes at your whole calculation. So this is assumes you're 100 percent correct. What if you're a little off? So if you're rate is, say the bid rate or whatever it's really called, the supply rate, whatever the electricity price is, is 95 percent of what you thought it was going to be. Are there going to be only 95 percent of induced jobs, or is there a direct correlation between the electric rate that Northern Pass sells and the number of induced jobs?

A. So the direct -- the correlation is between
the electricity market savings, not the rate
at which Northern Pass sells, but the
electricity market savings enjoyed by
consumers across New England because of the
new supply that's coming on Northern Pass and
the induced jobs. So there is that
correlation.

And other states have similar profiles
as well because the electricity cost savings
aren't going to be just limited to New
Hampshire. We have a fairly uncongested
transmission at work, so new supply will
fairly, proportionately affect all parts of
New England. And consumers, be they
industrial, commercial or residential, will
be able to deploy those same dollars of their
income for other uses, which creates the
economic activity. It is not perfectly
linear, but there is a high correlation.

I think we had a discussion, and I can't
recall anymore on which date it was of the
hearings, but there was a discussion at some
point about my updated analysis from
March 2017 having approximately 25 percent
lower overall wholesale electricity market benefits. That would mean that the induced jobs would also be in that general range lower.

Q. You just set me up for my next question, which was this is from October of 2015. You've updated your economic prediction analysis, whatever, the market analysis, like in February of 2017 and then March of 2017, but the jobs numbers haven't been changed. And like you just basically testified to, that number is different. So I would imagine that the induced jobs for the operation is going to be different, but that hasn't been -- this part of the report has not been updated.

A. It has not been updated. So, for the construction period, it's my understanding that nothing has changed at the time that we -- so, the construction budget, the spending, the distribution of spending geographically, so those numbers should not change. But I do agree that the operations period, the total jobs and total GDP impacts
would generally scale up and down with the electricity market benefits. I think the words I used in my updated analysis is that they're in a general, in a similar magnitude, similar range. But there is a scaling effect.

The updated analysis also, just as a little reminder, wasn't meant to be like a completely new report, and that's why I suggested my Original Report is still very important for the Committee to consider. It was a response to a very specific data request from a party that wanted me to update just the electricity market effects for certain changes in the market.

MR. WAY: Mr. Oldenburg, could I have a quick question on that?

MR. OLDENBURG: Sure.

MR. WAY: So once again, if someone said to you, I'd like you to update the job projections from your March -- or from the October 2015, how complicated a process is that? Is that a matter, frankly, of you getting on the computer and entering a couple
numbers, or is this months' work? You know, tell me what the scale is.

WITNESS FRAYER: It's definitely not months, but it's not a couple hours or even a day or two. It's more significant.

MR. WAY: All right.

MR. OLDENBURG: Thank you.

BY MR. OLDENBURG:

Q. The next figure I'd like to touch on is Figure 50 in the same report. Bates number is 27516. And it's basically the estimated number of total new jobs created in New England during the commercial operations. So this is basically a further breakdown of the previous chart we just looked at. The previous chart was just for New Hampshire, and this is a breakdown of New England; correct?

A. Yes. So I would say that the New England -- the totality of the New Hampshire bars in Figure 49 are, I believe -- what color are they? They're the purple in Figure 50.

Q. Okay. So how is this distribution of jobs throughout New England calculated? Is that
like a percentage, or is there like a work force analysis created? How do you come up with this distribution? Because it seems to be very consistent year to year, number of jobs and certain percentage for each state.

A. So I had mentioned earlier that in New Hampshire, Figure 49, the majority of the induced jobs were from electricity cost savings. There's just a little bit of jobs also induced because of the other types of local spending specific to New Hampshire, like the economic development funding, Forward New Hampshire Plan. But in other New England states, the total jobs created during operations are 100 percent all related to the electricity market effects. And the electricity market effects, you can think about them as a rate, as a cents-per-kilowatt-hour reduction on the utility bill. But we also know how much consumers in each state actually consume of electricity. So you have the kilowatt hours by customer class, generally speaking, and over time. And so the biggest bar you see in
Figure 50, the green bar, is Massachusetts because it represents, in terms of kilowatt hours of consumption, the biggest overall consumer of electricity, and that creates the bigger job number, if you will. So there isn't any proxies that we're using. We're really looking at the basic facts in terms of electricity cost savings in dollars. And in states where there's more electric consumption, those are more dollars. More dollars mean bigger induced effects.

Q. Okay. Thank you. I can now skip about two pages because I asked my construction questions previously.

So I guess my last question -- well, one of my last questions, when I heard of 2600 jobs being created in New Hampshire, my first thought of that was 2600 permanent, long-term, sustainable jobs in New Hampshire. And now that we've started to get into it, I don't get that warm and fuzzy feeling that these jobs are permanent, long-term, sustained jobs. Do you have an idea -- I mean, is there a number of jobs that you
would consider somebody gets a job during
this project and that's their career for
life, that type of thing? Is there any
number out there or any percentage?

A. I don't have a number, off the top of my
head, unfortunately, to your question. I
think, generally speaking, large
infrastructure projects are by their nature
temporary. But I would agree that there's
some number of jobs that will last much
longer than the actual period of
construction. We cut it off. We didn't want
to guess at that. We didn't let the model
essentially report out past the construction
period that certain numbers of jobs would
stay because we weren't certain, to tell you
the truth, about that. I think it tends to
be more case-specific, what I call kind of
"rebound effects." And we didn't want to
predict an X number of jobs staying for the
long haul, based on how the model is
simulating that.

I do think that the model is probably
overly perfect, and it probably also
under-represents that opportunity and says temporary spending, temporary job increase, and then, you know, a lot of labor force migration is happening. And we see -- we probably to some degree don't see -- there's a little bit more resistance, actually, in that when a person comes and finds a local community that is receptive, they may actually stay and may re-qualify or change slightly from the work they were previously doing in order to enjoy the amenities of the local communities. We didn't try to anticipate that in our analysis.

Q. Okay. Thank you.

MR. OLDENBURG: That's all I have.

CHAIRMAN HONIGBERG: Mr. Wright.

MR. WRIGHT: Thank you, Mr.

Chairman.

BY DIR. WRIGHT:

Q. Ms. Frayer, good afternoon.

A. Good afternoon.

Q. I thought Mr. Way had closed the door on backcasting, but as I was looking through my
notes I did come across something that I just want to clarify in my notes. I think it was during when Ms. Fillmore was asking you questions about backcasting. That's a term you used, "backcasting," I believe. And I thought I heard you say that in the context of the Greater Springfield project, you had gone back and done some level of backcasting. Is that an accurate reflection of what I heard?

A. I don't remember how that came out. But maybe I can clarify now and say that on our electricity market modeling, we routinely do backcasting, like once a year, once every year and a half, regardless of the Project.

Q. So that wasn't in retrospect to jobs in the REMI PI+ modeling.

A. No, it was not.

Q. Okay. Thank you. I wanted to clarify that in my notes.

I'll shift gears a little bit and go to your carbon reduction emission calculations part of your report. You had estimated in your final report 3.2 million metric tons of
CO2 reductions across the ISO-New England region.

A. Yes, that's correct.

Q. And my fourth-grade science teacher would really kill me because I still don't know the metric system. So in my mind, I converted that to 3.5 million U.S. tons. Is that okay?

A. Short tons.

Q. Short tons.

A. Yeah, I would say that I'm in the same boat.

So, subject to check, I will take that.

Q. I can still run a calculator.

So, looking at that emission reduction and your assumed energy flows of 7,954 gigawatts, I back-calculate a CO2 reduction rate of 880 pounds of carbon per megawatt. Does that sound like a reasonable number to you?

A. So you used the energy flows; right?

Q. Correct.

A. So, per megawatt hour, that sounds right. I think, yeah.

Q. Okay. In my mind, that number seems right to
me. That seems to be about the ballpark of what a combined-cycle natural gas plant would emit at.

A. Yes, because I think for many hours gas is in the margin in the region. Different types of gas plants are maybe sometimes less efficient or more efficient, and that affects the carbon emissions.

Q. Exactly.

A. But generally, on average, I think that sounds right.

Q. So in my mind it just made a lot of sense to me. 

    Now, the foundation of your emission calculation reduction is POOLMod? Am I pronouncing that correctly?

A. Yes.

Q. Now, that's a proprietary model of LEI's; correct?

A. Yes, it's our proprietary energy market simulation model.

Q. Okay. Now, that doesn't spit out that carbon reduction. That's something you calculated based on results of the model; correct?
A. So the model spits out hour-by-hour production by resource, and we have carbon emissions rates by resource. And the two in combination, when we compare the Base Case and Project Case, the difference between those gives us the number.

Q. So, literally you look at power plant by power plant, whether they're dispatched or not dispatched, and if they are, you plug in their carbon emission rates specific to that plant.

A. Yes, for that hour.

Q. Okay. Are you familiar with the EPA integrated planning model, IPM?

A. Yes, I am familiar with it. Not frequently a user, but I think I know it.

Q. I only raise that because I do have some familiarity with using that model. Could you use that type of model to calculate the same -- do you know if you could use that model to calculate a similar emission reduction across the ISO-New England region?

A. I would -- the only concern I have is I would need to check, and I don't know, off the top
of my head, what's the time-based granularity of that model. Is it actually looking at simulating -- so the purpose of POOLMod, our model, is that it simulates the actual security-constraint dispatch that ISO does to get to those hour-by-hour, day-by-day production data sets by plant. I would have to check whether the IPM is also that granular or whether it makes some simplifying assumptions.

Q. Okay. Your model, the POOLMod, does take into consideration constraints within the electrical system. Is that --

A. Yes, we model all the major interfaces that ISO-New England also monitors and considers as part of its regional system planning.

Q. So these could be thermal constraints and congestion constraints. Are there other types of constraints that the model can take into consideration?

A. So, all of the transmission constraints are converted into thermal terms, into megawatt absolute limits. In reality, some of the interfaces that are monitored might actually
have in some periods voltage constraints, but
voltage constraints can be represented
thermally as well. But it's generally
voltage, stability, thermal.

Q. So it recognizes that an electron can
necessarily make it from the top of Maine all
the way to southern New England.

A. Under certain conditions, yeah. Yeah.

Q. I know we all like to think of it as one big
pool, but...

Does the model take into consideration
known retirements? And I would use, for
example, like the Pilgrim Nuclear Power Plant
which has announced it is going to retire in
2019. How does the model treat that?

A. So, as soon as information like that is
known, it's immediately in our model. So,
Pilgrim is a good example. I'm going to say,
and I might have to do it subject to
confirmation because I don't want to look
through all my own pages of my report right
now, but it was captured in the update. I
know it was captured in the updated analysis.
I don't recall if we had that in our original
analysis, given when it was announced, but it
is captured in our updated analysis.

Q. I would assume that, given that natural gas
is such a large part of the New England power
grid, that the fuel prices of natural gas is
a very important component to the model.

A. For purposes of determining energy price
levels, yes.

Q. And your original model used 2015 AEO data?

A. We did two things. We had two scenarios,
actually, on gas prices. One scenario relied
on AEO data as an input to developing the gas
price forecast. And another scenario didn't
rely on AEO data, but actually relied on I
guess a forecasting model called GPCM, which
develops their own forecast of the cost of
gas supply commodity-wise and delivery
constraints and so forth.

Q. And you did update the data you used in terms
of gas prices, I think I read, from 2015 to
2016.

A. Yes. In the updated analysis we used the
latest available forecast from the AEO, which
would have been vintage 2016.
Q. Okay. I think 2017 may have come out in January. But that's probably a timing issue more than anything?

A. You're right. I think they issued the draft AEO 2017 at a high level in January. But at that point the modeling we needed done for the energy market was done, so...

Q. Do you know if there's anything significant in the 2017 forecast that would concern you?

A. No. There's a timing play. It's interesting. They are actually saying the cost of gas is going to be higher in the nearer term, early 2020s, and then might be lower in the back end. That's one of the observations I've made in kind of comparing high level. But I think it's like a timing issue. It's not a complete new set of trends.

Q. I think this is my last modeling question. When you do your models, do you typically run sensitivity analyses on your modeling results?

A. It depends on the objective of the study we're doing. So, in this particular
instance, for example, in the Original Report, there was a lot of uncertainty about, in fact, at that time, about potential gas projects, gas pipeline projects and what it would mean to gas price levels in the region. So we did do two gas price scenarios.

In the updated analysis, I think at this point there's less, I think, uncertainty, near-term uncertainty about that, so we didn't do it. We specifically focused on the AEO as requested in the data request. But I think at one of the technical sessions a question was raised about uncertainty regarding energy efficiency, future energy efficiency. And so we did quickly a test that we documented in a discovery data request response. So I think it depends on the nature of the work we're doing and where the uncertainties lie, whether in fact there's a need for -- explicitly a need for a range or it's more helpful to have a "most likely" Base Case. And in this case we have generally a most likely Base Case that we're projecting.
Q. Do you have your Prefiled Testimony in front of you? I think it's your April 17, 2017.
A. I do.
Q. If you can go to Page 35.
(A Witness reviews document.)
A. So it's the April 17. Is it the prefiled -- is it the testimony or the report?
Q. Your Prefiled Testimony.
A. Excuse me. What page?
Q. Thirty-five.
A. I think that sounds like it might be the report, but let me...
Q. Oh, I'm sorry.
MR. WRIGHT: Thank you, Mr. Honigberg.
BY MR. WRIGHT:
Q. It's your October 15, 2015, on Page 35, where you talk about the environmental impacts.
A. All right. I'm there.
Q. You see Section 3, Environment Impacts. And on the Line No. 5 you talk about the Cross-State Air Pollution Rule. This is air regulators' version of CASPR, not whatever CASPR you guys were talking about.
So, in there you make the assumption that, even though CASPR is not applicable to New England generating units because we're not subject to that federal rule, you make the assumption that we are subject to that rule. And what you've done, if I'm correct, is you've added in cost of operating generating stations for their SO2 and NOx emissions that don't really exist. Do you agree with that summary of what you have there?

A. So we've considered as part of the variable O & M cost some small amounts for allowance costs under SO2 and NOx, similar to the budgets that were under -- well, that would have been under CASPR. I believe they're very di minimus. Very, very, very small.

Q. Okay. That was going to be my follow-up question, because that would impact their cost of operating and whether they --

A. And the locational --

(Court Reporter interrupts)

Q. -- whether they get displaced or not.

A. More so it would impact the locational
marginal price levels. But again, we're not looking at absolute price levels. We're looking at price differences. I'm not sure it would impact which resources get displaced, though.

Q. Okay. I think that's the end of my questions.

CMSR. BAILEY: You're going to go next?

MS. (Whitaker) DANDENEAU: Sure, unless somebody else is going to.

CMSR. BAILEY: I thought Ms. Weathersby was next.

MS. (Whitaker) DANDENEAU: Oh, that's fine, too. Okay.

BY MS. (Whitaker) DANDENEAU:

Q. Hello, Ms. Frayer, my name is Rachel Whitaker.

A. Good afternoon.

Q. I have a couple follow-up questions about the REMI model, which I know we've talked a lot about already.

When Mr. Way was asking you questions, he was sort of, I think, trying to get at why
it was done at the state level, and I wanted
to follow up on that. I can see where the
state-level analysis would be so important.

But as you were talking, it sounded like
there was a lot that was lost by not doing a
finer-level analysis, a more local analysis.
And so I'm wondering why a more local
analysis was not done. Even if REMI can't do
it, why wasn't a more local analysis done
with a different model?

A. I can't speak definitively, but I can offer a
hypothesis.

Q. Sure.

A. I believe that some of the geographically
targeted or more localized effects are very
temporary in nature, and for that reason I
think there wasn't a lot of focus on them.
And I think Eversource has other experts that
speak to some of those other issues.

Q. Okay.

A. And I would definitely urge you to talk to
them a little more about it as well. But the
insight we got when talking to those experts,
and even in preparation of our Original
Report, is that they are not -- that they are quite temporary and quite small.

Q. Okay. You also talked about the data available for conducting those more local analyses not being, I think you used the term "reliable" or not as reliable, or maybe not as available.

A. They were definitely not available to me. And I don't think there is any good data right now in the record about this information that's objective.

Q. Okay.

A. I appreciate -- I've seen, I think, in a data request from one of the experts to Counsel for the Public -- I appreciate there was some interviews that were done, but I think they weren't of the quality of a true survey that is meant to elicit an objective, measurable, quantifiable effect. But I appreciate the comments in those interviews and the notes and stuff. It's just I'm not sure you can rely on that to do a quantifiable analysis.

Q. Okay. Thank you. And while I'm asking about data, where does the data come from for the
REMI model? You talked about how the model could be sort of specific to whatever you're analyzing. Where does the data come from to create that level of specificity?

A. So, at the state level and national level, I believe most of the data is coming from national accounts. Sorry. I keep referring to "national accounts." So there are statistical agencies here in the U.S, BA, BLS, that are constantly combining data, including even the census reports that we fill out, what, every ten years or so, but also surveys of businesses and manufacturing sector and so on. And states also have state-level data that they compile. And let's see. Once you start getting into substate level, into kind of counties and municipalities or metropolitan areas, there are some national data bases. But there's also a lot more data one needs to get from local economic centers, if you will. All this is meant to be public, based on publicly available scrub data. If there's further interest, I'm sure I can identify in the REMI
documentation detailed data sets.

Q. Okay.

MR. WAY: And if I could just follow-up on that? So when you get down to the state level, for example, here in New Hampshire, Department of Employment Security Labor Market Analysis, local employment dynamics, you know, maybe even a lot of the information that addresses some of the concerns at the local level, maybe not as much county level because it's kind of ethereal counties in New Hampshire, but certainly at defined local level, is that incorporated -- do I understand you to say that that's incorporated into REMI, or is that something that you have to physically go out and look at? And if you do have to physically go out and look at, is that something you did consider?

WITNESS FRAYER: So I'd have to check whether REMI had pulled any data from local, let's say more localized sources. I do know they look at state-level data and national accounts for the state-level geographical combinations. But I'm not sure what other
slopes they might -- so I need to check to be
able to confirm that.

MR. WAY: And that would be
something I would request, if you could, to the
extent that you use state-level data. Thank
you.

WITNESS FRAYER: And again, it
would be something that REMI would give us as
part of their data set. So, for the many of
us, many other consultants that use the model,
we typically rely on REMI to populate the data,
thus the very large license fees for it because
of all the work they do scrubbing the data and
putting it together.

BY MS. (Whitaker) DANDEANEAU:

Q. Excellent. When Ms. Fillmore was asking you
some questions yesterday, you talked a lot
about "positive" effects. I feel like that
word was used a lot. And I had written down
here, and I don't know if it was word for
word, but I believe Ms. Fillmore asked you
about negative effects. And you said --
again, I don't remember if this was word for
word. I was typing quickly. You had said
that there were no negative impacts, that if
there were going to be negative impacts, that
the model would have reported them. And so I
was wondering if you could talk about that a
little bit more, because I imagine there are
going to be negative impacts associated with
this project. I think we've heard about some
of them so far. And I'm just wondering if
your comment saying that there are not
negative impacts according to the model, is
that because, say the model shows that
there's 500 new jobs gained, 300 are lost, so
there's like a net gain of 200 jobs and so
there's no negative impact, it's overall
positive impact?

A. I'm trying to remember, and for the life of
me I can't remember the context of those
statements. But let me step back and say
there's two elements to this, two potential
answers to your question.

Q. Okay.

A. So we put an input into the model and then
the model creates a result and the result
could be positive or negative. And in fact,
in some of the figures we looked to because of the rebound effect during the operations stage once kind of the electricity cost savings dissipate, there is sometimes some small negatives. And we reported those as negatives in those back years. We didn't want to just assume them away because we said we were going to report for this time frame.

Q. Okay.

A. So the model will do positive and negative. But I don't think the discussion with Ms. Fillmore was about the model's ability to produce results that could be either positive or negative, or the fact that our results, there were some induced negative effects in the longer term from the rebound. I wonder if we were talking about positive and negative externalities. I'm not sure.

MS. (Whitaker) DANDENEAU: You know, I don't have anything else. Did somebody -- go ahead.

MR. WEATHERSBY: As I recall, that statement struck me as well. I think we were talking about during the construction
phase there would be no negative effects on
during construction and that you relied on
your model for those inputs, for inputs that
resulted in that. And I had a similar question
of whether that was net impacts, that there's
no net negative impacts, or just no negative
job impacts. Does that help?

MS. (Whitaker) DANDENEAU: Yeah,
I think it does.

WITNESS FRAYER: I think, going
back to my discussion about we simulate the
construction period local spending, and that
creates an outcome in the model. During the
construction period the model reports positive
effects. It doesn't -- I haven't seen any
negative effects. I could imagine, I guess, an
economy if there was an industry that benefited
somehow from, I don't know -- not even an
industry. I can't even imagine an industry.
But maybe there was somehow an abnormal impact,
where kind of the construction sector was
booming, and whenever the construction sector
is booming, maybe a different sector of the
economy goes down. But I didn't observe any of
that type of relationships in the model.

I do think that Ms. Fillmore might also have been asking and talking a little bit about what we were talking about earlier, which is very localized, temporary perceived negative impacts for certain businesses and certain activities during construction. And that's more of an input issue. That's not because of the model, though there is the question of the granularity of the model to be able to handle it.

To support some of the conclusions on those, I did speak, and I think it's documented in my Rebuttal Report from April, I did speak to other experts that Eversource has retained to deal with some of those issues, and I relied on their professional opinion on that as well in talking through those conclusions. And that was more input driven because of the expert opinion of those experts on those topics. We concluded that there would be no measurable effect as an input that we would put into the
model; therefore, there would be no negative result from the model.

Q. Okay. I had just gotten the impression that there were no negative impacts whatsoever, and that just didn't make sense to me. So I appreciate that clarification. And that's actually all I have for questions.

A. Thank you.

CHAIRMAN HONIGBERG: Ms. Weathersby.

MS. WEATHERSBY: Thank you.

BY MS. WEATHERSBY:

Q. So just follow up on that last point, am I understanding you correctly that you're saying that there may be some negative impacts on jobs or local economy, but it's very local in nature and temporary in nature and therefore did not go into your model?

A. I think that's a good way to -- that's a good summary, yes. And in reaching those conclusions, it wasn't -- it was based on kind of our review of information that, for example, Counsel for the Public's expert had prepared, but also talking to other experts
that are more familiar with the details of
the construction and so forth, or the details
of a particular sector of economy that
supported us in making those conclusions.

Q. So, for example, we had the Green [sic]
Monkey example, the performance center, that
business or other businesses in Plymouth that
may suffer some reduction in revenue. That
doesn't really -- that hasn't really been fit
into your projections.

A. That's correct.

Q. Okay. I'll stick with my job questions while
we're on this vein here, if I can.

In your jobs analysis, you indicated
that the line would be constructed over a
40-month period.

A. I believe -- so I was thinking of it in
years. But I think that corresponds.

There's a big ramp-up in construction that
I'm seeing from a local spending perspective
that's happening in 2017 and 2018. But
there's also some work originally scheduled
for 2016 and some work for 2019 as well.

Q. And we've heard testimony that construction
will take place over a couple of construction seasons, so I'm wondering where that 40-month period came from. And if it's more like 24 or 30 months, how does that affect your analysis? Is it, you know, a corresponding reduction?

A. So, actually, it's probably quite useful to look at Figure 46 in my Original Report, on Page 76, and that gives you a bit of an understanding.

So on a technical, from start to finish, the planning and construction phase in our analysis would go from 2015 through 2019, but the majority of the work is really, in our schedule, in 2017 and 2018. So that, I think, corresponds to the multiple, I guess two construction seasons that I think you may have heard from the construction panel. I assume that's where that information came from.

Q. So the majority of jobs in two years and then a couple on either side.

A. Yes.

Q. In your analysis, the induced jobs as a
result of the energy savings are clearly the
largest component of the newly created jobs.
When you determined the creation of an
induced job, did you assume that all of the
energy savings from a residential customer or
a business customer, that they then spent all
of that savings?

A. No, not necessarily. I think there's an
element to the model where they think through
what kind of customers -- is it a household?
Is it a particular type of commercial or
industrial customer? So there are, I call
them "cost functions" or "elasticity
relationships" in terms of how a dollar of
reduced electricity cost affects that
particular type of customer.

Q. So some analysis was done that said, just
paraphrasing what I'm hearing, that, okay,
they're going to save X percent for their
retirement; they're going to, you know, pay
down their debt X percent, and then with the
remainder they're going to go out and go to
the local restaurant or put an addition on
their home or buy new, you know, automated
machinery for the factory.

A. Yes. Some analysis is being done to that point. It's being done internal to the REMI PI+ model, so it's not an analysis we do. The REMI PI+ model actually represents those relationships already.

Q. We've also talked about how a lot of the jobs, particularly the construction jobs, and even the indirect jobs, but particularly the construction jobs, I guess, are maybe migratory in nature. There's the directional drilling folks that come up and the line workers, et cetera. And then there's indirect jobs that are created. You know, someone is going to open a restaurant to service them or build a new hotel. You know, and that economic growth gets stimulated by all of these workers that are coming into the state of New Hampshire. But I'm wondering what happens when the workers leave. You know, is it then the boom turns to bust when there's no longer people to fill that hotel or go to that restaurant? How is that factored into your analysis?
A. So there could be a rebound effect for some time, where there's some loss of jobs as the overall economy kind of right-sizes. This happens with any temporary boom or bust situation with a high growth or recession. I think there's always a wave pattern, if you will, that comes out of it.

In our analysis, I'm not sure that this level of spending on this project alone is enough to necessarily create huge additional capital stock, like new hotels, new restaurants that will be used. We were talking more about new jobs and potentially more sales. But I think there's already spare, generally what I call "spare capital stock" in the economy today. So it wasn't that we were building a bunch of stuff that's going to just lay dormant and vacant after the fact to support these construction workers. It's more that the businesses would have more sales and would need more labor to service those sales.

Q. And then those newly hired workers would then be laid off as the sales then shrink.
A. They may be laid off, yes. So that's why we didn't try to extend the analysis and say that, let's say the induced effects in New Hampshire, the induced jobs which by 2019 are down to 261, we didn't say that they're going to continue in 2020, 2021, 2022. Some may continue for some time, but there'll be a lot less. So we didn't try to present in our analysis a view that those jobs would be forever. Think of those as jobs that are occurring in those specific years, not jobs that then are going to happen forever.

Q. Okay. And if we look at your Figure 50 in your cost benefit analysis, is that what we're showing as negative jobs? Is that -- in 2019 and then 2026 onward? Am I understanding that correctly, or is that a different concept?

A. So there are some negatives. In 2019, it's kind of -- well, let me explain what the negatives are.

For the majority, the negatives, if you take a look, are related to Rhode Island, Massachusetts and Connecticut. And Figure 50
is talking about total new jobs created in
New England during commercial operations.
And in our analysis in the Original Report,
we took into account that Northern Pass could
win what was the Clean Energy RFP at that
time that the three states put together. And
if it did, we wanted to be pragmatic then on
what that would mean to retail customers in
those three states. And in those three
states, although they would enjoy, like all
the other states in New England, reductions
in wholesale market costs of the commodities,
they would also, based on the structure of
that tri-state RFP, customers in those three
states would be responsible for the costs of
the contract that would be signed at that
time with Northern Pass. And so in some
years the cost of the contract exceeded the
electricity cost savings than the customers
in those states would benefit. So, in 2019,
because capacity sales don't start until
2020, and in the back years, 2027 through
2030, or 2029, at that time there would be
negatives because the electricity market by
then has re-balanced, gotten back to
equilibrium as we were discussing earlier,
and so there wouldn't be, in our estimates,
direct electricity market benefits to
consumers, but there would still be a
contractual obligation to the customers in
those states. So that was specific to the
assumptions we made to be realistic,
pragmatic in how we're representing the
retail side of the equation.

Q. So this is a different concept than I was
speaking to before, and this reflects the
negative job losses. I guess that's
redundant. Negative jobs reflect the effect
of the reduced prices on the other generating
facilities, essentially, in the --

A. It's not to do with the generators. It's
reflecting an induced effect from the fact
that in those states, in those particular
years, although there is still a wholesale
cost reduction, there's also a contract cost.
And in those particular years, the contract
cost from the tri-state RFP would be bigger
than the wholesale rate reduction. So it's
not related to the generators or any
retirements. There wasn't any specific
retirement induced in the original analysis
either from Northern Pass, but really to the
construct of that tri-state RFP.

Q. Okay. Thank you.

Just back on my migratory worker theme
for a second. Does your model assume that
the workers that are here for the
construction jobs are spending all of their
money that they earn here in the state of New
Hampshire?

A. I think it would assume that they're spending
money on housing and retail services as
needed. I'm not sure I could say they would
be spending their entire salary. That's not
indicated.

Q. But if these folks, say have a home and a
mortgage and family in, well, Texas has come
up, is it assuming that, you know, a quarter
of their pay is going back to support the
family and their home, et cetera? Is any of
that modeled?

A. I think it's implicit, in the sense that, for
example, we assumed that the compensation being offered during construction would be better than the typical compensation we'd get otherwise. I would say that another way to think about it is the typical compensation you get otherwise is what's going to be paying for the ongoing household expenses, and it's the incremental part that needs to be spent to then establish a temporary residence here and buy food and health services if necessary and so forth.

Q. Switching subjects a bit. You had said that in the post-FCA 11 world that you would anticipate that there would be smaller capacity benefits in the next auction, but larger capacity auction benefits later on. And I'm paraphrasing. So, basically the benefits equal out to what you've projected. Did I sort of capture that essence at all?

A. I think so. What I was trying to say is that the annual capacity market benefits may differ from what we presented, but I anticipate that over time on a net present value basis when we're looking at the full
forecast time frame of when Northern Pass
could affect capacity market savings, it
would average out to generally in that same
range. So what would happen is the values in
the next few auctions might be lower than
what we predicted prior to FCA 11, but the
capacity benefits might be more
longer-lasting.

Q. And would that hold true if other large
suppliers entered the capacity market in the
future?

A. Depends on the timing. So are you suggesting
other large suppliers, let's say in late
2020s, 2030 enter the market?

Q. Sure. Let's start there.

A. Yes, they would bring down the price. But in
my modeling in that time, I would associate
the price reductions they make with their
project, not necessarily with Northern Pass,
if that was the case. So I'd want to look at
circumstances specifically.

Q. So, say another line is built. Hydro-Quebec
is bringing power to the New England area and
it goes online in 2022.
A. So, almost contemporaneously.

Q. Almost contemporaneously.

A. The effects we haven't studied for this project. But I would expect that in the capacity market we have, it's a non-linear demand curve. So we would still have a price reduction that's more than the price reduction we have here. It would be more difficult to take it apart and figure out which portion of the capacity market benefit is related to Northern Pass versus another project. It would -- what the model would be showing is the total quantity of the price effect between all the various supply resources, but it wouldn't be showing you what's incremental to just Northern Pass. So it's possible to model. And it would be bigger. The totality of that would be bigger than what we're showing here. But we wouldn't be able to figure out which piece would be related to just Northern Pass.

Q. A couple times we've talked about capacity inputs "delisting." And forgive me because I'm just learning all this. Is that
essentially when -- if a generator delists, that basically means they're not -- they've decided they're not going to participate in that auction? They're like folding their hands?

A. Yes, for that auction. And there's different flavors of delisting. For example, a permanent delist is much closer to retirement, where they're saying not only that auction, but never again in the future. Static delist might be for one auction. A dynamic delist might be just for one auction.

Q. So if someone chooses to no longer participate in the capacity auctions, then they only can sell their electricity on the wholesale market?

A. Then they can sell only just the energy commodity, and maybe ancillary services if they can provide that. But generally speaking, they can't go back and try to get a capacity supply obligation for that period for which the Forward Capacity Auction was procuring capacity.

Q. And what would be the economic effects on
such a participant, or non-participant in this case? I mean, it seems as though by not participating and just selling energy on the day market, whatever you call it, could impact them negatively financially.

A. I think you raise a really good point. And it depends on what kind of supply resource it is and what alternatives they have. For example, we have imports from New York that serve as capacity resources. And one of the reasons that they may want to delist is because they can go back and sell their capacity in the New York market. And it may be more economic, more worthwhile for them to do that. We're capturing that in our analysis because we can see the arbitrage opportunities as they arise, depending on the projections of our New York capacity market model and our New England capacity market model. Other resources might make an economically rational decision, and they might say, well, the capacity price is so low, it's not really remunerating me for the obligations I'm taking on as a capacity
supplier and the risks. So, for them, maybe
on a risk-adjusted basis they made a decision
that they only want to take energy, and
that's better than if they take on the
capacity performance. But generally
speaking, if a resource leaves, delists year
over year, multiple times, they're
essentially on their pathway to retirement
because the energy market alone is typically
not supporting generation resources.

Q. I guess that's what I was going to -- because
we've heard testimony that Northern Pass may
cause some suppliers to delist. And if
they're essentially -- it sounds as though
it's going to -- it could accelerate a
generator's path to retirement. I know we
said, oh, there's no -- you had testified
that there's no retirement as a result of
this. But it seems as though it will have an
impact and perhaps accelerate a retirement.

Is that fair to say?

A. I think that is exactly what our model is
trying to capture. It's looking at whether
it does accelerate the pathway to retirement.
And because our model is chronological and it's looking at not just one auction in a snapshot, it's looking at what's happening year after year, it can actually predict, project when that retirement decision is triggered. Because of the recovery of the capacity prices, albeit as we've talked about, peak load growth isn't huge, it's small, but there is that expected recovery over time, we do see that the projects that we are anticipating do delist, then come back after some time. So, for them it's not an economic decision that leads them down the pathway of retirement, but it could be. And our model captures that. It captures the differences between a delist and a retirement. And that's an important difference that reflects the reality. And it also captures the fact that even delists themselves aren't something that can happen in huge volumes.

Counsel for the Public's expert's model was looking at delists in 2500-megawatt increments. Big amounts of delists,
hypothetically. Our model is actually very consistent with what we've seen in previous auctions, where if we do have delists, it might be a few hundred megawatts here or there. We're not seeing, even as prices have come down in previous auctions, these big amounts of delists or response that happen too quickly. Because, in fact, if I was a power plant and I saw prices step down from $6 to $5, I'd say, wow, you know what, I'd rather not delist. I like getting five bucks. Because if I delist, I get zero in my capacity, and five bucks is worse than six, and I would have preferred six, but five is still a lot more than what I think is my cost of performing the capacity supply obligation, so I might as well take the five. And that type of economic rational behavior is what our model is capturing.

Q. I don't want to say this is my last question yet, but bear with me to make sure it is.

(Pause in proceedings)

Q. That's my last question. Thank you.

A. Thank you.
BY CHAIRMAN HONIGBERG:

Q. I just have a couple things I want to cover, and mostly following up on things Commissioner Bailey talked about with you. We think we know that Hydro-Québec has excess capacity that it would like to be able to sell wherever it can sell it; right?

A. I think that's a fair statement.

Q. And from an exhibit we saw earlier, I think it was something Ms. Birchard showed you, they're sniffing around other interconnections into New England, Maine and Vermont, according to that press release; right?

A. Yes. I think they would like to see -- they'd like to keep their options.

Q. Right. I mean, I think that's -- just looking at it from the outside, knowing nothing, it seems like a pretty obvious thing for them to want to do.

Is it your view that New England could handle or would benefit from two Northern Passes, you know, a 1,000-megawatt project and another 1,000 megawatt project?
A. Without having done the analysis, I would be comfortable saying that New England could handle multiple large-scale transmission projects with hydroelectric energy behind it, assuming it's available. But I would prefer that there's potentially some thoughtful timing on when those projects come in.

Q. And that makes perfect sense. But developers aren't always thoughtful about timing.

One of the things you talked about with Commissioner Bailey, and you were not willing to consider or include in your analysis, was the line that's coming down, proposed to come down under Lake Champlain and then across Vermont. It's TDI is the developer, and it has some other catchy name that's associated with it. Do you recall that?

A. So are we talking New England Clean Power Link or are we talking Champlain-Hudson Power Express? New England side or New York side?

Because both --


A. Okay. Yes. So that's the New England Clean Power Link.
Q. Okay, the Clean Power Link.

        I don't recall your exact words, but I
think you said it's a hypothetical, doesn't
exist, so I wouldn't include it in the
analysis. And we were talking about what
else might be happening. In that context,
you were talking opportunity costs.

A. Hmm-hmm.

Q. I want you to assume that it exists. How
would that affect your analysis? Because the
developer certainly thinks it exists, and
it's got a lot of permits already approved.
And I believe it's stated that it intends to
bid for the Massachusetts business as well.
So let's assume that it's proceeding as well.
What happens to your analysis?

A. So would we want to assume it in the Base
Case and then in the Project Case add
Northern Pass on top of it? When you say
"let's assume it exists," Chairman, can I get
a little bit more detail on the hypothetical?

Q. Well, I think you were unwilling to include
it in an analysis of Northern Pass's effects
on the market because it was a hypothetical.
I think, then -- I don't know whether that's what you're calling the Base Case or not, but I think it's the Base Case. I think I want you to assume it exists and then add Northern Pass. What happens?

A. So let's say it exists. Its existence would change our Base Case prices.

Q. Which direction would they go?

A. It would inevitably need to go down because it's incremental supply beyond what we have or beyond what we projected. It may change also, though, over time our new entry assumptions, new energy efficiency. May not be as economic because they look at production cost savings. And if you have additional new supply, that changes the decision for those programs. And you might not have new generic -- new entry local to New England, like a new combustion turbine. It would defer those because you wouldn't have room in the capacity market for those any longer.

So I think in the short term it would mean lower prices. In the longer term, we
might get to the same Base Case prices we already have.

Q. And that's because some of that massive new capacity would be coming and would chase out existing capacity, and so you'd end up with a new equilibrium and roughly the same place you would expect, just maybe in a different year with a different mix of supply; right?

A. Yup. And again, it would more likely chase out either price-sensitive, existing resources, like imports, maybe have some delist for some short periods of time of some existing resources, but also, more predominantly, in my opinion, defer other new investments that would have otherwise taken place.

Q. And moving forward in time closer to where we are, then, assuming again that it exists, what's your understanding or expectation as to how the ISO's Market Monitor would respond to minimum offer price calculations?

A. For?

Q. For Northern Pass.

A. For Northern Pass? Well, I think Northern
Pass's calculations will remain the way that we've done it. What will happen is it's a question then of there's a new starting point to consider because the minimum offer price is looking at the unit cost of the Project. Think of it that way. It's a cost of new entry for the Project. Then it's really the dynamics of the auction that determine whether it's constraining or not. So if we start with a market that is much more oversupplied, there might need to be, again, a timing issue here about when Northern Pass would -- if we assume that somehow TDI's New England Clean Power Link gets built, there might be a timing decision that needs to take place to ensure that the MOPR is not binding, because in the first year or two of TDI, it will effectively lower the capacity price. So, it'll be the capacity price that gets binding on the MOPR, not that the MOPR calculations change.

Q. I feel better since you called it the TDI project in that sentence and then corrected yourself. So I feel better now. And since
this is all about me, that's all that matters right now.  

[Laughter]

Q. Another question about your calculations using the ISO model and the 20 versus 40 years question, another discussion you had with Commissioner Bailey. I think you may have had an exchange with another questioner about this. I want to make sure I understand your position. You feel confident that 40 would hold because that's the way they always analyze transmission projects.

A. No. I think I feel confident that 40 will hold because it's the right number for Northern pass. And to tell you the truth, I don't know how the Internal Market Monitor analyzes new transmission projects, ETUs, because that's confidential and hasn't been disclosed. But in other markets, the system operators have disclosed what they've done with respect to transmission versus generation projects in their version of the MOPR.

Q. Right. You made that representation earlier,
but you didn't give an example. You said it's happened elsewhere. Can you cite to an example where it's happened elsewhere, where it would be easy for folks to find?

A. So, in New York they have the equivalent of the MOPR. They call it the "buyer side mitigation test," BSM. And the way that the New York ISO implements it is by what they call "class years." They pool together a bunch of new resources that have asked for capacity rights. I'm trying to use the terminology they use, just so you can find it. And then they do these tests on all resources that have asked to basically interconnect and join the capacity market about the same time. And I think they've talked definitively in various vintages of their class year studies about those assumptions. For example, I believe in Class Year 2012, which might have been the first class year where they studied a very large transmission project -- well, no, it wouldn't be the first year. But it was the first time where they talked about the fact that I
believe the amortization rate for a transmission project needs to be very different from the amortization rate they would use in looking at the unit cost for a generation project as part of their demand curve reset. So that's an example.

They've done a Class Year 2015 study where they again raise this issue, where they say the amortization rates need to be customized to the type of projects you're looking at.

Q. And the "they" in that sentence was, again, the New York operator?

A. The New York ISO. And I believe the actual reports are written in some ways by Potomac Economics, which is their market monitor, that reflects on what the New York ISO did.

Q. Any other operator --

A. Those are the two that come to mind. There might be others in between. But I'm very familiar with those two because of our other work there on other projects.

Q. Okay. That's what I wanted to cover. I know that Attorney Iacopino has a few questions,
and I know that Commissioner Bailey has some
follow-up questions. I don't know -- and
Mr. Way has questions. Why don't we start
with Mr. Way and work this way.

MR. WAY: Thank you.

BY MR. WAY:

Q. I have hopefully a quick question. I had
asked you a question earlier, Ms. Frayer and
I didn't really get a satisfying answer and I
kind of left it off the hook and I want to
just revisit it.

Because we had talked about the reasons
for updating, why we didn't update the local
economic impacts from the March -- or from
the October to the March report, I looked in
your footnote, and one of the things it did
say is there was not enough time to do it.
It was based upon the wholesale electricity
market. And so I'm just trying to wrap my
head around some of the "what if" scenarios
because we've talked about a few "what if"
scenarios.

Once you've developed your model and
you've customized it, you've put in all your
inputs, help me understand once again -- and
I'm not trying to trivialize it. If I have
one change, one variable, one input that
changes, isn't it just you going in to the
model and typing it or putting in that new
number and then having it spit out? Is that
being too simplistic? So, you know, I'm
imagining as we go through this process there
may be some "what if" scenarios, and I want
to know what we're asking for if we do put
that towards you.

A. So if it's truly one input, one cell, it is
one input and one cell and it's not
difficult. But sometimes a particular change
isn't limited to one input, one cell. So in
the scheme of things, for example, on the
electricity cost savings, we're actually
breaking it down further by type of customer.
We're updating, if we need to, the
electricity cost and the baseline by type of
customer. We're looking at multiple states,
multiple years. So there's more than just
literally one number that we change.

Q. And so when you're talking about that -- when
I'm talking about the job estimates changing as a result of the last report, you're referring to that.

A. Yes. With respect to, for example, the job estimates during the operations phase, that would be -- I thought that's what you were asking about.

Q. Correct.

A. So there are a lot of changes, not just a single -- it's not a single number change.

Q. All right. Thank you.

A. And we would want to make sure, once we look at the results -- I always want to go through and understand them in probably a lot more granular detail than what we're just reporting in the report, to make sure it all makes sense.

Q. Thank you.

CHAIRMAN HONIGBERG: Mr. Iacopino.

MR. IACOPINO: Thank you.

BY MR. IACOPINO:

Q. Ms. Frayer, if I understand what I've read and what I've heard correctly, you were
engaged to support Eversource in the
presentation of this Project to the
Committee, and before that in some testimony
to the legislature in some public debates
about the Project; is that correct?

A. Yes, I think those are examples. I think, in
addition, we've worked with Eversource on
more of their kind of internal commercial
strategy with respect to investments more
generally. So we've done that work as well.

Q. Were you engaged at all, or was your company
engaged at all in the determinations made by
Eversource, or Northeast Utilities at the
time, to actually pursue this project?

A. I think that we joined the -- we started
working with Eversource after the Northern
Pass concept project was announced. There
was another consulting firm that originally
did some work very similar to ours that
predates our involvement with them on
Northern Pass issues.

Q. Were you engaged to provide any consultancy
to Eversource, for instance, on what the size
or capacity of the line should be in order to
be profitable or in order to establish economic benefits?

A. We have generally not been asked in any of our work to look at the profitability to Hydro-Quebec or the shipper. So it's not really been a function of our work. We have worked with them in thinking about how benefits change, like "what ifs" if the Project characteristics change in some way. In fact, I think a presentation that came up earlier with another attorney was done at that time where they were changing the Project dimensions from 1200 megawatts to 1090 megawatts.

Q. And you were involved in that decision-making?

A. I don't think we were -- I wouldn't say we were involved in that decision-making. That was over my pay grade. But I think we did some analysis at that time that laid out what the implications would be to the electricity markets under that type of change, if you will, to the Project. I don't know how that information was then used by the
decision-makers, but I presume they saw it.

Q. Let me shift gears slightly. You expressed confidence in your analysis that this project would qualify for and clear in the Forward Capacity Market. You told us that you had done an analysis of that. Was that analysis done totally in-house at London Economics?

A. Yes. So when I was referring to the analysis and research we've done to support my confidence in that conclusion, I'm talking about the analysis that we're showing, for example, in the Supplemental and Rebuttal Report, where we show that, one, we believe that Hydro-Quebec, based on our analysis, has surplus energy and capacity to sell into New England, given all its other obligations; two, we've looked at what other parties have identified conceptually or hypothetically to be an important aspect of qualifying and participating in the auction as well.

Q. Let me ask you about that for a minute.

When you say what "other parties" have told you, do you mean folks from Eversource or --
A. No, no. I'm referring, actually, to the fact that some of the other parties' intervenors had raised this conceptually as an issue, that maybe Northern Pass can't actually clear the FCA because of the MOPR. And we went and showed that that's not to be the case. I thought it was intuitive to begin with that it wouldn't be the case.

Q. Well, your report came first. So I assume that you did your analysis that they would qualify and clear before you issued your first report; correct?

A. My first report, I actually, I would say, didn't do any detailed analysis to show that they would, like I did in the Supplemental Report, that they would have a MOPR of X and it would not be binding on them clearing the capacity market because I thought it was kind of self-evident and intuitive, that there shouldn't be an issue. It's a new supply resource. It has the opportunities to make a lot of revenues in the energy market and shouldn't be receiving a very high MOPR then which would bind it from clearing in the
capacity market. It's not a resource that requires a subsidy, like a REC payment to make it whole. But in fact, even REC payments the ISO allows to be considered in the MOPR as well. So I thought it was self-evident in my Original Report. So there wasn't an analysis for the Original Report at that time in the same level of detail that we then did in the Supplemental Rebuttal because intervenors raised this conceptually as an issue, and there wasn't anything in the record that clarified the point.

Q. Did you feel you had a fair opportunity to rebut those claims?

A. I feel so, yes. Wondering what my client would think. But I think I've done that.

Q. Let me shift gears again, then, to my next question.

During your testimony, I believe it was with Mr. Pappas, you made the statement that the capacity market would re-balance itself after the change in the rules and change in the demand curve. And I guess the question I had is: Is there anything that would stop
the market from re-balancing that the Committee should be aware of going forward?

A. Well, I think in our analysis, essentially I also assumed that the capacity market over time re-balances itself to the long-run equilibrium, the cost of new entry. But I think there are practical considerations here that our analysis takes into account. The market won't re-balance itself overnight. It won't even re-balance itself in one auction or two auctions. It will take time for the market to re-balance itself because we're talking about the need to make very important decisions. I think as I was talking to Ms. Weathersby, hopefully, about this, the decisions aren't as simple as a one-zero type of decision. They're not black and white. There may be decisions made that extend those capacity market benefits.

So I think it's the speed pragmatically with which this market re-balances that's really at issue here. And I think that it's going to take a little bit of time. It's not going to happen overnight.
Q. You also mentioned -- I don't know who you were answering. But you also mentioned that Hydro-Quebec had issued a report regarding its exports. And my question is: Has that report been made part of the record, to the best of your knowledge? It's export capacity I guess is what we're talking about.

A. I think... I'm trying to remember. Was this... who was I talking to? I think I was trying to say, and I don't -- I hope this is consistent with your recollection, too. But I think I was trying to say that Hydro-Quebec also wants to export its surplus energy. And that's a major strategy. I believe that is picked up in the Hydro-Quebec Annual Report and the Hydro-Quebec Strategic Plan. And I believe both are part of the Counsel for the Public's exhibits.

Q. Okay. Thank you.

And then you also mentioned today in response to someone's questions that essentially Hydro-Quebec is using up all of its ability to export because of, for lack of a better term, constrained transmission.
There's another expert in this case who has filed Prefiled Testimony that says that the Phase I and Phase II line is only -- is being minimally used, at least in his opinion.

Where did you obtain your information that Hydro-Quebec is essentially using all of their capacity to export to New England?

A. From the ISO, directly from the source, because I believe ISO releases information on energy flows on interties. And if it's not from the ISO, I think there might be a public OASIS site that allows you to track those.

If you will, I might want to see if I've actually been more specific.

Q. I was going to say, can you give us a reference?

(Witness reviews document.)

A. I specifically recall, and this would have been at some point last year, finding very specific data on energy scheduled flows on Phase I and Phase II interties. And I thought it was generated by a Counsel for the Public data request, but it might have been coming out of an informal data request. If
it's -- I'm very confident it's somewhere in
the record. If you don't mind, we can look
for it afterwards and --

Q. I would appreciate that.

And then lastly, I know you filed
rebuttals, Rebuttal Testimony after Counsel
for the Public and other parties filed their
initial testimony and filed Supplemental
Testimony.

We also received as part of Public
Comment a report issued by a Susan Tierney of
Applied Research. Did you have the
opportunity to review that? It was just
filed as part of the Public Comment.

A. Which? Do you know --

Q. I believe the name of the company is Applied
Research. Susan Tierney was the author.

A. So, Susan Tierney works with Applied --
sorry -- with Analysis Group. But what's the
date of the --

Q. My recollection is it was one day before you
filed your Supplemental Report, if I remember
correctly.

A. I think I've seen trade press mentions of
that report.

Q. Have you had any opportunity to review it?
A. I have reviewed it on a cursory level. I haven't necessarily dug into it sentence by sentence. But on a cursory level I have.

Q. On a broad scale, they say that your report basically only lists the positives and not the negatives. I think you've heard a little bit of that earlier today. Is there any response that you have to that --
A. I think --

Q. -- other than what you've already told us today, obviously?
A. So I think they were focused -- I thought the Sue Tierney report was focused really on electricity market impacts, not the local economic elements. So it wouldn't really relate to some of the specific discussions we've had about local economic impacts during -- like the temporary economic impacts during construction.

I think her concern, broadly speaking, is that somehow I have not taken into account -- I've just assumed away that there
would be no retirements. And frankly, she hasn't read my report to make that assumption, I think. Our Original Report went through in detail, our updated analysis, all the data discovery that we did through the technical sessions, I think that should have clarified that this isn't an assumption. This is an outcome of our modeling. We've done a very detailed analysis, and we believe that, based on the projections in our modeling, there isn't an outright retirement of specific generators.

In the past, Ms. Tierney has worked with NEPGA, so that was a concern in the past for her as well. So we're not creating a situation where we're replacing one megawatt of Northern Pass for one megawatt of capacity that is exiting completely from the market, retiring because of Northern Pass. There will be dynamic effects as we've talked about, dynamic delists for some time frame. As with any competitive market, when you introduce new supply, it means that somebody else is running less, operating less the more
expensive supply. That's a competitive market outcome. But it's not necessarily what she I think took away from our report.

Q. Thank you. When you get that reference, if you could just have counsel provide it to me, we'll make it available to everybody.

A. Thank you.

CHAIRMAN HONIGBERG: All right.

We're going to need to break now for the evening. Commission Bailey still has some questions she wants to follow up on, and I know Attorney Needleman has some redirect.

Ms. Monroe, you have a list of the various requests that have been made of Ms. Frayer. You can go over those with Mr. Needleman and make sure that everybody is on the same page with those.

All right. Is there anything else we need to do this evening before we come back? Yes, Ms. Manzelli.

MS. MANZELLI: Thank you, Mr. Chair. My understanding was that we were to have a discussion about the sequence of subsequent witnesses. Would that occur after
the conclusion of this witness?

CHAIRMAN HONIGBERG: The "we" in that sentence would not include us. I think such a discussion has been going on during the day. And when we adjourn, I'm sure people will catch up on that.

MS. MANZELLI: Thank you.

CHAIRMAN HONIGBERG: Anything else?

[No verbal response]

CHAIRMAN HONIGBERG: All right. Thank you all. We are adjourned for the night.

(Whereupon the hearing was adjourned at 5:46 p.m.)
CERTIFICATE

I, Susan J. Robidas, a Licensed Shorthand Court Reporter and Notary Public of the State of New Hampshire, do hereby certify that the foregoing is a true and accurate transcript of my stenographic notes of these proceedings taken at the place and on the date hereinbefore set forth, to the best of my skill and ability under the conditions present at the time.

I further certify that I am neither attorney or counsel for, nor related to or employed by any of the parties to the action; and further, that I am not a relative or employee of any attorney or counsel employed in this case, nor am I financially interested in this action.

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ADJUDICATORY HEARING    June 13, 2017

147:2;151:11; 164:20;170:6
abnormal (3) 49:18;50:13; 150:20
above (7) 29:24;30:9;39:24; 41:7;58:24;74:18; 119:21
absolute (3) 121:13;135:23; 142:2
AC (2) 23:17,20
accelerate (3) 167:15,20,24
accept (3) 42:5;56:11,15
access (3) 22:21;23:23;38:11
accommodate (1) 71:24
according (3) 19:4;48:10; 170:13
account (7) 50:12;103:17,19; 105:4;159:4;187:8; 191:24
accountants (1) 114:9
accounting (1) 85:4
accounts (6) 107:23;111:12,14; 145:7;8;146:23
accrete (1) 15:4
accuracy (1) 92:16
accurate (2) 104:14;131:9
achieving (1) 16:15
across (6) 91:1;123:4;131:1; 132:1;134:22;171:14
Action (1) 39:14
activities (4) 69:13;92:23;111:1; 151:7
activity (8) 67:8,83:5;98:13; 107:12;111:15; 114:19;115:14; 123:18
actual (17) 43:19;65:2,18; 68:4;81:2,14;84:14; 108:16;110:11; 111:11,14,15,23,23; 129:11;135:4;178:14
actuality (1) 29:2
add (8) 6:4;11;23;43:5; 81:11;118:7,7; 172:18;173:4
added (5) 14:1;19;10;65:21; 73:18;141:7
adding (3) 19:4;25;17;28:19
addition (5) 50:1;68:6;73:1; 155:23;182:7
additional (10) 30:8,12;31:9; 44:15,20;75:12; 83:16;111:20; 157:10;173:16
additive (2) 12:27,4;14
address (1) 118:15
addressed (1) 93:15
addresses (1) 146:9
adequacy (1) 16:5
adjourn (1) 194:5
adjourned (2) 194:12,13
adjusted (1) 79:6
adjustment (1) 90:23
advance (1) 41:8
AEO (6) 137:9,12,14;23; 138:5,139:11
affect (4) 123:13;154:4; 163:2;172:10
affected (2) 67:12;103:23
affects (2) 133:7;155:15
AFTERNOON (9) 3:1,9;10;75:16; 77:11,12;130:21,22; 142:19
afterwards (1) 190:3
again (46) 5:10;7;17;8;4;12;4; 21:14;20;15;9;30;6; 37:8;38:12;47:6; 51:17;52:20;53:10; 54:16;58:15;18; 59:20;24;60:11; 65:17;99;11;82;4; 86:17;88;23;89;4; 90:20;100;7;101;6; 15:15;18;118;20, 24;125:19;142;1; 147:7;23;165:10; 174:9;18;175:11; 178:8,12;180:1; 186:17
against (4) 28:23;39:20,21; 62:3
age (3) 86:7,13;87:13
agencies (2) 107:16;145:9
agency (1) 78:2
aggregate (1) 12:21
aggregated (1) 87:17
agreed (1) 59:2
agreement (9) 29:20;30:6;57:1,2; 12;17;58:3,17,19
agricultural (1) 107:9
ah (1) 101:19
ahead (2) 20:8;149:21
Air (2) 140:22,22
Alabama (1) 95:14
albeit (1) 168:7
algorithms (1) 70:8
all-in (1) 17:9
allow (3) 26:3;86:5;90:18
allowance (1) 141:13
allowed (2) 63:7;82:10
allows (6) 28:24;70:13;71:2; 91:7;186:4;189:12
almost (2) 164:1,2
alone (3) 18:8;157:9;167:9
along (1) 86:4
alternative (2) 32:22,34:4
alternatives (5) 32:22;34,21,22; 166:8
although (8) 23:20;69:7;102:20; 104:17;110:2;115:1; 159:10;160:20
always (4) 157:6;171:9; 176:11;181:13
amazing (1) 80:7
amenities (1) 130:11
American (1) 82:1
amortization (9) 55:8;56:11;57:5,8; 58:20;59:10;178:1,3, 9
amortizations (1) 59:8
amount (11) 15:22,16:2;36:20; 40:8;69:17;89:1; 90:3,8;13;97:4;122:2
amounts (4) 40:6;141:13; 168:24;169:7
analogy (1) 45:8
analyses (2) 138:21,144:5
analysis (84) 5:3;9;22;17:1; 18:3;25;23;33:12; 34:3;35;20;36:12,14;
(3) beget - capture
deal (1)

151:17

deal (1)

96:11

debates (1)

182:4

debt (1)

155:21

decide (4)

48:2;60:6;62:16;

88:18

decided (1)

165:3

decision (7)

166:21:167:2;

168:5,13:173:17;

175:15:187:17

decision-makers (1)

184:1

decision-making (2)

183:16,18

decisions (3)

187:14,16,18

declining (1)

40:14

default (4)

54:2,3,4,13

defaults (1)

53:10

defer (2)

173:20;174:14

deferring (1)

63:5

define (1)

32:19

defined (3)

63:24;115:11;

146:12

definitely (6)

47:15;88:11:89:14;

126:3;143:21;144:8

definition (1)

54:16

definable (1)

104:6

to definitively (3)

101:2;143:11;

177:17

degree (1)

130:5

delays (3)

99:1;101:7,12

delist (28)

40:21;41:1,4,6,9;

11,18;42:2,45:5;

48:4,5,12,13,17,18;

21,60:7,17,165:8,11;

12,166:11:167:13;

168:11,16;169:11,12;

174:12

delisted (1)

40:23

delisting (2)

164:23;165:7

delists (12)

18:13;39:6;41:17;

60:20;165:1;167:6;

168:19,23,24;169:3;

7;192:21

deliver (4)

23:4;33:19;76:8,8

deliverable (1)

57:21

delivery (1)

137:17

delve (1)

97:23

demand (13)

35:6;40:15,17;

42:7;43:19,23,50:21;

51:3;59:14;80:8;

164:6;178:5;186:23

demands (1)

67:24

demographics (5)

86:6,12;87:4,11,14

demonstrate (1)

51:24

demonstrated (1)

17:1

demonstrative (1)

17:13

Department (1)

146:6

depending (5)

146:6

deploy (2)

121:19;123:16

depreciate (1)

28:24

depreciating (1)

28:18

deriving (1)

83:15

Des (4)

21:5;23:5;25:10;

26:7

describe (2)

44:7,118:3

describing (1)

99:13

description (1)

101:9

designed (5)

15:21;16:9;71:24;

73:5;107:1

destination (2)

25:7;33:21

detail (10)

85:7;99:5,8;

101:22,24;116:12;

164:23;165:7

delists (12)

18:13;39:6;41:17;

60:20;165:1;167:6;

168:19,23,24;169:3;

7;192:21

deliver (4)

23:4;33:19;76:8,8

deliverable (1)

57:21

delivery (1)

137:17

delve (1)

97:23

demand (13)

35:6;40:15,17;

42:7;43:19,23,50:21;

51:3;59:14;80:8;

164:6;178:5;186:23

demands (1)

67:24

demographics (5)

86:6,12;87:4,11,14

demonstrate (1)

51:24

demonstrated (1)

17:1

demonstrative (1)

17:13

Department (1)

146:6

depend (9)

12:15;78:18;80:19;

93:21;166:17

depends (7)

70:1;80:20;100:8;

138:23;139:17;

163:2;166:7

deploy (2)

121:19;123:16

depreciate (1)

28:24

depreciating (1)

28:18

deriving (1)

83:15

Des (4)

21:5;23:5;25:10;

26:7

describe (2)

44:7,118:3

describing (1)

99:13

description (1)

101:9

designed (5)

15:21;16:9;71:24;

73:5;107:1

destination (2)

25:7;33:21

detail (10)

85:7;99:5,8;

101:22,24;116:12;
II (8)
37:11,13,22,38:2; 110:8,111:9,189:3; 21
illustrative (1)
101:5
imagine (9)
78:12,89:4,92:3; 112:1,17;124:12; 145:24
imaging (1)
180:8
IMAPP (2)
70:21;72:17
IMM (8)
35:16,36:11,51:24; 52:14,21;53:6,18; 56:10
immediate (1)
14:7
immediately (1)
136:17
IMM's (1)
30:15
impact (23)
9:16,18,22,24; 57:8,76:19;119:22; 194:3
include (1)
100:1
includes (5)
66:24;67:1
induced (49)
153:14,161:17
indirect (17)
64:1,3,8,15,16,24; 66:13,17,83:22; 110:5,15,112:12; 113:1,120:4,10; 156:9,14
individual (2)
8:2,24;15
individually (1)
119:5
induced (49)
indicates (2)
177:8
implications (1)
183:21
implicit (2)
110:16,116:24
implies (1)
84:4
import (1)
31:16
important (9)
15:12,29:9,108:20; 125:11,137:6,143:3; 168:17,184:19; 187:13
importantly (2)
56:16,68:15
imports (9)
36:10,13,48:15; 52:22,24,53:1,60:7; 166:9,174:11
impression (5)
10:3,10:19:1,4; 152:3
impute (1)
111:16
Inc (1)
78:8
include (10)
9:16,18,22,24; 57:8,76:19;119:22; 194:3
included (4)
19:22,30:15,32:6; 77:4
includes (5)
65:20,68:6,105:22; 119:11,17
including (1)
145:11
income (2)
113:17;123:17
inconsistent (2)
64:9,14
incorporated (4)
31:18,78:8,146:13, 14
increase (5)
44:17,46:17,67:7; 102:17,130:2
increased (2)
102:3,4
increasing (2)
28:22,44:18
increment (2)
28:19,40:6
incremental (9)
increments (1)
168:24
indicated (2)
153:14,161:17
in-house (1)
184:7
initial (2)
81:23,190:8
Initiative (1)
78:7
initiatives (1)
74:20
input (12)
6:24,83:3,85:10; 137:12,148:22; 151:8,21,24;180:3, 12,13,15
inputs (7)
56:7,93:5,107:8; 150:3,3,164:23; 180:1
inserted (1)
36:8
inside (1)
69:15
insight (1)
143:23
install (1)
84:8
installed (2)
46:14,47:4
instance (2)
139:1,182:23
instead (2)
5:20,110:3
insurance (3)
49:17,22;50:8
integrated (1)
134:14
Integrating (1)
70:22
intent (2)
93:1;172:13
intend (1)
17:3
inflationary (1)
6:21
inflation (3)
7:7,10,8,10
intentional (1)
16:17
intentionally (1)
15:14
interactions (1)
93:24
interconnect (1)
177:15
interconnection (1)
28:14
interconnection (1)
170:12
interest (1)
145:24
interested (8)
73:12,86:5,87:3,6; 10,15,88:17,115:15
interesting (3)
102:9,15,138:11
interfaces (3)
38:12,135:14,24
interim (1)
7:21
Internal (4)
34:15,156:3; 176:18,22
International (1)
78:6
interpolation (1)
108:22
INTERROGATORIES (1)
3:7
interrupts (2)
41:14,141:22
inter-temporal (1)
33:22
interpretive (2)
37:13,14
interities (10)
25:1,1,33:19,34:2; 20:36,10,37:10; 52:10,189:10,21
interveners (2)
185:2,186:10
interviews (2)
144:16,20
into (52)
introduce (4)
17:17,19,47:18; 192:23
introducing (1)
17:8
intuitive (3)
116:13,185:7,19
investment (1)
28:21
investments (3)
110:22,174:15; 182:9
involved (3)
79:17,183:15,18
involvement (1)
182:20
SEC DOCKET NO. 2015-06 NORTHERN PASS TRANSMISSION, LLC

DAY 15 - AFTERNOON SESSION ONLY

ADJUDICATORY HEARING

June 13, 2017

T

table (6)  
10:15,22;11:20;  
14:19;36:23;117:18

tables (2)  
6:11;94:4
tail (1)  
102:7
tailor (1)  
91:3
talk (19)  
8:7;9:15;19:13;  
21:20;38:17;50:19;  
51:12;63:14;64:12;  
24:97;16:19;108:9;  
11:8;8;140;18:21;  
143:21;148:4
talked (30)  
8:14;22;11:29;21;  
30:17;48:5;49:16;  
55:12;77:18;82:24;  
83:23;88:14;105:2;  
108:14;114:1;  
119:16;121:5;  
142:21;144:3;145:1;  
147:15;156:7;  
164:22;168:7;170:4;  
171:10;177:17;24;  
179:12;192:20
talking (47)  
5:4;8:24;9:19;  
24:23;31:4;32:18;  
38:8;50;4;51:23;  
64:11;71;17;89:20;  
94:14;102:10;  
104:11,16;20;106:22;  
114:4;115:19;  
116:23;140;24;

110:24;138:23;178:7

110:24;138:23;178:7

51:7

51:7

summing (1)  
119:1

summing (1)  
119:1

superficial (1)  
101:18

superficial (1)  
101:18

supplant (1)  
19:24

supplant (1)  
19:24

Supplemental (5)  
184:12;185:15;  
186:9;190:8;22

System (2)  
22:22;23;110:12;  
22:23;24;12:5;3;  
12:28;13;32:10;  
40:12;43;3;50:7;  
51:16;82:2;132:6;  
135:13;16;176:19

system-backed (1)  
31:16

systems (2)  
35:19;107:17
73:8
upon (2)
79:1;179:18
Upstate (1)
34:6
urban (2)
107:2,2
urge (1)
143:21
usable (1)
57:9
use (36)
4:10;7:4;11:4;
12:8;22:24;23:15;
34:19;35:19;36:3;
37:15;47:22;51:16;
58:7;59:8;60:1;
68:13;78:13;16:17;
79:21;81:2;82:15;
19:90;19:93:2;111:1;
134:19;20:136:12;
147:5,10;171:11;12;
178:4
used (24)
6:17;50:11;59:13;
70:11;80:11,13,14,
19:81;16;82:8;99:15;
100:24;102:16;
125:3;13:1;132:20;
137:9;19:22;144:5;
147:19;157:12;
183:24;189:4
useful (4)
26:22;58:9;86:3;
154:7
user (1)
134:16
uses (2)
57:3;123:17
using (13)
4:21;25:3;58:22;
82:1;4;107:17;110:2;
115:21;128:6;
134:18;176:5;
188:22;189:6
usually (2)
58:11;79:13
utilities (2)
10:13;182:13
utility (4)
68:12;17:121:18;
127:20
utilization (1)
38:1
utilized (1)
34:3
6:4,13;7:13,18:8:13,
15:16,18,18:20,24;
9:1,12,14,18:10;23;
13:1,15:1,2,26:1;
31:20;34:4;40:15;
47:12;69:15;73:18;
102:22;162:24
values (2)
7:23;163:4
variable (4)
76:11,16;141:12;
180:3
variety (1)
25:5
various (6)
92:22;93:7;121:14;
164:14;177:17;
193:14
vein (1)
153:13
verbal (1)
194:10
verified (1)
111:7
verified-after-the-fact (1)
111:5
verify (10)
108:10
Vermont (3)
170:13;171:15,22
version (6)
55:20;82:7;88:4;
89:12;140:23;176:22
versions (1)
82:8
versus (4)
116:13;164:11;
176:5,21
viable (1)
36:4
view (4)
72:21;122:10;
158:9;170:21
viewing (1)
21:17
vintage (1)
137:24
vintages (1)
177:17
visit (1)
80:5
vocal (1)
90:17
voltage (3)
136:1,2,4
volume (1)
42:24
volumes (3)
33:4;102:17;
168:21
vortex (2)
50:15;51:2
vortices (1)
51:15
voucher (1)
102:10
vouchers (1)
115:7

W
wages (1)
83:7
walk (1)
81:19
wants (8)
24:1;42:6;52:2;
53:12;55:4;75:22;
188:13;193:11
warm (1)
128:21
wave (1)
157:6
waves (3)
51:2,6,14
way (63)
15:7,8;16:12;23:7;
35:8,21;36:9;40:3;
18:41;24:12;13;
46:23;50:2;64:14;
65:23;66:1,6;89:6;
77:8,10;80:15;
86:23;87:5,8;88:13;
89:19,20;93:20;
91:24;92:12;97:15;
99:23;103:3;24;
110:20;113:15;
114:17;115:11;83;
119:14;125:16,19;
126:6;130:23;136:7;
142:23;146:3;147:3;
152:19;162:4;175:1,
176:11;177:7;
179:3,4,5,6;183:9
ways (7)
26:17;83:19;84:5;
110:12;113:1;
121:19;178:15
weather (13)
49;18:50;6:10,11,
13,14,17;20,22,51:5,
8:12,13
weather-normalized (1)
50:17
Weathersby (7)
90:11;142:13;
149:22;152:10,11,12;
187:15
web (1)
26:13
week (6)
19:17;29:21;63:20;
89:104:21;108:4
weeks (2)
97:20;104:22
welcome (1)
53:14
weren't (2)
129:16;144:17
Western (3)
34:7;37;16,17
what's (10)
19:7;42:11;69:21;
110:3;135:1;162:6;
164:16;168:3;
174:19;190:19
whatsoever (1)
152:4
wheelhouse (1)
121:22
whenever (1)
150:22
whereas (1)
55:1
Whereupon (1)
194:13
wherever (1)
170:7
Whitaker (9)
99:11,21;142:10,
14,16,18,17:15;
149:19;150:8
white (1)
187:17
whole (5)
45:4;71:23;121:23;
122:13;186:3
wholesale (16)
5:4,18;11:12:13,6;
9:18,21;14:18;38:17;
50:3;124:159:12;
160:20;165:16;
179:18
who's (2)
21:1;52:4
willing (4)
40:5;42:4;56:14;
171:11
win (1)
159:5
wind (1)
74:24
win-win (1)
74:8
wire (1)
58:23
within (15)
22:12,13;29:8;
32:8,56;24:84:14;
85:1,86:13;87:6,9;
91:21,95:2;114:2;
115:17;135:12
without (11)
10:18;13:5;34:5;
36:21;38:5,9,10;72:4,
117:7;4171:1
Witness (21)
55:23;66:20;69:4,
23:75;28:24:88,3,
<table>
<thead>
<tr>
<th>4 (2)</th>
<th>4:4;16</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 (6)</td>
<td>8 (1) 114:20</td>
</tr>
<tr>
<td>40-month (2)</td>
<td>8.6 (2) 13:12,22</td>
</tr>
<tr>
<td>40-year (5)</td>
<td>81 (2) 36:19;59:20</td>
</tr>
<tr>
<td>41 (1)</td>
<td>82 (1) 4:5</td>
</tr>
<tr>
<td>427 (1)</td>
<td>83 (1) 63:21</td>
</tr>
<tr>
<td>43 (2)</td>
<td>880 (1) 132:17</td>
</tr>
<tr>
<td>46 (1)</td>
<td></td>
</tr>
<tr>
<td>47 (1)</td>
<td>90 (1) 38:3</td>
</tr>
<tr>
<td>49 (3)</td>
<td>90-percent (1) 51:5</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5 (3)</td>
<td>95 (2) 122:18,20</td>
</tr>
<tr>
<td>5:46 (1)</td>
<td></td>
</tr>
<tr>
<td>50 (5)</td>
<td>500 (5) 39:12;61:13;17;</td>
</tr>
<tr>
<td>550 (2)</td>
<td>62:12:148:12</td>
</tr>
<tr>
<td>58.3 (1)</td>
<td>38:23:39:12</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (1)</td>
<td>6 (1) 114:20</td>
</tr>
<tr>
<td>61 (1)</td>
<td>61.6 (1) 13:22</td>
</tr>
<tr>
<td>61.6 (1)</td>
<td>13:11</td>
</tr>
<tr>
<td>7 (1)</td>
<td></td>
</tr>
<tr>
<td>7,954 (1)</td>
<td></td>
</tr>
<tr>
<td>70 (1)</td>
<td>70-sector (4) 82:4,9,14;107:11</td>
</tr>
<tr>
<td>72 (1)</td>
<td>97:10</td>
</tr>
<tr>
<td>76 (1)</td>
<td></td>
</tr>
<tr>
<td>76 (1)</td>
<td>154:9</td>
</tr>
<tr>
<td>7-percent (2)</td>
<td></td>
</tr>
</tbody>
</table>