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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)

Cmsr. Kathryn M. Bailey Public Utilities Comm.
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

I N D E X

WITNESS: FRAYER:

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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

1 in my pocket today is worth more to me than a
2 dollar in my pocket at some time in the
3 future.

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

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

8 Q. The March testimony.

9 A. Testimony. Okay.

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

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

16 Q. Okay. So on those pages, bottom of Page 4,
17 the top of Page 5, you say that over the
18 11-year modeling horizon, the net present
19 value of \$602 million in annual savings
20 translates to \$4.5 billion in 2020 dollars
21 using a 7-percent discount rate. You see
22 that?

23 A. Yes, I see it.

24 Q. Okay. Can you tell me how you calculated

1 that? Not the discounted cash flow model,
2 but how did you get -- where did you do the
3 present value calculation in that analysis?

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

9 Q. Figure 1?

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

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

17 Q. Right.

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

24 Q. But the bars are nominal?

1 A. The bars are nominal.

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

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

8 Q. That's essentially what it does?

9 A. Yeah.

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

14 A. Well, when we show annual results, we want to
15 specify it's nominal because we don't want
16 there to be confusion about the appropriate
17 level of the discount rate to be used,
18 because there's others in the industry that
19 sometimes do their forecast in real dollars.
20 So, for example, in today's dollars, they
21 would do so by taking the inflationary
22 element that's naturally present, let's say
23 in gas prices, taking it out before they put
24 that input into the model, and so what

1 they're producing would be annual effects in
2 real dollar terms. And if you're already
3 presenting results in real dollar terms, you
4 wouldn't use a discount rate that is
5 associated with nominal dollars. So it's
6 just for clarity so that there is no
7 confusion that there's inflation present in
8 our numbers.

9 Q. Okay.

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

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

19 A. So, basically the calculation would start
20 with these nominal dollars by year, and there
21 would be an interim step that frankly Excel
22 does for us, where each of these annual
23 values get converted to whatever you choose
24 to be the starting point. We did 2020

1 dollars into 2020 dollars. And then there is
2 a summation of those individual bars.

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

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

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

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

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

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

23 Q. No. Sorry, not the difference between net
24 present value and nominal. I'm talking about

1 the difference when you say net present value
2 or present value.

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

4 Q. It's the same thing.

5 A. Yeah.

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

8 A. Yes.

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

15 A. Well, we do. So when we talk about
16 cumulative sum, we make sure that we include,
17 where appropriate, references to the net
18 present value, the discounted total. But
19 when we're talking about annual averages, we
20 wanted to present it in its raw form that
21 comes out of the model because this is a
22 multi-year analysis. And we don't want to
23 say to a customer, you know, ten years from
24 now you'll be paying -- just as an example --

1 let's start with a premise that today's
2 price, round numbers, is \$40. And you don't
3 want to give them the false impression that
4 in real dollar terms, ten years from now
5 you'll still be paying \$40, because really
6 ten years from now they'll be paying a
7 nominal, they'll be paying whatever is the
8 price with all that inflation that has built
9 up over time. So we didn't want to undermine
10 the impression that inflation has an impact
11 on the cost that we see recorded and we
12 observed that are reported by ISOs, by
13 utilities on the bills. Those are in all
14 nominal dollars terms.

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

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

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

24 A. I could.

1 Q. Will you?

2 A. We'd be happy to do that, yes.

3 Q. Okay. Thank you.

4 A. We would use the same 7-percent discount
5 rate.

6 Q. Okay. That's fine.

7 All right. Now, Mr. Quinn testified
8 that of the \$3.8 billion in savings projected
9 over the life of the Project -- and I believe
10 that the energy and capacity savings were
11 only for ten years -- of the \$3.8 billion,
12 \$800 million was from electricity wholesale
13 market savings. And I don't think he updated
14 his number after you updated your number, so
15 those are based on probably old numbers. So
16 I don't know if you can do this translation
17 in your head, but I was wondering if you
18 could show me how you get to that \$800
19 million for New Hampshire savings from these
20 numbers in this table, how you would do it.
21 Do you take the average nominal number and
22 multiply it by 10 for the capacity market and
23 by 11 for the energy market and you add them
24 together?

1 A. So the energy market and the capacity market
2 savings are additive.

3 Q. I understand.

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

7 Q. Thirteen?

8 A. I was going to use --

9 Q. Or Figure 1?

10 A. -- Figure 10.

11 Q. Oh, sorry. Ten, yeah.

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

20 Q. Right.

21 A. So, again, behind this aggregate New England
22 number, we do have a New Hampshire number.
23 So I'm happy to provide it if that's helpful.
24 But as a rough check, I would say that even

1 on a net present value basis, probably that
2 10 percent -- sorry. I should step back and
3 say on a New England-wide basis, energy
4 market benefits on an annual average basis
5 without discounting are about 10 percent of
6 the total wholesale electricity market
7 benefits. A little bit more, but in that
8 ballpark. And you can tell that from
9 Figure 1 because wholesale electricity market
10 benefits, annual average in nominal terms for
11 New Hampshire is 61.6, and energy markets are
12 8.6, and capacity markets are 58.3. There's
13 a little bit of a distinction here because we
14 have different years we're modeling. But if
15 you have the underlying data, it basically
16 gives you about a 10-percent portion. So
17 energy market benefits are about 10 percent
18 of the wholesale electricity market benefits.

19 Q. Okay. So then let's go back to Figure 1. So
20 if the energy markets benefits are 10 percent
21 of the wholesale market, why is -- I mean,
22 8.6 isn't 10 percent of the 61.

23 A. Because we're talking slightly different time
24 frames. And this is why in parentheses we

1 unfortunately added 10-year, 11-year. As
2 soon as the Project begins operations, it's
3 electrified, energy flows will start going
4 down the Project, and that will start
5 creating energy market benefits. But because
6 of the timing of the capacity auctions, those
7 won't be immediate. There's a little bit of
8 a gap between start of operations and when
9 the capacity supply obligation will begin,
10 and that's causing the annual average
11 disconnect. It's not a rounding error. It's
12 just a disconnect. But there's no disconnect
13 in the underlying year-by-year numbers.

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

17 A. Correct.

18 Q. -- in the wholesale market.

19 A. In this table, just for presentation.

20 Q. Yeah. Okay. So, again, getting back to how
21 much we think we're going to, New Hampshire
22 is going to save from this project, in
23 nominal terms, it's \$61.6 million a year.
24 And you're going to tell me what it is in

1 present value terms.

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

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

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

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

1 A. I think so.

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

4 A. Yes. And the reason we're getting capacity
5 is because we want resource adequacy.

6 Q. Yes.

7 A. We want reliable service.

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

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

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

24 A. So the capacity market savings, as we've also

1 demonstrated in our analysis, aren't going to
2 last forever. They're going to eventually go
3 away because the market will re-balance back
4 to that equilibrium point where it's
5 targeting or trying to converge with the cost
6 of new entry. But there are nevertheless
7 savings over some time frame because we are
8 introducing new supply, new supply that's
9 lower cost on an all-in basis that creates
10 that supply shift to create a lower price.
11 So I would agree with you that you can't have
12 capacity market savings forever, and that's
13 demonstrative of that convergence. But I
14 don't think the convergence principle
15 undermines or obviates the fact that we can
16 create savings. We will have lower capacity
17 prices when we first introduce the new
18 supply.

19 Q. When you first introduce the new supply.

20 Yup.

21 If Northern Pass causes retirements
22 which don't occur in the Base Case, would the
23 capacity market savings be less than you
24 predicted?

1 A. We had a bit of a discussion I think on this
2 at one point, and my answer is: If we were
3 doing a static analysis and we said Northern
4 Pass causes a retirement and that's it,
5 there's nothing else, then that retirement is
6 a form of re-balancing of the market in
7 response to Northern Pass. So in isolation,
8 that piece alone would reduce the capacity
9 market benefits. But we can't do that in
10 isolation.

11 Q. So what else would offset it?

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

17 Q. Right.

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

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

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

24 A. We didn't include it because the model didn't

1 predict or project that there would be any
2 retirements. So it wasn't an assumption; it
3 was an outcome of the model.

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

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

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

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

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

1 the old plant.

2 A. Hmm-hmm.

3 Q. Do you remember that?

4 A. Yes.

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

7 A. It did. It bid in the --

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

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

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

19 A. Yes, it's a timing issue.

20 Q. Okay. Thank you.

21 Okay. I looked at the TSA because
22 there's been a lot of, I think, conflicting
23 information, but maybe it's just a
24 misunderstanding of terms in the record about

1 who's going to pay for what. So,
2 Hydro-Quebec TransÉnergie, that's HQT; right?

3 A. Yes.

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

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

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

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

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

17 A. HQP will be viewing -- no. Let's step back.

18 I think you had said just a second go,
19 so HQP will pay a tariff. Right.

20 Q. We didn't talk about tariffs yet.

21 A. Okay. So maybe if I can explain it, it
22 might -- I hope I can get to your answer, but
23 I want to explain it in maybe a little bit of
24 a linear fashion.

1 Q. That's what I -- I would love linear.

2 A. Okay. So like we just discussed,
3 Hydro-Quebec Production is the entity that
4 operates generation and is essentially the
5 exporter, the ones that -- the entity that is
6 scheduling and making transactions to
7 external markets outside Quebec. And it
8 makes revenues on those sales. It is not
9 considered technically as closely regulated
10 as HQ Distribution. HQ Distribution, which
11 we haven't talked about, is the entity that
12 operates within Quebec to service customers
13 within Quebec.

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

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

18 So, HQP, in the normal course of
19 business, because it's already exporting
20 power to other markets outside Quebec, has to
21 pay a standard transmission tariff for access
22 to HQT system in Quebec, because all of their
23 exports, the power for the exports originates
24 somewhere in Quebec. So they need to use

1 already the Quebec system to take that export
2 capacity outside of Quebec.

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

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

17 Q. And that's AC.

18 A. Yes.

19 Q. Okay. And --

20 A. AC, although I think HQ might actually in
21 Quebec have -- HQT in Quebec might have DC
22 components to their system in other places,
23 too. But it's access to their entire system.
24 It's kind of a single transmission-use tariff

1 that they apply to any sales that HQP wants
2 to make outside of Quebec.

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

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

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

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

20 A. There might be this relationship where
21 there's an exchange, I guess, of legal
22 ownership. But essentially, the first thing
23 we've been talking up to this point is the
24 fact that HQP, to make any sales on existing

1 interties or new interties, has to pay a
2 charge to HQT for the Quebec portion of the
3 system, for using the Quebec system.

4 Q. Okay.

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

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

13 A. It is not.

14 Q. So it's not in the tariff today.

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

18 Q. So doesn't that socialize that cost over all
19 Canadian customers?

20 A. It socializes the costs. But in that -- and
21 I think we pulled it up when we were doing
22 this discussion. HQT actually did a
23 financial analysis, because it is regulated
24 by the Quebec regulator, to show that on a

1 net present value basis it anticipates that
2 HQP's payment of the overall just generic
3 tariff will allow it to recover the cost of
4 this incremental project.

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

8 A. No.

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

10 A. Yes.

11 Q. Can you tell me what it is?

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

14 (Pause in proceedings)

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

23 Q. Yes, that would be great. We can make that
24 an exhibit.

1 CHAIRMAN HONIGBERG: Yeah,
2 mechanically, how can we make that an exhibit,
3 Pam?

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

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

10 MS. MONROE: We can find out.

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

13 MS. MONROE: Committee 39.

14 (Exhibit Committee 39 marked for
15 identification.)

16 BY CMSR. BAILEY:

17 Q. So do they pay more -- once the DC line is
18 built, are they going to have to pay more
19 than the \$8.69 per-megawatt-hour price? It
20 seems like they're moving energy from the
21 dams to the converter station, which they
22 would pay \$8.69 per megawatt hour today to
23 do, and then they're moving that energy from
24 the converter station to the U.S. border, and

1 they're still only going to pay \$8.69 a
2 megawatt hour.

3 A. Yes, that's my understanding, notwithstanding
4 that HQT does need to go through cost of
5 service rate applications once in a while, as
6 would be expected from a regulated entity.
7 And down the road, if it determines that it
8 needs higher costs, it may change its tariff.
9 So the tariff isn't set in stone forever.
10 But it is a cost of service tariff. And if
11 you think about it from HQT's perspective,
12 what they're saying is we've identified from
13 our system studies that in order for your
14 interconnection requests to be granted, we
15 need this upgrade. They're very happy to
16 make that upgrade because their original
17 asset base for their entire network is slowly
18 depreciating over time, and they're
19 essentially adding a new increment and
20 upgrade to their rate base in order to -- or
21 as part of this investment. And as a
22 regulated entity, increasing your asset base
23 or replenishing your asset base against what
24 was already depreciated allows them to

1 maintain that same tariff, because in
2 actuality one could argue but for this
3 project, over time their tariff should
4 actually go down. But their tariff is what
5 it is, and it hasn't changed in many years.

6 Q. That's remarkable.

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

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

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

1 but it's --

2 Q. HQP does?

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

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

18 A. So if we can step through them linearly,
19 first and foremost, all the construction -- I
20 believe all the construction costs that serve
21 as the foundation for the cost of
22 transmission service that HQP will be taking
23 on Northern Pass, those go into the
24 calculation.

1 Q. And that's the \$5 million that you just said
2 or --

3 A. No, that's the \$1.6 billion.

4 Q. Oh, no, no, no. I'm talking about -- we're
5 just in Canada now, linearly.

6 A. Okay. I think in Canada, what will likely --
7 the only piece that should be represented in
8 the minimum offer price calculations for the
9 Project would be this additional contribution
10 that HQP will need to make to HQT for the
11 Quebec line, that \$5 million.

12 Q. And what about the tariff cost of the
13 transmission services?

14 A. They will essentially be netted out. And the
15 reason they're netted out, that means zero,
16 is because this is a system-backed import on
17 the Northern Pass Project. And we've
18 incorporated the fact that those energy
19 sales, if they were redirected to another
20 market, would have value. But if they were
21 redirected to another market, they would pay
22 that same transmission tariff. So we could
23 have taken into count the \$8 transmission
24 tariff point-to-point that's payable on one

1 side of the ledger, but we would have also
2 had to take it out on the other side of the
3 ledger when we're counting those opportunity
4 sales, and therefore they would have been
5 netted out. So that's why we say they don't
6 get included, because HQP will sell the
7 surplus energy somewhere. And from a
8 transmission service perspective within
9 Quebec, there is no incremental cost for the
10 Quebec system.

11 Q. Except for the \$5 million.

12 A. Except for that contribution that they do owe
13 funding for.

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

17 A. Yes.

18 Q. And would you, so that we're talking about
19 the same thing, agree that you could define
20 "opportunity cost" as the loss of potential
21 gain from other alternatives when one
22 alternative is chosen?

23 A. Yes, I think that sounds reasonable.

24 Q. Okay. So are you saying that the loss of

1 potential gain is from selling power to
2 Ontario during off-peak?

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

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

9 A. Well, I think that's the same thing. It's
10 consistent with the prior statement, in the
11 sense that what would happen in a world --
12 this is what the opportunity cost analysis is
13 trying to do -- what would happen in a world
14 where Northern Pass wasn't built. And we've
15 established that HQP has surplus energy, so
16 HQP would sell it to another market, would
17 have to sell it into another market where
18 they have the transmission capacity on those
19 interties to deliver it. And we've done a
20 full examination of all the other, what we
21 call "destination markets" for HQ's surplus
22 energy, and it's inter-temporal. It's not
23 just saying, oh, Ontario or New York or New
24 Brunswick. You have to actually look at if

1 they could sell it because of the
2 transmission interties and how they would be
3 utilized. And our analysis suggests the best
4 opportunity, the highest value alternative
5 opportunities in a world without Northern
6 Pass would be Ontario off-peak or Upstate New
7 York, Western New York off-peak.

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

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

12 Q. But Northern Pass doesn't exist either.

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

22 Q. But the alternatives could be to sell it, if
23 Northern Pass doesn't get built, to sell it
24 on another line that doesn't exist yet.

1 A. I think --

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

14 A. So, Commissioner Bailey, I agree with your
15 premise hypothetically. But I think from the
16 perspective of the IMM, they can't establish
17 the opportunity cost on the basis of those
18 hypotheticals. They will point blank need to
19 use the existing systems and infrastructures
20 as part of their analysis. And I shouldn't
21 say "they." I think that the way that the
22 process works is that HQP, or the entity
23 that's providing the qualifications packet,
24 the sponsor that's going through the process

1 with ISO, would basically provide them with a
2 rationale, and they would say, if it's not
3 Northern Pass, then I have to use other
4 projects, other current commercially viable
5 pathways to sell that energy, and it's going
6 to be this, this, this or this point. I
7 can't see how another potential project gets
8 inserted into that equation.

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

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

1 average energy price; right?

2 A. That's correct.

3 Q. And that's much higher than the price of
4 energy that they would get from Ontario
5 off-peak; correct? A lot higher?

6 A. It is higher.

7 Q. Okay.

8 A. And, again, because they have maximized
9 opportunities of selling into New England on
10 existing interties. They are already selling
11 on Phase II, for example. And our analysis
12 of the Base Case assumes they continue to
13 sell on Phase II the existing intertie. So
14 what spare intertie capacity do they have to
15 use, and that's why we have to go off-peak to
16 Ontario or Western New York.

17 Q. And is the Western New York price higher than
18 the Ontario off-peak?

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

21 Q. Okay. And there's no capacity available on
22 the Phase II line to put some of that energy
23 over that line?

24 A. Not significantly. I believe that the

1 phase -- that the capacity utilization
2 factor, capacity factor of Phase II in recent
3 years has been well over 90 percent.

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

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

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

17 Okay. Let's talk about the wholesale
18 capacity market benefits. We have on the
19 record that the Forward Capacity Auction 11
20 cleared with a surplus of 1,760 megawatts.
21 Do you recall that?

22 A. That sounds right.

23 Q. Okay. And recently, another 550 megawatts
24 has given notice that they're going to retire

1 from FCA 12, like in February. I think
2 somebody said that yesterday. Well, let's
3 just assume for the purposes of the
4 question --

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

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

10 A. I think so.

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

15 A. Yes.

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

18 A. Yes.

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

22 A. Yes.

23 Q. And they have 1200 megawatts at \$5.30 per
24 kilowatt month that is over and above what

1 they need to meet the reliability
2 requirements; right?

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

7 Q. Right.

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

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

23 A. Well, the dynamic delisted threshold is
24 higher than even where we were. It doesn't

1 mean that they will delist. There is a
2 threshold set by the ISO for purposes really
3 of easing its burden on how many requests for
4 delist bids it needs to review. So,
5 basically it's kind of like a safe harbor
6 that tells generators: If you want to delist
7 above this price, you have to come to me in
8 advance, and I will review your cost
9 structure to make sure your delist bid is
10 consistent with competitive markets. But if
11 you want to delist in the auction below this
12 price, you can do so if you want, but --

13 Q. And then they can't get back in --

14 (Court Reporter interrupts)

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

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

22 A. It does.

23 Q. -- in the capacity auction.

24 A. Well, it stabilizes. The way I like to think

1 about it, it goes in rounds. If enough folks
2 delist at a certain round price, such that
3 then the total quantity of supply in the
4 market, the remaining quantity that's willing
5 to accept that price equals the total
6 quantity that the ISO wants to buy based on
7 their demand curve, then that means the
8 auction has successfully completed and a
9 price is set.

10 Q. All right. So with a surplus that has the
11 capacity greater than what's needed for
12 reliability, would you agree that the only
13 way that ISO would purchase 1,000 megawatts
14 is if the clearing price was to be either
15 equal or less than the overall cost of
16 capacity in the FCA 11? So if they bought
17 35,000 megawatts of capacity in FCA 11 at
18 \$5.30, if you multiply that by 1,000 to get
19 to kilowatts, and multiply it by \$5.30 to get
20 to kilowatt hours -- kilowatt months and then
21 multiply that by 12 months, it would produce
22 the total cost of the capacity for that
23 auction; right?

24 A. Yes. So the volume procured multiplied by

1 the price represents the total cost --

2 Q. Right.

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

5 Q. So, then, if you add 1,000 megawatts and you
6 go to 36,000 megawatts, the price procured
7 has to go -- it can't -- the total cost has
8 to be less than the total cost at
9 35,000 megawatts if they don't need more for
10 reliability.

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

13 Q. Okay. And do you know what right now the
14 price would have to be to make the result of
15 FCA 12, the total result if they purchased
16 36,000 megawatts, what the price per kilowatt
17 month would be to be under the total cost of
18 the 11 auction?

19 A. So the actual specific demand curves, the MRI
20 curves for FCA 12, I don't believe they're
21 set yet. They will be set shortly, soon, but
22 they will probably shift out a little. But
23 there is some demand growth. We don't know
24 exactly at this stage. But generally

1 speaking -- I'm not sure. Maybe I should
2 start with the answer.

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

7 But I can at least describe
8 qualitatively what I expect to happen if they
9 procure more megawatts in the next auction
10 and they're starting from an oversupply
11 position today, which I think is your
12 premise. Prices will have to go down further
13 than what they were in the last auction, and
14 prices will go down percentage-wise more than
15 the additional capacity they purchased
16 because the MRI curve is curved. It's not
17 linear. It's not if I increase a lower price
18 by one percent, I'm increasing quantity by
19 one percent. No, it's not how it works. And
20 so for each additional megawatt that they're
21 buying, the unit price they're paying
22 everybody is going to be lower, and that
23 means the total cost of the market will be
24 lower if they buy more.

1 Q. Unless it forces retirements.

2 A. Unless it -- so if the price -- unless
3 there's retirements that happen, and then you
4 start the whole story, okay, the retirements.
5 Is there then delist that would have happened
6 that aren't happening? So it's a bit of, I
7 want to call it a daisy chain, but maybe
8 that's not an appropriate analogy. But
9 there's a bit of a daisy chain of
10 consequences that our forecasting models are
11 trying to predict based on what we've
12 observed in other markets from other prior
13 auctions about those daisy chains.

14 Q. And knowing what you know now from Forward
15 Capacity Auction 11, and the fact that
16 there's a surplus, do you still think that
17 there's going to be savings from the capacity
18 auction? What impact will the next capacity
19 auction have on your savings calculations?

20 A. I think, knowing what we know now for FCA 11,
21 we would probably get smaller capacity market
22 benefits in the next auction, but bigger
23 capacity market benefits down the road
24 potentially. So what it does is it changes

1 the time frame. Remember those bar charts we
2 were looking --

3 Q. Yes.

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

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

21 A. So I think there's... I think you're asking
22 about -- I'm not sure I understood your
23 question, so I'm trying to figure out a way
24 to rephrase it to make sure I understood it.

1 Q. Okay.

2 A. I think you're asking about...

3 Q. No retirements, excess surplus and really
4 very little growth in net installed capacity
5 requirements.

6 A. So, given where we are, maybe again you're
7 asking about the kind of situation we are in
8 today; right?

9 Q. Right.

10 A. And if I can expand on my prior answer about
11 why I think there is not a significant
12 material change in the net present value, but
13 maybe in the timing, what I could expect what
14 could happen, hypothetically, is that we are
15 definitely more oversupplied because of
16 FCA 11 than what I had anticipated when I was
17 doing my updated analysis. I recognize that.
18 When we introduce a new project that further
19 reduces the price, it potentially could --
20 and we've already reflected this in the
21 updated analysis. When I say there's no
22 retirements, I really use the "retirement"
23 word singularly. No plants are going to
24 close their doors as a result of the lower

1 price consequence of NPT entering, based on
2 my analysis. But they may decide, and we
3 have that already present in the updated
4 analysis, to delist one year, the dynamic
5 delist we talked about, which is they don't
6 want to take on the obligation for that year,
7 for that period. And as capacity prices over
8 time come back, they may come back into the
9 capacity market. And when they do come back
10 into in the capacity market, it creates a
11 consequence. So let's take it piecemeal.

12 So if there is a delist, a dynamic
13 delist, and we've had that, we actually show
14 those in the updated analysis. And even in
15 the original analysis, imports, for example,
16 are very price-sensitive. They can
17 dynamically delist. We also had a generation
18 unit delist for a little bit in the updated
19 analysis. That means that in those years the
20 capacity market benefit isn't as big as it
21 would otherwise be, because once they delist,
22 they stop the price from going down further.
23 But then, once they return, they keep the
24 price, the capacity price from going back up.

1 And what it does is it tends to extend the
2 capacity market benefits. They might be
3 smaller each year, but they will last longer
4 because of the dynamic.

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

11 A. Yes.

12 Q. Okay. Thank you.

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

14 Q. That's good. Thanks. Okay.

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

20 A. Yes.

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

24 A. Yes.

1 Q. In addition to what you already calculated?

2 A. Yes, and it's because the way that we
3 calculated the wholesale energy and capacity
4 market benefits that we've been talking about
5 for the last few minutes is on the basis of
6 normal weather, normal conditions on the
7 system. And so we should think of those
8 "insurance benefits," as I call them, as
9 incremental because they're moving away from
10 normal weather.

11 Q. Okay. But the normal weather that you used
12 to make your predictions takes into account
13 abnormal weather periods. Because isn't it
14 based on historic weather, so it has already
15 the impact from the polar vortex and the
16 high, high temperatures in the past, in the
17 recent past? Wouldn't the "normal weather"
18 have that in it?

19 A. No, not really. So when we talk "normal
20 weather," I'm actually talking what they call
21 the "P50 demand forecast," which is assume
22 that there is normal weather. And it's
23 actually a forecast that ISO prepares. It
24 isn't based on historicals. It's a

1 forward-looking outlook, assuming we don't
2 have polar vortex or heat waves. They do
3 have a demand forecast. They call it the
4 "P90" that then says, no, assume that normal
5 weather has a 90-percent probability of being
6 ceded. So we have basically heat waves
7 because we do it on our summer peak. So the
8 normal weather is not the same as average
9 historical experience. That's what I'm
10 trying to make --

11 Q. Okay. That wasn't my understanding.

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

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

23 When you were talking about who would
24 have to demonstrate to the IMM the ORTP

1 calculations, who would that be?

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

4 Q. Okay. And who's the sponsor?

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

11 Q. Or maybe it's HRE.

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

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

16 A. I actually don't know the answer. They may
17 have. But we haven't had an elective
18 transmission upgrade clear -- well, yes, an
19 elective transmission upgrade like this
20 clear. But, again, the calculation that the
21 IMM is doing is very similar to what they do
22 annually already today for existing imports,
23 many features of that. And they do that
24 repeatedly for all the imports that come into

1 the capacity market because imports
2 actually -- they don't get the benefit of not
3 having to do it next year just because they
4 participated in the prior FCA. They have to
5 do it annually.

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

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

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

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

24 Q. But if they had done it, you would know, and

1 then you would have to argue about why this
2 project was less than the default.

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

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

16 A. Yes, because, again, by definition, it's just
17 a starting price, I believe, of the auction
18 plus a penny. Something like that. So it's
19 meant to trigger a review, really, because
20 they've -- and I think the thinking behind
21 that is those projects are very customized,
22 so they do want them to undergo a review, and
23 they don't feel that they will be
24 overburdened by too many applications for

1 that review; whereas, for certain generation
2 technology, they feel that it's easier to set
3 that generic number, and then if a project
4 wants to have a specific number, they come.
5 But not every single new combined cycle unit
6 would necessarily have to come every year.

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

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

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

17 A. Can I just check quickly?

18 BY MS. BAILEY:

19 Q. Sure.

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

22 Q. Okay.

23 (Witness reviews document.)

24 A. You know what? I would say that it's not

1 confidential because I have a sentence in my
2 report that specifically refers to that
3 number, and it's not marked as confidential.

4 Q. All right. Good. I didn't think it was.
5 The result at the bottom of that spreadsheet
6 is confidential.

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

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

13 A. I don't know for sure, but I am extremely
14 confident that they would be willing to
15 accept that. I think it's industry standard.
16 But more importantly, it's very much
17 consistent with what they're trying to do,
18 which is to measure the true economic cost of
19 this capacity. And one element of the true
20 economic cost of this capacity is the
21 transmission cost for service that HRE/HQP
22 would have to pay to get their capacity into
23 New England, and that transmission cost is
24 basically contained within the four corners

1 of the Transmission Service Agreement, the
2 TSA. And the TSA is a 40-year agreement for
3 transmission service, and it uses -- or it
4 dictates a tariff that HRE would have to pay
5 that is based on a 40-year amortization. So
6 I think with respect to this project, 40
7 years is just the right number.

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

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

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

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

23 Q. But for the U.S. portion of that line, that's
24 not a tariff.

1 A. I think the technical nomenclature is that
2 it's a "participant-funded" Transmission
3 Service Agreement. It's not a reliability
4 transmission project, but a
5 participant-funded project where a rate for
6 transmission service, if you don't want to
7 use the word "tariff," has been determined
8 based on cost of service.

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

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

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

15 A. But again, I think that to the extent any
16 parts need to be replaced, they would be part
17 and parcel of the commercial agreement and
18 the obligation that HRE is taking on. Again,
19 that's a 40-year agreement with a tariff
20 that's based on a 40-year amortization.
21 Again, I think 40 years is quite standard to
22 be using for transmission assets in general,
23 be they composed of just conductor wire,
24 underground, above ground. I don't make that

1 distinction. And I know that other ISOs have
2 generally agreed. There was a little bit of
3 a discussion that New York ISO, which does
4 something very similar to ISO-New England in
5 calculating what they call their "buyer side
6 mitigation" offer floors, has well recognized
7 that it's just obviously not plausible to
8 assume the same generic amortizations you use
9 for generation for transmission. They use a
10 much longer amortization assumption for
11 transmission projects that come through their
12 door as compared to the generic assumptions
13 being used in the equivalency of ORTP or the
14 demand curve.

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

18 A. Yes.

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

24 A. No, it doesn't because, again, we've been,

1 I'm going to use the word "conservative."
2 Everybody hates it. But we've been pragmatic
3 in our forecast. So we've said that as 1,000
4 megawatts clears, there might be market
5 response from other sellers of the capacity
6 that will decide that they don't want
7 capacity supply obligation imports, delist --

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

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

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

19 A. It's actually a retirement, yes. And what we
20 do have is delists. We have market response.
21 There are generators who may not want to take
22 on that performance obligation because the
23 price has fallen, other suppliers leaving.
24 But they may come back once prices recover if

1 it's rational and economic for them to do so.

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

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

7 Q. Yes.

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

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

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

23 Q. Right.

24 A. So I don't know. I think it's a legitimate

1 thought process, probably a consideration
2 they would think through. But it actually
3 goes against -- it goes in the opposite
4 direction by selling less capacity, but
5 having the same total costs that need to be
6 recovered on a net basis after consideration
7 of your energy revenues and so forth. You're
8 actually going to need a higher capacity
9 price or higher offer floor.

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

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

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

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

22 Q. Okay. All right.

23 A. Unless there's a reason they could suggest
24 that it's divisible. So I should correct

1 myself. We had a combined cycle plant that
2 cleared the auction before last, and it only
3 cleared for one unit of a two-unit project.
4 But it had a concrete reason. It was
5 actually deferring construction of the second
6 unit because of some permitting issues. So I
7 think for that reason the ISO allowed it to
8 divide its bid.

9 Q. Okay.

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

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

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

23 A. Yes.

24 Q. And that defined "total jobs" as the sum of

1 direct, indirect and induced jobs. And it
2 says, "Direct jobs are jobs directly related
3 to construction or operation. Indirect jobs
4 are jobs created by businesses to support the
5 workers with direct jobs." And then it says,
6 "Induced jobs are jobs created as a result of
7 spending from workers with direct and
8 indirect jobs."

9 Are those two things inconsistent, the
10 induced spending and induced jobs, or were
11 you talking about two different things?

12 A. I was intending to talk about the same thing,
13 so I apologize if the text appears to be
14 inconsistent. But the way I like to also say
15 it is direct jobs beget indirect jobs and can
16 contribute to induced jobs. But indirect
17 jobs also could contribute to induced jobs.

18 Is that --

19 Q. I think so, yeah.

20 A. So I might have misstated that last piece in
21 the Prefiled Testimony.

22 Q. In the footnote?

23 A. I think the prefiled, because in the footnote
24 it does talk about both direct and indirect.

1 Q. Yeah, all right. Does your analysis
2 calculate actual jobs induced by spending, or
3 is it simply more spending in the economy
4 produces more induced jobs?

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

15 Q. I don't think so.

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

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

23 MR. WAY: Ms. Bailey?

24 CMSR. BAILEY: Yes.

1 MR. WAY: This is Chris over
2 here.

3 CMSR. BAILEY: Chris over where?
4 Oh.

5 [Laughter]

6 MR. WAY: Can I clarify?

7 CMSR. BAILEY: Yes, please do.

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

20 WITNESS FRAYER: Nope. The
21 model is calculating everything simultaneously.
22 The reason I was a little bit confused with
23 Commissioner Bailey's question is there was
24 words about "jobs inducing more jobs" and

1 "spending inducing more jobs." And actually in
2 our model, some categories of the expenditures
3 associated with the construction of the Project
4 are represented as spending for materials and
5 services, and some categories of expenditure
6 are represented as jobs. So we have both types
7 of drivers that increase overall economic
8 activity.

9 But the induced effects are
10 directly being simulated through this, we
11 call it a "computable general equilibrium
12 model" being affected. So the fact is that
13 because we are -- as an example, the
14 compensation rates associated with the
15 Project for some categories of labor are
16 higher than what exists in the economy today,
17 and the fact that they have more money in
18 their pocket induces them to spend on other
19 services, retail services, et cetera, that
20 they wouldn't have otherwise. But we also
21 have more jobs for particular sectors, and if
22 a particular sector has more qualified labor,
23 it also kind of expands, and that kicks
24 off -- it demands other goods and services

1 that are necessary for that industry sector,
2 and that expands the economy, too. So there
3 are multiple channels in the model that
4 reflect how the actual economy works.

5 BY CMSR. BAILEY:

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

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

23 Q. And that's really -- the savings from the
24 electricity market are what produces the

1 economic benefits in the operational years.

2 A. A majority, yes.

3 Q. Okay.

4 WITNESS FRAYER: Does that
5 answer your question, too?

6 MR. WAY: Yes, it does.

7 Although, one question I'm going to have is
8 that there are savings that occur during the
9 operational phase. And if I'm a manufacturer,
10 for example, the idea is that I'll pay less in
11 energy costs, and at some point I'll then take
12 that money and I'll spend it in other places.
13 And for a lot of activities there's a
14 multiplier. There's a tipping point. And I'm
15 just wondering what is that dollar value inside
16 of the modeling where it's assumed that once
17 you reach this amount in savings, a job is
18 created. So, for example, like on some -- you
19 know, it could be federal grants at \$50,000.
20 It's assumed that another job is created. Some
21 it's \$30,000. What's the tipping point for
22 this?

23 WITNESS FRAYER: To tell you the
24 truth, I don't know. It's going to be very

1 sector-specific. I think it depends on whether
2 there's excess capacity, if you will, to expand
3 output or whether -- and at what time that
4 excess capacity materializes. So there's a
5 time element because it is a time-based model.
6 I would need to go into the model, literally
7 sector by sector, and identify where the
8 current model algorithms identify that type of
9 relationship or break point, if you will,
10 because it is a little bit more complex than
11 the typical RIMS multipliers. I've used those,
12 too. But this model is more dynamic and it
13 allows us to model things like these
14 electricity cost savings.

15 BY MS. BAILEY:

16 Q. All right. I think this is my last line.

17 How confident would you say you are that
18 this project will clear the capacity market?

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

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

23 A. I am.

24 Q. And CASPR? I don't know what that stands

1 for, but that's -- you know, there's a
2 substitution auction after that allows
3 subsidized resources like Northern Pass, if
4 it has a PPA, to --

5 A. And if it didn't clear --

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

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

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

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

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

18 The hope is that that proposal, that
19 some fix to the auction process will go
20 through the Markets Committee soon and the
21 Participants Committee and then get to FERC
22 in time for the auction in 2019. And it just
23 seems to me that the whole program is being
24 designed to accommodate laws in Massachusetts

1 that require large-scale hydro so they can
2 recover some of the costs, which seem to me
3 will have to be subsidized with a PPA from
4 the capacity market without impacting the
5 Forward Capacity Market competitive auction.

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

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

15 Q. Okay.

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

23 Q. A what?

24 A. A bolt onto the Forward Capacity Market, like

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

11 So they are proposing this "bolt-on." I
12 think what they're interested in doing is
13 avoiding some of the other proposals that
14 have come in from stakeholders that could
15 create lots of unintended consequences in the
16 Forward Capacity Auction. But they are also
17 trying to create a process which they think
18 is value added to the Forward Capacity
19 Market, where they've also heard complaints
20 from existing generators that sometimes it's
21 not so easy to retire a plant in the Forward
22 Capacity Market. And so this would be an
23 opportunity in the substitution auction for a
24 project that clears the FCA but doesn't

1 really want to continue with its obligation
2 to exit, to retire. So it's a second bite at
3 the apple for those projects that may have
4 not cleared because of the MOPR, and a second
5 bite of the apple for those projects that got
6 a capacity supply obligation but don't want
7 it, to essentially exchange their risks and
8 obligations to get to a win-win situation.

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

23 Q. Like what?

24 A. Like offshore wind, as an example. Just one.

1 Q. But not like Northern Pass or TDI?

2 A. Well, I can't speak to TDI.

3 Q. You haven't analyzed that.

4 A. But I think that I'm very confident that all
5 the numbers are in the right places. This is
6 the cost workbook, and this is what it is.
7 This is the observations that we're getting
8 from those calculations, and they suggest a
9 lot of cushion in there between what the
10 minimum offer price would be and what we're
11 projecting capacity prices to be with that
12 additional capacity.

13 Q. Okay. Thank you very much.

14 A. Thank you.

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

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

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

24 CMSR. BAILEY: Just one thing.

1 BY CMSR. BAILEY:

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

10 A. Yes.

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

14 A. Yes.

15 Q. Okay.

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

19 Q. Does that include the opportunity cost of
20 supply?

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

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

1 A. Yes.

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

5 A. Yes.

6 Q. Okay. Thank you.

7 CHAIRMAN HONIGBERG: Mr. Way.

8 MR. WAY: Thank you, Mr.

9 Chairman.

10 BY MR. WAY:

11 Q. Good afternoon, Ms. Frayer.

12 A. Good afternoon.

13 Q. I'm over here. I wanted to pick up a little
14 bit on what Ms. Bailey stated earlier and
15 focus a little bit on the jobs, the job
16 creation, and maybe take it from the model
17 and bring it to a little bit more to the real
18 world. And some of the things we talked
19 about I'd like to have some clarification on
20 and maybe just sort of bring it all together.
21 I suspect as we go through this, too, that
22 there will be other panel members that may
23 want to jump in on certain points, and I
24 encourage others to do that.

1 And I wanted to focus a little bit on
2 the REMI model. I know in my agency we have
3 a similar model, but it isn't that one. So I
4 really wanted to just get more of a sense of
5 it. And for the record, that's what?

6 Regional Economic Model International
7 Initiative?

8 A. Inc., I think. Incorporated, yeah.

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

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

23 Q. And that's one of my questions. So they
24 actually will do some customization

1 specifically upon request. Do they do that
2 customization, or do you do that?

3 A. They do the customization.

4 Q. All right. And does it --

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

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

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

16 Q. All right. Thank you.

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

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

23 Q. And how often have you taken training,
24 updates of training? When was your last

1 update, I guess?

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

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

12 A. Good question. I think maybe the first time
13 I used REMI was maybe circa 2007, 2008.
14 Before that we had -- we used other tools
15 that might be in some way similar. There are
16 other software out there. IMPLAN is another
17 tool that's kind of similar. There's a few
18 others depending on the jurisdiction outside
19 of the U.S. and Canada that we've used. It's
20 not -- it depends on the geography and the
21 nature of the project. So it's not
22 consecutive from 2007 onwards. We come to
23 them with specific project requests, and they
24 customize models to those requests.

1 Q. So, about ten years of experience with the
2 company. The actual model you use is called
3 REMI PI Plus, REMI pi Plus, however you're
4 calling it?

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

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

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

14 Q. It's the actual tool.

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

18 Q. So I'm trying to get a sense of how -- and
19 maybe we're going to walk through the process
20 a little bit on how we set out the jobs. We
21 start out with something and at the end we
22 have a job estimate. And I sort of assume
23 that we're going to start with the initial
24 project. And I would assume that you're also

1 using the NAICS code, the North American
2 Industry Classification System?

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

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

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

23 Q. Very good. So, moving beyond that, once
24 again to recap I think everything we talked

1 about, the construction team is going to give
2 you an estimate of number of jobs, I would
3 assume, that you then input?

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

21 Q. And I would assume that that gets you to the
22 jobs, and then it spits off the indirect jobs
23 that we talked about earlier and the induced
24 jobs.

1 A. Yes. Yeah. And sometimes we don't enter it
2 as a direct job. In some specific industries
3 we enter it as labor expended in terms of
4 industry sales. But that implies a direct
5 job as well. So there's different ways to
6 model the effects of the spending that
7 Northern Pass would have to be doing locally
8 to construct and install this project.

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

17 A. We didn't, I think, provide this in our
18 report. We did not provide this in our
19 report. I'm trying to think if it was in any
20 of the work papers. I think in some of our
21 work papers it was summarized. For example,
22 there might be a sector like professional and
23 technical services. It's a big enough
24 sector. And different types of categories of

1 jobs may fall within the sector, like legal
2 expertise, professional, certain professional
3 categories of services for let's say
4 accounting and communications and so forth
5 also fall in that. And we had budget line
6 items that had been broken down to that level
7 of detail, subcategories.

8 Q. And that was information that you had
9 provided?

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

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

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

22 Q. Well, for example, if we're looking at
23 occupations, and particularly it could be in
24 a part of the state where you're trying to

1 match up where the skill sets are and if
2 those occupations could even be filled in
3 that area, that might be useful information.
4 And I guess along the same lines, what I'd be
5 interested in is that these models allow you
6 to spit out the demographics as well -- so in
7 other words, male, female employees, age
8 groups, ethnicity. Did you do that as well?

9 A. I will have to check. I'm not sure that
10 ethnicity or sex is actually part of the
11 model. I do believe more high-level
12 demographics, like population, percentage of
13 population within certain age brackets, like
14 labor force-qualified population, is
15 something that it could spit out. But we did
16 not ask the model to document that. But it's
17 something, again, that's there behind the
18 scenes in the model. We simply didn't
19 document it.

20 Q. Very good.

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

23 MR. WAY: If that information is
24 available, that would be good.

1 MR. IACOPINO: And what should
2 we call this list? What would you call it?

3 A. So you were interested in occupations and
4 demographics.

5 BY MR. WAY:

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

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

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

19 A. I've written it down.

20 Q. Thank you.

21 A. And I will do --

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

24 WITNESS FRAYER: I hope not.

1 CHAIRMAN HONIGBERG: So how long
2 do you think it will take to prepare that?

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

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

11 WITNESS FRAYER: Definitely.

12 CHAIRMAN HONIGBERG: All right.

13 BY MR. WAY:

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

24 For a rule of thumb, are you folks

1 assuming that at a certain amount of savings
2 you're more than likely going to see a
3 full-time job or a full-time equivalent?
4 Because I would have to imagine you're
5 thinking of that when you're pitching it to
6 the public.

7 A. So the relationships are being governed by
8 kind of elasticity equations. And I don't,
9 unfortunately, have a rule of thumb for you.
10 I did over the break try to see if I could
11 pull it up, but I don't have a working
12 version of the REMI model here. So it's not
13 something I could answer off the cuff.
14 Again, I could definitely look into it and
15 give you a more proper answer if you'd like
16 in writing.

17 Q. I would.

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

20 MR. WAY: Who are we talking to?

21 MS. MONROE: Pam, down here.

22 Hi, Chris.

23 MR. WAY: We've got to solve
24 this.

1 [Laughter]

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

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

20 A. And is this -- again, our model is New
21 England-wide. Would this be for New
22 Hampshire only? Because I think there are
23 different -- there are different adjustment
24 factors because labor productivity rates are

1 different across the states, too.

2 BY MR. WAY:

3 Q. I would tailor it for New Hampshire.

4 A. Okay.

5 Q. The next thing I wanted to get to, and this
6 is the construction phase. And the thing
7 about the REMI or any model is it allows you
8 to find the target area, I would assume. And
9 I think the hard part as we're all trying to
10 figure out the impact of job creation is,
11 say, for example, if we have an underground
12 corridor. That's going to have a footprint
13 of impact in job creation; would you agree?
14 So in other words, if I'm constructing an
15 underground corridor in Woodstock or
16 Plymouth, chances are that Claremont isn't
17 going to be contributing an awful lot. So
18 when we look at construction statewide, the
19 question would be: Should that, could that,
20 would it have been better to limit that
21 footprint of examination within an effective
22 service area as opposed to statewide? I'm
23 trying to get a sense of how statewide
24 actually contributes.

1 A. Well, I don't think -- so when we say it's a
2 job from in New Hampshire -- and you can
3 imagine this. There's construction work
4 being done in, let's say the seacoast area.
5 It won't be just construction workers that
6 live in seacoast areas. It could be
7 construction workers that live on this side
8 of 101 that are traveling during the day,
9 commuting to the job site. I think that's
10 the level of geography that I can attest to.
11 I can't say that it will be jobs for those
12 occupations that are very localized around
13 the physical geographics of the route. So we
14 didn't get down to county-level data. It is
15 possible to do the REMI modeling on
16 county-level data. But the accuracy of that
17 data, in my opinion, is subject to the level
18 of public information on county-level
19 statistics, which I find in this part of the
20 country not to be the best at really linking
21 back the location of the workers that work
22 and the location of the various economic
23 activities. So, for that reason we kept it
24 at state level.

1 We do know that the Project intends for
2 construction to use construction labor that
3 is from out of state, and we were very
4 meticulous and went back and forth when we
5 were asking for data inputs to have
6 Eversource break that down based on where
7 they think they will pull labor for various
8 stages of the construction of the Project.
9 So we have big direct jobs in Massachusetts,
10 in Maine, a bit in Connecticut, as well. So
11 those are all also participating on the
12 Project. But we didn't say what part of the
13 state do they live in, for example.

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

21 A. You could. And depending on the type of
22 model, I just -- when it comes to a
23 computable general equilibrium model, where
24 you have to model interactions between

1 different sectors, not just at the state
2 level but locally, I think there's a lot of
3 extrapolation and interpolation done to get
4 those relationships because the I/O tables
5 don't go down to that level.

6 Q. Right.

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

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

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

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

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

22 MR. OLDENBURG: So now the
23 Project's been bid. And Quanta, it's been
24 testified that Quanta, a holding company that

1 holds multiple specialty contractors who do
2 this type of work all day within their
3 portfolio. So, some of the testimony we heard,
4 like PAR Electric, Longfellow Drilling M.J.
5 Electric, underground construction company
6 Subsurface, they all have specialty work to do,
7 like the HDD drilling, the horizontal
8 directional drilling, if they're a foundation
9 specialist, all this. Is it safe to say they
10 don't -- they're not in New Hampshire. They're
11 not in New England. And they're going to come
12 to this state to do the work. So how do
13 those -- how do you separate out those jobs
14 that come from Texas or Alabama or whatever?
15 They come into the state, and those folks are
16 here for a couple years doing this project.
17 Are they considered -- because they're here for
18 a number of years, are they considered New
19 Hampshire-direct jobs? Or how are they
20 captured?

21 WITNESS FRAYER: So if they're
22 living in the state, even if it's on a
23 temporary basis, not on a permanent basis, yes,
24 they're considered part of, let's say New

1 Hampshire. And in fact, there's a bit of a
2 rebound effect possible, because once they
3 leave the economy, those jobs -- the jobs that
4 are associated with transplant, though I can't
5 tell and I didn't look, I know that there is
6 migration, labor migration simulated in the
7 model. But we can't go so far as to tell if
8 it's from Texas or California. But we do see
9 that the construction will simulate and attract
10 labor migration generally to the region of New
11 England. The rest of the world isn't dealt
12 directly in the model. It exists, but we don't
13 see it. What we see is the New England states,
14 one by one.

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

24 WITNESS FRAYER: And I think

1 Eversource thought about this when they gave us
2 the budgeted items. If we go back to my
3 Original Report, just to give you a little bit
4 of a feel, there's a big amount of the overall
5 project spending for construction that is
6 outside the region.

7 (Witness reviews document.)

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

14 MR. OLDENBURG: Thank you.

15 BY MR. WAY:

16 Q. So I want to talk a little bit more -- I'd
17 still like to focus in on the micro area a
18 bit, the areas of impact. And we oftentimes
19 talk about Plymouth. We've done that over
20 the last several weeks because that's a good
21 example where they're going to be directly
22 impacted. And there was a couple statements
23 that you had made that I just wanted to delve
24 into a little bit further, that if people

1 can't get to a certain establishment -- and
2 it could be, like I said, it could be
3 Plymouth, it could be Franconia, it could be
4 Woodstock. If they can't get to a certain
5 establishment, they'll go to other locations.
6 That was one statement. And would you agree
7 that's true for essential services? Would
8 you agree? Or are you lumping in everything?
9 And I think even the example was made with
10 the river this morning. But essential
11 services, yes, you're going to go to a
12 different area. But there may be
13 entertainment and other types of activity
14 where you don't go to another area; would you
15 agree?

16 A. It's possible for the very temporary nature
17 of that. So I think I would agree that it's
18 quite possible during construction in a
19 particular location, which is going to be
20 very temporary for a very finite period of
21 time. If there was a customer that wanted
22 something then and there in a very
23 particular, let's say in a particular store
24 or a particular service and didn't want to

1 live through potentially the traffic delays
2 and so forth, they may forego doing that in
3 that time period. So I agree it's quite
4 possible. I think getting to that level of
5 detail really was beyond the scope of my
6 analysis. And frankly, I don't know if it
7 was done by any party in this case at the
8 right level of detail to represent all those
9 elements.

10 Q. Okay.

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

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

21 MS. (Whitaker) DANDENEAU: Okay.
22 Thank you.

23 BY MR. WAY:

24 Q. Another statement you had made, too, that

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

21 A. I think it's very much business-specific and
22 context-specific to the situation. I agree
23 there will be circumstances that this will
24 not be applicable. That's why I used the

1 word "it could." I didn't say it would
2 definitively be one for one. Just, you know,
3 hypothetical, silly examples. It's
4 plausible -- I don't want to make the Flying
5 Monkey into a banner of illustrative examples
6 here. But it could be that, again, those --
7 it was, I believe, traffic delays during
8 construction that was a concern that started
9 that hypothetical description. It may be
10 that the patrons might want to stay longer
11 and therefore would actually drink and eat
12 more because of the traffic delays to
13 out-wait when the construction has ended for
14 the day. I'm just giving a hypothetical
15 again. It could be -- the point really for
16 me is that it's going to be very, very
17 specific to each and every circumstance, and
18 it can't be done on kind of a superficial,
19 ah, this percentage type of basis. I think
20 to do it well, you have to really look at the
21 details, and I didn't attempt to look at that
22 level of detail.

23 Q. And knowing you didn't get to that level of
24 detail, what you just said, though, I don't

1 know if you'd agree with me, that if I'm a
2 business right in the middle of things,
3 there's probably not a lot of increased sales
4 or customer -- increased customer base or
5 sales that are going to come out of it in the
6 short term, though.

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

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

24 So I guess what I'm getting to is that

1 it's -- when you look at a target area, and
2 I'm trying to reconcile that if REMI can look
3 at things in a very sort of micro way -- and
4 let me preface this by saying I'm not asking
5 you right now to do this. I'm trying to
6 understand if it could be done -- that REMI
7 can look at an area, that it's one thing to
8 say here are the benefits of construction,
9 here's all the good things, the jobs that
10 could be created, and then you look at the
11 testimonials that you might get from business
12 owners saying that this is how it might
13 impact their business, and in some cases they
14 might either lay off people or close down or
15 have some sort of impact. So there's going
16 to be positive impacts which you've taken
17 into account. And I'm trying to reconcile
18 negative impacts that by the nature of the
19 modeling can't be taken into account but
20 certainly have an impact. So on mass
21 balance, I have this many jobs that are
22 created, and yet at the local level, in the
23 affected service area, it's going to take
24 that number down. Is there a way -- if I

1 came to you today and I had \$600 an hour and
2 I said, "Is this something that you would be
3 able to do?" is that something you would be
4 able to do?
5 A. I would have to think about it before I gave
6 you a definitive yes. As I suggested to a
7 question earlier from one of your fellow
8 Committee members, I don't think REMI is the
9 right tool to do this. I think that I
10 appreciate the concerns about balance that
11 you're talking about. I think we would want
12 to make sure if we were to do this analysis,
13 that we were objective in understanding it,
14 but also accurate in representing the
15 duration. So the REMI model is an annual
16 model. So when we're talking about a job,
17 although some can be seasonal and part-time
18 or full time, it's actually referred to in
19 statistics literature as a "job year." The
20 construction impacts we're talking about are
21 sometimes days, maybe multiple days, a week,
22 a few weeks, but it's not -- there's a
23 difference of time dimension we would want to
24 make sure we appreciate in doing that

1 balance. There's all those nuances we've
2 talked through in the last ten minutes on
3 substitution effects that we would want to
4 take into account. I think I would -- it's
5 something that you would want to make sure
6 you're thinking through very thoroughly.

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

16 A. You are still considered a job year. And I
17 think different sectors of the economy will
18 have naturally more of a preponderance for
19 seasonal employment than full time. An
20 example is you go to like the recreational
21 sector of the economy, which probably
22 includes ski resorts, which I'm sure
23 everybody is familiar with. Those are
24 seasonal jobs, but they will be represented

1 as one for that sector in the New Hampshire
2 model of REMI.

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

5 A. At peak, yes.

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

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

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

23 Does REMI become limited in a rural area
24 such as New Hampshire? Is that one of the

1 limitations, that it's more designed for
2 urban settings or stronger urban settings?
3 A. I don't -- I don't think so if we keep the
4 model on the state level. I think I've had
5 issues sometimes, not here, but in other
6 parts, when we tried to break it down
7 further, because I think the statistics that
8 are inputs that form the base line aren't as
9 good. The agricultural sector, farming is
10 represented as a sector, first and foremost
11 in our 70-sector model. We're capturing the
12 reported economic activity. If there was a
13 sector of the economy, I will call it -- what
14 do they call it? -- the sector of economy
15 that wasn't reporting data to the statistics
16 agencies, like a sector that didn't transact
17 in dollars but was using barter systems,
18 which I don't think really applies to New
19 Hampshire, but it does in some other
20 countries around the world, or Black Market,
21 REMI isn't going to capture it because its
22 statistics are based on reported national
23 statistics and national accounts. And I
24 think in the U.S. I have never had an issue

1 with the robustness of that data. Other
2 countries, we need to think more carefully
3 about that.

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

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

24 Q. Well, for example, you had numbers there for

1 I think 2016. Refresh my memory, did you go
2 back -- and you also had a year of 2015
3 planning-type jobs and --

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

7 Q. Right.

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

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

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

24 For example, you mentioned the concept

1 of a multiplier or multiplier effect.
2 Although this model isn't using multipliers,
3 it's simulating what's happening instead of
4 calculating in a closed form the number of
5 indirect and induced jobs. It's simulating
6 how the economy would work. But we can
7 compare it to the multipliers that the U.S.
8 Government publishes, the RIMS II
9 multipliers, which then you'll say, well,
10 that's another forecasting tool. Yes, but
11 it's actually based on actual historical
12 data. So in some ways I think the results
13 that you're seeing here, if you think a
14 little bit about this many direct jobs then
15 create these many indirect and induced jobs,
16 the implicit multiple there, multiplier, is
17 very consistent with what we've observed
18 historically with other types of policies and
19 spending and infrastructure. I'm not
20 suggesting Northern Pass is in any way very
21 unique here from other infrastructure
22 investments we've made in the economy.
23 Q. So what I hear you saying is when you look at
24 the back case study, you would look at those

1 modeling-type activities that use multipliers
2 that are based on historical data.

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

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

13 Q. National? I'm sorry?

14 A. Based on actual national accounts. So,
15 actual data on economic activity. So you
16 can, in other words, impute the effects by
17 looking at this, capturing through snapshots
18 the relationships between different sectors
19 of the economy: As this sector of the
20 economy does this, how much additional direct
21 jobs and direct induced jobs are created in
22 response. So my understanding is those
23 numbers are computed by actual data, actual
24 historical data.

1 Q. Because I would have to imagine, then, as
2 people look at this -- you know, and this is
3 a multi-year project, so this question that
4 I'm asking now, it will be asked next year
5 and the year after and the year after.
6 People are going to want to know where
7 they're at with the job creation. Now, the
8 induced jobs, I think everybody probably
9 understands, or at least I consider them to
10 be kind of etherial. It's hard to sometimes
11 figure out where the induced jobs are. But
12 the direct jobs and the indirect jobs, do you
13 see a mechanism going forward where you're
14 going to be able to answer that question? I
15 think at the planning phase it's harder to
16 do, but as we get to the construction phase,
17 that question, I would imagine, will have to
18 be asked -- answered.

19 A. Well, I think the direct jobs could be
20 measured through census-taking through the
21 construction process in some form or fashion.
22 I'm not sure that we've necessarily prepared
23 anything right now to do that. But it's
24 something that could be done. And in some

1 ways even indirect jobs, too, because the
2 suppliers that support the construction
3 process will be known. It'll just be a
4 little bit more difficult for them to
5 necessarily isolate impact of their services
6 and provisions to this project if they're
7 also providing services to many other
8 clients. But it's plausible that you could
9 create some sort of census survey that tracks
10 that information.

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

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

23 Q. All right. And then one last thing. I think
24 a question I had going back to the

1 occupations we talked about, those
2 occupations will land within a certain
3 footprint of the Northern Pass construction
4 area, and I'm talking still about the
5 construction phase. I mean, obviously the
6 construction jobs are going to be right on
7 the work zone sites. But, you know, as we
8 talk about the legal analysts, as we talk
9 about the accountants, all those other jobs,
10 does your modeling attempt to regionalize
11 those locations and impacts? I know there's
12 some other modeling that actually does do
13 that. Or does yours just simply say, look,
14 in New Hampshire you'll have a legal analyst
15 and it will be somewhere?

16 A. So I just want to clarify part of your
17 question. The way I like to think about it,
18 the construction-related jobs during
19 construction, the activity itself is
20 occurring let's say between 8 a.m. and 6 p.m.
21 in a very geographically, localized area.
22 But the job doesn't have to reside -- the
23 worker that's doing the job doesn't have to
24 reside specifically in that area.

1 Q. That's true. Although, another way to look
2 at it is if I'm a community and I want to
3 know what jobs -- you're right. There's the
4 job and there's the employee. The employee
5 could come. But if the job is located in
6 that area, as you said, they're spending
7 their money, vouchers and everything in that
8 area. So that would be information that a
9 municipality might want to know is whether
10 those jobs are located somewhere in the
11 footprint, the defined footprint of the
12 effective service area.

13 A. I could appreciate that. And then I would
14 just clarify it's the activity itself that
15 they're interested in because that then
16 creates that person, if you will, that job,
17 within specific hours in that geographical
18 area. But again, I think the REMI model is
19 really, when we're talking jobs, it's not at
20 this level. The form of model that we're
21 using right now isn't that geo-targeted in
22 its reporting of the results. So I didn't
23 want someone to think that our results are
24 that geo-targeted either that we're

1 reporting.

2 But I agree with the conclusions you're
3 making, for example, in relationship to, you
4 know, a construction worker, if they're
5 working in this part of New Hampshire, when
6 they need to go buy a sandwich at lunch,
7 they're probably not going to go a hundred
8 miles to the north or a hundred miles to the
9 south to get that sandwich. So I totally
10 agree and understand that. I just wanted to
11 clarify the distinction between what the
12 model is showing and the geographical detail
13 of that versus what intuitive conclusions we
14 can draw ourselves from that result.

15 Q. All right. Thank you.

16 CHAIRMAN HONIGBERG: Mr.
17 Oldenburg.

18 MR. OLDENBURG: Thank you very
19 much.

20 BY MR. OLDENBURG:

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

24 MR. OLDENBURG: Could we bring

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

9 BY MR. OLDENBURG:

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

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

20 A. Yes.

21 Q. But if I understand this chart correctly, in
22 2016 it shows creating 136 jobs, and then in
23 2017 it shows creating 2676.

24 A. Yes.

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

3 A. So, the way I like to describe it is that
4 this chart is showing each year, year by
5 year. But I would agree that there is an
6 element of a job that's in 2016 -- you can't
7 just add 136 to 2676 and then add that to
8 2238 and 427. So you shouldn't do a
9 cumulative sum of year by year. That's why I
10 also report just the average. So you need to
11 either focus on a single year or you look at
12 the average over time, because a job in one
13 year may not discontinue; it may actually be
14 part of the count of new jobs the next year,
15 too. Does that address your question?

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

22 A. So this isn't incremental jobs year over year
23 to the prior year. This is the total number
24 of jobs in that year. And again, we didn't

1 want to leave the wrong impression by summing
2 up these into a total sum of total jobs over
3 these many years because that would, I think,
4 give the wrong impression. So that's why we
5 showed them year by year individually and
6 then did an annual average.

7 Q. Okay.

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

13 Q. Okay.

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

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

21 A. I think the answer is yes to all the above.
22 So it wouldn't include somebody that's coming
23 in and leaving, right, commuting back and
24 forth. That's why we have actually jobs in

1 other states, too.

2 Q. In other states.

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

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

22 Q. Okay. The next figure I'd like to go to is
23 Figure 49 in the same report. It's the Bates
24 number 27515. It's like two pages down in

1 the report. This is the estimated number of
2 new jobs -- the top graph. Exactly. It's
3 the estimated number of new jobs in New
4 Hampshire created during the operation. So
5 this is -- we talked about induced jobs for
6 the construction. And if I understand right,
7 we just had this discussion. I didn't want
8 to butt in, but the induced jobs that you see
9 here, the big green bars, are different,
10 though; right?

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

21 Q. So when you calculated -- this is really out
22 of my wheelhouse here. So when you
23 calculated the whole rate, the electric rate
24 that Northern Pass could bid on in the market

1 and you came up with that, I don't know if
2 it's a dollar amount or whatever, that
3 directly relates to the number of induced
4 jobs you're going to create. So Northern
5 Pass sells their electricity. It lowers the
6 electric rate to all consumers, and that
7 lowering of the rate creates these induced
8 jobs. Is that --

9 A. Yes, you are correct.

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

11 A. Yeah.

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

24 A. So the direct -- the correlation is between

1 the electricity market savings, not the rate
2 at which Northern Pass sells, but the
3 electricity market savings enjoyed by
4 consumers across New England because of the
5 new supply that's coming on Northern Pass and
6 the induced jobs. So there is that
7 correlation.

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

20 I think we had a discussion, and I can't
21 recall anymore on which date it was of the
22 hearings, but there was a discussion at some
23 point about my updated analysis from
24 March 2017 having approximately 25 percent

1 lower overall wholesale electricity market
2 benefits. That would mean that the induced
3 jobs would also be in that general range
4 lower.

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

17 A. It has not been updated. So, for the
18 construction period, it's my understanding
19 that nothing has changed at the time that
20 we -- so, the construction budget, the
21 spending, the distribution of spending
22 geographically, so those numbers should not
23 change. But I do agree that the operations
24 period, the total jobs and total GDP impacts

1 would generally scale up and down with the
2 electricity market benefits. I think the
3 words I used in my updated analysis is that
4 they're in a general, in a similar magnitude,
5 similar range. But there is a scaling
6 effect.

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

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

18 MR. OLDENBURG: Sure.

19 MR. WAY: So once again, if
20 someone said to you, I'd like you to update the
21 job projections from your March -- or from the
22 October 2015, how complicated a process is
23 that? Is that a matter, frankly, of you
24 getting on the computer and entering a couple

1 numbers, or is this months' work? You know,
2 tell me what the scale is.

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

6 MR. WAY: All right.

7 MR. OLDENBURG: Thank you.

8 BY MR. OLDENBURG:

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

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

23 Q. Okay. So how is this distribution of jobs
24 throughout New England calculated? Is that

1 like a percentage, or is there like a work
2 force analysis created? How do you come up
3 with this distribution? Because it seems to
4 be very consistent year to year, number of
5 jobs and certain percentage for each state.

6 A. So I had mentioned earlier that in New
7 Hampshire, Figure 49, the majority of the
8 induced jobs were from electricity cost
9 savings. There's just a little bit of jobs
10 also induced because of the other types of
11 local spending specific to New Hampshire,
12 like the economic development funding,
13 Forward New Hampshire Plan. But in other New
14 England states, the total jobs created during
15 operations are 100 percent all related to the
16 electricity market effects. And the
17 electricity market effects, you can think
18 about them as a rate, as a
19 cents-per-kilowatt-hour reduction on the
20 utility bill. But we also know how much
21 consumers in each state actually consume of
22 electricity. So you have the kilowatt hours
23 by customer class, generally speaking, and
24 over time. And so the biggest bar you see in

1 Figure 50, the green bar, is Massachusetts
2 because it represents, in terms of kilowatt
3 hours of consumption, the biggest overall
4 consumer of electricity, and that creates the
5 bigger job number, if you will. So there
6 isn't any proxies that we're using. We're
7 really looking at the basic facts in terms of
8 electricity cost savings in dollars. And in
9 states where there's more electric
10 consumption, those are more dollars. More
11 dollars mean bigger induced effects.

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

15 So I guess my last question -- well, one
16 of my last questions, when I heard of 2600
17 jobs being created in New Hampshire, my first
18 thought of that was 2600 permanent,
19 long-term, sustainable jobs in New Hampshire.
20 And now that we've started to get into it, I
21 don't get that warm and fuzzy feeling that
22 these jobs are permanent, long-term,
23 sustained jobs. Do you have an idea -- I
24 mean, is there a number of jobs that you

1 would consider somebody gets a job during
2 this project and that's their career for
3 life, that type of thing? Is there any
4 number out there or any percentage?

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

23 I do think that the model is probably
24 overly perfect, and it probably also

1 under-represents that opportunity and says
2 temporary spending, temporary job increase,
3 and then, you know, a lot of labor force
4 migration is happening. And we see -- we
5 probably to some degree don't see -- there's
6 a little bit more resistance, actually, in
7 that when a person comes and finds a local
8 community that is receptive, they may
9 actually stay and may re-qualify or change
10 slightly from the work they were previously
11 doing in order to enjoy the amenities of the
12 local communities. We didn't try to
13 anticipate that in our analysis.

14 Q. Okay. Thank you.

15 MR. OLDENBURG: That's all I
16 have.

17 CHAIRMAN HONIGBERG: Mr. Wright.

18 MR. WRIGHT: Thank you, Mr.
19 Chairman.

20 BY DIR. WRIGHT:

21 Q. Ms. Frayer, good afternoon.

22 A. Good afternoon.

23 Q. I thought Mr. Way had closed the door on
24 backcasting, but as I was looking through my

1 notes I did come across something that I just
2 want to clarify in my notes. I think it was
3 during when Ms. Fillmore was asking you
4 questions about backcasting. That's a term
5 you used, "backcasting," I believe. And I
6 thought I heard you say that in the context
7 of the Greater Springfield project, you had
8 gone back and done some level of backcasting.
9 Is that an accurate reflection of what I
10 heard?

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

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

18 A. No, it was not.

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

21 I'll shift gears a little bit and go to
22 your carbon reduction emission calculations
23 part of your report. You had estimated in
24 your final report 3.2 million metric tons of

1 CO2 reductions across the ISO-New England
2 region.

3 A. Yes, that's correct.

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

9 A. Short tons.

10 Q. Short tons.

11 A. Yeah, I would say that I'm in the same boat.
12 So, subject to check, I will take that.

13 Q. I can still run a calculator.

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

20 A. So you used the energy flows; right?

21 Q. Correct.

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

24 Q. Okay. In my mind, that number seems right to

1 me. That seems to be about the ballpark of
2 what a combined-cycle natural gas plant would
3 emit at.

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

9 Q. Exactly.

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

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

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

17 A. Yes.

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

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

22 Q. Okay. Now, that doesn't spit out that carbon
23 reduction. That's something you calculated
24 based on results of the model; correct?

1 A. So the model spits out hour-by-hour
2 production by resource, and we have carbon
3 emissions rates by resource. And the two in
4 combination, when we compare the Base Case
5 and Project Case, the difference between
6 those gives us the number.

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

12 A. Yes, for that hour.

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

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

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

23 A. I would -- the only concern I have is I would
24 need to check, and I don't know, off the top

1 of my head, what's the time-based granularity
2 of that model. Is it actually looking at
3 simulating -- so the purpose of POOLMod, our
4 model, is that it simulates the actual
5 security-constraint dispatch that ISO does to
6 get to those hour-by-hour, day-by-day
7 production data sets by plant. I would have
8 to check whether the IPM is also that
9 granular or whether it makes some simplifying
10 assumptions.

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

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

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

21 A. So, all of the transmission constraints are
22 converted into thermal terms, into megawatt
23 absolute limits. In reality, some of the
24 interfaces that are monitored might actually

1 have in some periods voltage constraints, but
2 voltage constraints can be represented
3 thermally as well. But it's generally
4 voltage, stability, thermal.

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

8 A. Under certain conditions, yeah. Yeah.

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

11 Does the model take into consideration
12 known retirements? And I would use, for
13 example, like the Pilgrim Nuclear Power Plant
14 which has announced it is going to retire in
15 2019. How does the model treat that?

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

1 analysis, given when it was announced, but it
2 is captured in our updated analysis.

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

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

9 Q. And your original model used 2015 AEO data?

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

19 Q. And you did update the data you used in terms
20 of gas prices, I think I read, from 2015 to
21 2016.

22 A. Yes. In the updated analysis we used the
23 latest available forecast from the AEO, which
24 would have been vintage 2016.

1 Q. Okay. I think 2017 may have come out in
2 January. But that's probably a timing issue
3 more than anything?

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

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

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

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

23 A. It depends on the objective of the study
24 we're doing. So, in this particular

1 instance, for example, in the Original
2 Report, there was a lot of uncertainty about,
3 in fact, at that time, about potential gas
4 projects, gas pipeline projects and what it
5 would mean to gas price levels in the region.
6 So we did do two gas price scenarios.

7 In the updated analysis, I think at this
8 point there's less, I think, uncertainty,
9 near-term uncertainty about that, so we
10 didn't do it. We specifically focused on the
11 AEO as requested in the data request. But I
12 think at one of the technical sessions a
13 question was raised about uncertainty
14 regarding energy efficiency, future energy
15 efficiency. And so we did quickly a test
16 that we documented in a discovery data
17 request response. So I think it depends on
18 the nature of the work we're doing and where
19 the uncertainties lie, whether in fact
20 there's a need for -- explicitly a need for a
21 range or it's more helpful to have a "most
22 likely" Base Case. And in this case we have
23 generally a most likely Base Case that we're
24 projecting.

1 Q. Do you have your Prefiled Testimony in front
2 of you? I think it's your April 17, 2017.

3 A. I do.

4 Q. If you can go to Page 35.

5 (Witness reviews document.)

6 A. So it's the April 17. Is it the prefiled --
7 is it the testimony or the report?

8 Q. Your Prefiled Testimony.

9 A. Excuse me. What page?

10 Q. Thirty-five.

11 A. I think that sounds like it might be the
12 report, but let me...

13 Q. Oh, I'm sorry.

14 MR. WRIGHT: Thank you, Mr.
15 Honigberg.

16 BY MR. WRIGHT:

17 Q. It's your October 15, 2015, on Page 35, where
18 you talk about the environmental impacts.

19 A. All right. I'm there.

20 Q. You see Section 3, Environment Impacts. And
21 on the Line No. 5 you talk about the
22 Cross-State Air Pollution Rule. This is air
23 regulators' version of CASPR, not whatever
24 CASPR you guys were talking about.

1 So, in there you make the assumption
2 that, even though CASPR is not applicable to
3 New England generating units because we're
4 not subject to that federal rule, you make
5 the assumption that we are subject to that
6 rule. And what you've done, if I'm correct,
7 is you've added in cost of operating
8 generating stations for their SO2 and NOx
9 emissions that don't really exist. Do you
10 agree with that summary of what you have
11 there?

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

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

21 A. And the locational --

22 (Court Reporter interrupts)

23 Q. -- whether they get displaced or not.

24 A. More so it would impact the locational

1 marginal price levels. But again, we're not
2 looking at absolute price levels. We're
3 looking at price differences. I'm not sure
4 it would impact which resources get
5 displaced, though.

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

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

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

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

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

16 BY MS. (Whitaker) DANDENEAU:

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

19 A. Good afternoon.

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

23 When Mr. Way was asking you questions,
24 he was sort of, I think, trying to get at why

1 it was done at the state level, and I wanted
2 to follow up on that. I can see where the
3 state-level analysis would be so important.

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

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

13 Q. Sure.

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

20 Q. Okay.

21 A. And I would definitely urge you to talk to
22 them a little more about it as well. But the
23 insight we got when talking to those experts,
24 and even in preparation of our Original

1 Report, is that they are not -- that they are
2 quite temporary and quite small.

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

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

12 Q. Okay.

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

23 Q. Okay. Thank you. And while I'm asking about
24 data, where does the data come from for the

1 REMI model? You talked about how the model
2 could be sort of specific to whatever you're
3 analyzing. Where does the data come from to
4 create that level of specificity?

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

1 documentation detailed data sets.

2 Q. Okay.

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

19 WITNESS FRAYER: So I'd have to
20 check whether REMI had pulled any data from
21 local, let's say more localized sources. I do
22 know they look at state-level data and national
23 accounts for the state-level geographical
24 combinations. But I'm not sure what other

1 sources they might -- so I need to check to be
2 able to confirm that.

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

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

15 BY MS. (Whitaker) DANDENEAU:

16 Q. Excellent. When Ms. Fillmore was asking you
17 some questions yesterday, you talked a lot
18 about "positive" effects. I feel like that
19 word was used a lot. And I had written down
20 here, and I don't know if it was word for
21 word, but I believe Ms. Fillmore asked you
22 about negative effects. And you said --
23 again, I don't remember if this was word for
24 word. I was typing quickly. You had said

1 that there were no negative impacts, that if
2 there were going to be negative impacts, that
3 the model would have reported them. And so I
4 was wondering if you could talk about that a
5 little bit more, because I imagine there are
6 going to be negative impacts associated with
7 this project. I think we've heard about some
8 of them so far. And I'm just wondering if
9 your comment saying that there are not
10 negative impacts according to the model, is
11 that because, say the model shows that
12 there's 500 new jobs gained, 300 are lost, so
13 there's like a net gain of 200 jobs and so
14 there's no negative impact, it's overall
15 positive impact?

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

21 Q. Okay.

22 A. So we put an input into the model and then
23 the model creates a result and the result
24 could be positive or negative. And in fact,

1 in some of the figures we looked to because
2 of the rebound effect during the operations
3 stage once kind of the electricity cost
4 savings dissipate, there is sometimes some
5 small negatives. And we reported those as
6 negatives in those back years. We didn't
7 want to just assume them away because we said
8 we were going to report for this time frame.

9 Q. Okay.

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

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

22 MR. WEATHERSBY: As I recall,
23 that statement struck me as well. I think we
24 were talking about during the construction

1 phase there would be no negative effects on
2 jobs during construction and that you relied on
3 your model for those inputs, for inputs that
4 resulted in that. And I had a similar question
5 of whether that was net impacts, that there's
6 no net negative impacts, or just no negative
7 job impacts. Does that help?

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

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

1 that type of relationships in the model.

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

13 To support some of the
14 conclusions on those, I did speak, and I
15 think it's documented in my Rebuttal Report
16 from April, I did speak to other experts that
17 Eversource has retained to deal with some of
18 those issues, and I relied on their
19 professional opinion on that as well in
20 talking through those conclusions. And that
21 was more input driven because of the expert
22 opinion of those experts on those topics. We
23 concluded that there would be no measurable
24 effect as an input that we would put into the

1 model; therefore, there would be no negative
2 result from the model.

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

8 A. Thank you.

9 CHAIRMAN HONIGBERG: Ms.
10 Weathersby.

11 MS. WEATHERSBY: Thank you.

12 BY MS. WEATHERSBY:

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

19 A. I think that's a good way to -- that's a good
20 summary, yes. And in reaching those
21 conclusions, it wasn't -- it was based on
22 kind of our review of information that, for
23 example, Counsel for the Public's expert had
24 prepared, but also talking to other experts

1 that are more familiar with the details of
2 the construction and so forth, or the details
3 of a particular sector of economy that
4 supported us in making those conclusions.

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

11 A. That's correct.

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

14 In your jobs analysis, you indicated
15 that the line would be constructed over a
16 40-month period.

17 A. I believe -- so I was thinking of it in
18 years. But I think that corresponds.
19 There's a big ramp-up in construction that
20 I'm seeing from a local spending perspective
21 that's happening in 2017 and 2018. But
22 there's also some work originally scheduled
23 for 2016 and some work for 2019 as well.

24 Q. And we've heard testimony that construction

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

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

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

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

23 A. Yes.

24 Q. In your analysis, the induced jobs as a

1 result of the energy savings are clearly the
2 largest component of the newly created jobs.
3 When you determined the creation of an
4 induced job, did you assume that all of the
5 energy savings from a residential customer or
6 a business customer, that they then spent all
7 of that savings?

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

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

1 machinery for the factory.

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

7 Q. We've also talked about how a lot of the
8 jobs, particularly the construction jobs, and
9 even the indirect jobs, but particularly the
10 construction jobs, I guess, are maybe
11 migratory in nature. There's the directional
12 drilling folks that come up and the line
13 workers, et cetera. And then there's
14 indirect jobs that are created. You know,
15 someone is going to open a restaurant to
16 service them or build a new hotel. You know,
17 and that economic growth gets stimulated by
18 all of these workers that are coming into the
19 state of New Hampshire. But I'm wondering
20 what happens when the workers leave. You
21 know, is it then the boom turns to bust when
22 there's no longer people to fill that hotel
23 or go to that restaurant? How is that
24 factored into your analysis?

1 A. So there could be a rebound effect for some
2 time, where there's some loss of jobs as the
3 overall economy kind of right-sizes. This
4 happens with any temporary boom or bust
5 situation with a high growth or recession. I
6 think there's always a wave pattern, if you
7 will, that comes out of it.

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

23 Q. And then those newly hired workers would then
24 be laid off as the sales then shrink.

1 A. They may be laid off, yes. So that's why we
2 didn't try to extend the analysis and say
3 that, let's say the induced effects in New
4 Hampshire, the induced jobs which by 2019 are
5 down to 261, we didn't say that they're going
6 to continue in 2020, 2021, 2022. Some may
7 continue for some time, but there'll be a lot
8 less. So we didn't try to present in our
9 analysis a view that those jobs would be
10 forever. Think of those as jobs that are
11 occurring in those specific years, not jobs
12 that then are going to happen forever.

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

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

22 For the majority, the negatives, if you
23 take a look, are related to Rhode Island,
24 Massachusetts and Connecticut. And Figure 50

1 is talking about total new jobs created in
2 New England during commercial operations.
3 And in our analysis in the Original Report,
4 we took into account that Northern Pass could
5 win what was the Clean Energy RFP at that
6 time that the three states put together. And
7 if it did, we wanted to be pragmatic then on
8 what that would mean to retail customers in
9 those three states. And in those three
10 states, although they would enjoy, like all
11 the other states in New England, reductions
12 in wholesale market costs of the commodities,
13 they would also, based on the structure of
14 that tri-state RFP, customers in those three
15 states would be responsible for the costs of
16 the contract that would be signed at that
17 time with Northern Pass. And so in some
18 years the cost of the contract exceeded the
19 electricity cost savings than the customers
20 in those states would benefit. So, in 2019,
21 because capacity sales don't start until
22 2020, and in the back years, 2027 through
23 2030, or 2029, at that time there would be
24 negatives because the electricity market by

1 then has re-balanced, gotten back to
2 equilibrium as we were discussing earlier,
3 and so there wouldn't be, in our estimates,
4 direct electricity market benefits to
5 consumers, but there would still be a
6 contractual obligation to the customers in
7 those states. So that was specific to the
8 assumptions we made to be realistic,
9 pragmatic in how we're representing the
10 retail side of the equation.

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

17 A. It's not to do with the generators. It's
18 reflecting an induced effect from the fact
19 that in those states, in those particular
20 years, although there is still a wholesale
21 cost reduction, there's also a contract cost.
22 And in those particular years, the contract
23 cost from the tri-state RFP would be bigger
24 than the wholesale rate reduction. So it's

1 not related to the generators or any
2 retirements. There wasn't any specific
3 retirement induced in the original analysis
4 either from Northern Pass, but really to the
5 construct of that tri-state RFP.

6 Q. Okay. Thank you.

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

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

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

24 A. I think it's implicit, in the sense that, for

1 example, we assumed that the compensation
2 being offered during construction would be
3 better than the typical compensation we'd get
4 otherwise. I would say that another way to
5 think about it is the typical compensation
6 you get otherwise is what's going to be
7 paying for the ongoing household expenses,
8 and it's the incremental part that needs to
9 be spent to then establish a temporary
10 residence here and buy food and health
11 services if necessary and so forth.

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

20 A. I think so. What I was trying to say is that
21 the annual capacity market benefits may
22 differ from what we presented, but I
23 anticipate that over time on a net present
24 value basis when we're looking at the full

1 forecast time frame of when Northern Pass
2 could affect capacity market savings, it
3 would average out to generally in that same
4 range. So what would happen is the values in
5 the next few auctions might be lower than
6 what we predicted prior to FCA 11, but the
7 capacity benefits might be more
8 longer-lasting.

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

12 A. Depends on the timing. So are you suggesting
13 other large suppliers, let's say in late
14 2020s, 2030 enter the market?

15 Q. Sure. Let's start there.

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

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

1 A. So, almost contemporaneously.

2 Q. Almost contemporaneously.

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

22 Q. A couple times we've talked about capacity
23 inputs "delisting." And forgive me because
24 I'm just learning all this. Is that

1 essentially when -- if a generator delists,
2 that basically means they're not -- they've
3 decided they're not going to participate in
4 that auction? They're like folding their
5 hands?

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

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

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

24 Q. And what would be the economic effects on

1 such a participant, or non-participant in
2 this case? I mean, it seems as though by not
3 participating and just selling energy on the
4 day market, whatever you call it, could
5 impact them negatively financially.

6 A. I think you raise a really good point. And
7 it depends on what kind of supply resource it
8 is and what alternatives they have. For
9 example, we have imports from New York that
10 serve as capacity resources. And one of the
11 reasons that they may want to delist is
12 because they can go back and sell their
13 capacity in the New York market. And it may
14 be more economic, more worthwhile for them to
15 do that. We're capturing that in our
16 analysis because we can see the arbitrage
17 opportunities as they arise, depending on the
18 projections of our New York capacity market
19 model and our New England capacity market
20 model. Other resources might make an
21 economically rational decision, and they
22 might say, well, the capacity price is so
23 low, it's not really remunerating me for the
24 obligations I'm taking on as a capacity

1 supplier and the risks. So, for them, maybe
2 on a risk-adjusted basis they made a decision
3 that they only want to take energy, and
4 that's better than if they take on the
5 capacity performance. But generally
6 speaking, if a resource leaves, delists year
7 over year, multiple times, they're
8 essentially on their pathway to retirement
9 because the energy market alone is typically
10 not supporting generation resources.

11 Q. I guess that's what I was going to -- because
12 we've heard testimony that Northern Pass may
13 cause some suppliers to delist. And if
14 they're essentially -- it sounds as though
15 it's going to -- it could accelerate a
16 generator's path to retirement. I know we
17 said, oh, there's no -- you had testified
18 that there's no retirement as a result of
19 this. But it seems as though it will have an
20 impact and perhaps accelerate a retirement.
21 Is that fair to say?

22 A. I think that is exactly what our model is
23 trying to capture. It's looking at whether
24 it does accelerate the pathway to retirement.

1 And because our model is chronological and
2 it's looking at not just one auction in a
3 snapshot, it's looking at what's happening
4 year after year, it can actually predict,
5 project when that retirement decision is
6 triggered. Because of the recovery of the
7 capacity prices, albeit as we've talked
8 about, peak load growth isn't huge, it's
9 small, but there is that expected recovery
10 over time, we do see that the projects that
11 we are anticipating do delist, then come back
12 after some time. So, for them it's not an
13 economic decision that leads them down the
14 pathway of retirement, but it could be. And
15 our model captures that. It captures the
16 differences between a delist and a
17 retirement. And that's an important
18 difference that reflects the reality. And it
19 also captures the fact that even delists
20 themselves aren't something that can happen
21 in huge volumes.

22 Counsel for the Public's expert's model
23 was looking at delists in 2500-megawatt
24 increments. Big amounts of delists,

1 hypothetically. Our model is actually very
2 consistent with what we've seen in previous
3 auctions, where if we do have delists, it
4 might be a few hundred megawatts here or
5 there. We're not seeing, even as prices have
6 come down in previous auctions, these big
7 amounts of delists or response that happen
8 too quickly. Because, in fact, if I was a
9 power plant and I saw prices step down from
10 \$6 to \$5, I'd say, wow, you know what, I'd
11 rather not delist. I like getting five
12 bucks. Because if I delist, I get zero in my
13 capacity, and five bucks is worse than six,
14 and I would have preferred six, but five is
15 still a lot more than what I think is my cost
16 of performing the capacity supply obligation,
17 so I might as well take the five. And that
18 type of economic rational behavior is what
19 our model is capturing.

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

22 (Pause in proceedings)

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

24 A. Thank you.

1 BY CHAIRMAN HONIGBERG:

2 Q. I just have a couple things I want to cover,
3 and mostly following up on things
4 Commissioner Bailey talked about with you.

5 We think we know that Hydro-Quebec has
6 excess capacity that it would like to be able
7 to sell wherever it can sell it; right?

8 A. I think that's a fair statement.

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

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

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

21 Is it your view that New England could
22 handle or would benefit from two Northern
23 Passes, you know, a 1,000-megawatt project
24 and another 1,000 megawatt project?

1 A. Without having done the analysis, I would be
2 comfortable saying that New England could
3 handle multiple large-scale transmission
4 projects with hydroelectric energy behind it,
5 assuming it's available. But I would prefer
6 that there's potentially some thoughtful
7 timing on when those projects come in.

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

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

18 A. So are we talking New England Clean Power
19 Link or are we talking Champlain-Hudson Power
20 Express? New England side or New York side?
21 Because both --

22 Q. Vermont. The New England side.

23 A. Okay. Yes. So that's the New England Clean
24 Power Link.

1 Q. Okay, the Clean Power Link.

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

8 A. Hmm-hmm.

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

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

22 Q. Well, I think you were unwilling to include
23 it in an analysis of Northern Pass's effects
24 on the market because it was a hypothetical.

1 I think, then -- I don't know whether that's
2 what you're calling the Base Case or not, but
3 I think it's the Base Case. I think I want
4 you to assume it exists and then add Northern
5 Pass. What happens?

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

8 Q. Which direction would they go?

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

23 So I think in the short term it would
24 mean lower prices. In the longer term, we

1 might get to the same Base Case prices we
2 already have.

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

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

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

22 A. For?

23 Q. For Northern Pass.

24 A. For Northern Pass? Well, I think Northern

1 Pass's calculations will remain the way that
2 we've done it. What will happen is it's a
3 question then of there's a new starting point
4 to consider because the minimum offer price
5 is looking at the unit cost of the Project.
6 Think of it that way. It's a cost of new
7 entry for the Project. Then it's really the
8 dynamics of the auction that determine
9 whether it's constraining or not. So if we
10 start with a market that is much more
11 oversupplied, there might need to be, again,
12 a timing issue here about when Northern Pass
13 would -- if we assume that somehow TDI's New
14 England Clean Power Link gets built, there
15 might be a timing decision that needs to take
16 place to ensure that the MOPR is not binding,
17 because in the first year or two of TDI, it
18 will effectively lower the capacity price.
19 So, it'll be the capacity price that gets
20 binding on the MOPR, not that the MOPR
21 calculations change.

22 Q. I feel better since you called it the TDI
23 project in that sentence and then corrected
24 yourself. So I feel better now. And since

1 this is all about me, that's all that matters
2 right now.

3 [Laughter]

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

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

24 Q. Right. You made that representation earlier,

1 but you didn't give an example. You said
2 it's happened elsewhere. Can you cite to an
3 example where it's happened elsewhere, where
4 it would be easy for folks to find?

5 A. So, in New York they have the equivalent of
6 the MOPR. They call it the "buyer side
7 mitigation test," BSM. And the way that the
8 New York ISO implements it is by what they
9 call "class years." They pool together a
10 bunch of new resources that have asked for
11 capacity rights. I'm trying to use the
12 terminology they use, just so you can find
13 it. And then they do these tests on all
14 resources that have asked to basically
15 interconnect and join the capacity market
16 about the same time. And I think they've
17 talked definitively in various vintages of
18 their class year studies about those
19 assumptions. For example, I believe in Class
20 Year 2012, which might have been the first
21 class year where they studied a very large
22 transmission project -- well, no, it wouldn't
23 be the first year. But it was the first time
24 where they talked about the fact that I

1 believe the amortization rate for a
2 transmission project needs to be very
3 different from the amortization rate they
4 would use in looking at the unit cost for a
5 generation project as part of their demand
6 curve reset. So that's an example.

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

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

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

18 Q. Any other operator --

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

23 Q. Okay. That's what I wanted to cover. I know
24 that Attorney Iacopino has a few questions,

1 and I know that Commissioner Bailey has some
2 follow-up questions. I don't know -- and
3 Mr. Way has questions. Why don't we start
4 with Mr. Way and work this way.

5 MR. WAY: Thank you.

6 BY MR. WAY:

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

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

23 Once you've developed your model and
24 you've customized it, you've put in all your

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

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

24 Q. And so when you're talking about that -- when

1 I'm talking about the job estimates changing
2 as a result of the last report, you're
3 referring to that.

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

8 Q. Correct.

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

11 Q. All right. Thank you.

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

18 Q. Thank you.

19 CHAIRMAN HONIGBERG: Mr.
20 Iacopino.

21 MR. IACOPINO: Thank you.

22 BY MR. IACOPINO:

23 Q. Ms. Frayer, if I understand what I've read
24 and what I've heard correctly, you were

1 engaged to support Eversource in the
2 presentation of this Project to the
3 Committee, and before that in some testimony
4 to the legislature in some public debates
5 about the Project; is that correct?

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

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

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

22 Q. Were you engaged to provide any consultancy
23 to Eversource, for instance, on what the size
24 or capacity of the line should be in order to

1 be profitable or in order to establish
2 economic benefits?

3 A. We have generally not been asked in any of
4 our work to look at the profitability to
5 Hydro-Quebec or the shipper. So it's not
6 really been a function of our work. We have
7 worked with them in thinking about how
8 benefits change, like "what ifs" if the
9 Project characteristics change in some way.
10 In fact, I think a presentation that came up
11 earlier with another attorney was done at
12 that time where they were changing the
13 Project dimensions from 1200 megawatts to
14 1090 megawatts.

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

17 A. I don't think we were -- I wouldn't say we
18 were involved in that decision-making. That
19 was over my pay grade. But I think we did
20 some analysis at that time that laid out what
21 the implications would be to the electricity
22 markets under that type of change, if you
23 will, to the Project. I don't know how that
24 information was then used by the

1 decision-makers, but I presume they saw it.

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

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

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

22 When you say what "other parties" have
23 told you, do you mean folks from Eversource
24 or --

1 A. No, no. I'm referring, actually, to the fact
2 that some of the other parties' intervenors
3 had raised this conceptually as an issue,
4 that maybe Northern Pass can't actually clear
5 the FCA because of the MOPR. And we went and
6 showed that that's not to be the case. I
7 thought it was intuitive to begin with that
8 it wouldn't be the case.

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

13 A. My first report, I actually, I would say,
14 didn't do any detailed analysis to show that
15 they would, like I did in the Supplemental
16 Report, that they would have a MOPR of X and
17 it would not be binding on them clearing the
18 capacity market because I thought it was kind
19 of self-evident and intuitive, that there
20 shouldn't be an issue. It's a new supply
21 resource. It has the opportunities to make a
22 lot of revenues in the energy market and
23 shouldn't be receiving a very high MOPR then
24 which would bind it from clearing in the

1 capacity market. It's not a resource that
2 requires a subsidy, like a REC payment to
3 make it whole. But in fact, even REC
4 payments the ISO allows to be considered in
5 the MOPR as well. So I thought it was
6 self-evident in my Original Report. So there
7 wasn't an analysis for the Original Report at
8 that time in the same level of detail that we
9 then did in the Supplemental Rebuttal because
10 intervenors raised this conceptually as an
11 issue, and there wasn't anything in the
12 record that clarified the point.

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

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

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

19 During your testimony, I believe it was
20 with Mr. Pappas, you made the statement that
21 the capacity market would re-balance itself
22 after the change in the rules and change in
23 the demand curve. And I guess the question I
24 had is: Is there anything that would stop

1 the market from re-balancing that the
2 Committee should be aware of going forward?

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

20 So I think it's the speed pragmatically
21 with which this market re-balances that's
22 really at issue here. And I think that it's
23 going to take a little bit of time. It's not
24 going to happen overnight.

1 Q. You also mentioned -- I don't know who you
2 were answering. But you also mentioned that
3 Hydro-Quebec had issued a report regarding
4 its exports. And my question is: Has that
5 report been made part of the record, to the
6 best of your knowledge? It's export capacity
7 I guess is what we're talking about.

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

19 Q. Okay. Thank you.

20 And then you also mentioned today in
21 response to someone's questions that
22 essentially Hydro-Quebec is using up all of
23 its ability to export because of, for lack of
24 a better term, constrained transmission.

1 There's another expert in this case who has
2 filed Prefiled Testimony that says that the
3 Phase I and Phase II line is only -- is being
4 minimally used, at least in his opinion.

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

8 A. From the ISO, directly from the source,
9 because I believe ISO releases information on
10 energy flows on interties. And if it's not
11 from the ISO, I think there might be a public
12 OASIS site that allows you to track those.
13 If you will, I might want to see if I've
14 actually been more specific.

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

17 (Witness reviews document.)

18 A. I specifically recall, and this would have
19 been at some point last year, finding very
20 specific data on energy scheduled flows on
21 Phase I and Phase II interties. And I
22 thought it was generated by a Counsel for the
23 Public data request, but it might have been
24 coming out of an informal data request. If

1 it's -- I'm very confident it's somewhere in
2 the record. If you don't mind, we can look
3 for it afterwards and --

4 Q. I would appreciate that.

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

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

15 A. Which? Do you know --

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

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

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

24 A. I think I've seen trade press mentions of

1 that report.

2 Q. Have you had any opportunity to review it?

3 A. I have reviewed it on a cursory level. I
4 haven't necessarily dug into it sentence by
5 sentence. But on a cursory level I have.

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

11 A. I think --

12 Q. -- other than what you've already told us
13 today, obviously?

14 A. So I think they were focused -- I thought the
15 Sue Tierney report was focused really on
16 electricity market impacts, not the local
17 economic elements. So it wouldn't really
18 relate to some of the specific discussions
19 we've had about local economic impacts
20 during -- like the temporary economic impacts
21 during construction.

22 I think her concern, broadly speaking,
23 is that somehow I have not taken into
24 account -- I've just assumed away that there

1 would be no retirements. And frankly, she
2 hasn't read my report to make that
3 assumption, I think. Our Original Report
4 went through in detail, our updated analysis,
5 all the data discovery that we did through
6 the technical sessions, I think that should
7 have clarified that this isn't an assumption.
8 This is an outcome of our modeling. We've
9 done a very detailed analysis, and we believe
10 that, based on the projections in our
11 modeling, there isn't an outright retirement
12 of specific generators.

13 In the past, Ms. Tierney has worked with
14 NEPGA, so that was a concern in the past for
15 her as well. So we're not creating a
16 situation where we're replacing one megawatt
17 of Northern Pass for one megawatt of capacity
18 that is exiting completely from the market,
19 retiring because of Northern Pass. There
20 will be dynamic effects as we've talked
21 about, dynamic delists for some time frame.
22 As with any competitive market, when you
23 introduce new supply, it means that somebody
24 else is running less, operating less the more

1 expensive supply. That's a competitive
2 market outcome. But it's not necessarily
3 what she I think took away from our report.

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

7 A. Thank you.

8 CHAIRMAN HONIGBERG: All right.
9 We're going to need to break now for the
10 evening. Commission Bailey still has some
11 questions she wants to follow up on, and I know
12 Attorney Needleman has some redirect.

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

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

21 MS. MANZELLI: Thank you, Mr.
22 Chair. My understanding was that we were to
23 have a discussion about the sequence of
24 subsequent witnesses. Would that occur after

1 the conclusion of this witness?

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

7 MS. MANZELLI: Thank you.

8 CHAIRMAN HONIGBERG: Anything
9 else?

10 [No verbal response]

11 CHAIRMAN HONIGBERG: All right.
12 Thank you all. We are adjourned for the night.
13 (Whereupon the hearing was adjourned at
14 5:46 p.m.)

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