

3417

BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO

- - -

In the Matter of the :
Application of Ohio Edison:
Company, The Cleveland :
Electric Illuminating :
Company, and The Toledo :
Edison Company for : Case No. 14-1297-EL-SSO
Authority to Provide for :
a Standard Service Offer :
Pursuant to R.C. 4928.143 :
in the Form of an Electric:
Security Plan. :

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PROCEEDINGS

before Mr. Gregory Price, Ms. Mandy Chiles, and
Ms. Megan Addison, Attorney Examiners, at the Public
Utilities Commission of Ohio, 180 East Broad Street,
Room 11-A, Columbus, Ohio, called at 9:00 a.m. on
Thursday, September 24, 2015.

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Thursday Morning Session

September 24, 2015.

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EXAMINER ADDISION: Let's go on the
record.

The Public Utilities Commission of Ohio
has set for hearing at this time and place Case No.
14-1297-EL-SSO, being In the Matter of the
Application of Ohio Edison Company, the Cleveland
Electric Illuminating Company and The Toledo Edison
Company for Authority to Provide a Standard Service
Offer pursuant to RC 4928.143 in the Form of an
Electric Security Plan.

My name is Megan Addison, and I am one of
the attorney examiners assigned by the Commission to
hear this case. We'll dispense with taking
appearances this morning.

Are the companies ready to proceed?

MR. KUTIK: Yes, your Honor. The
companies call as their next witness Dr. Lawrence
Makovich.

EXAMINER ADDISION: Good morning.

THE WITNESS: Good morning.

(Witness sworn.)

EXAMINER ADDISION: Thank you. You may

1 be seated.

2 MR. KUTIK: Your Honor, at this time we
3 have provided to the court reporter and have asked
4 have marked for identification as Company Exhibit 42
5 the Supplemental Testimony of Dr. Lawrence Makovich
6 on behalf of Ohio Edison Company, the Cleveland
7 Electric Illuminating Company, and the Toledo Edison
8 company.

9 EXAMINER ADDISION: So marked.

10 (EXHIBIT MARKED FOR IDENTIFICATION.)

11 MR. KUTIK: May I proceed, your Honor?

12 EXAMINER ADDISION: You may.

13 - - -

14 DR. LAWRENCE MAKOVICH

15 being first duly sworn, as prescribed by law, was
16 examined and testified as follows:

17 DIRECT EXAMINATION

18 By Mr. Kutik:

19 Q. Dr. Makovich, would you introduce
20 yourself, please.

21 A. Yes. My name is Lawrence J. Makovich,
22 and I am vice president and chief power strategist at
23 IHS energy.

24 MR. KUTIK: May we go off the record for
25 a minute, your Honor?

1 EXAMINER ADDISION: You may.

2 (Discussion off the record.)

3 EXAMINER ADDISION: Let's go back on the
4 record.

5 Q. (By Mr. Kutik) Dr. Makovich, do you have
6 before you what's been marked for identification as
7 Company Exhibit 42?

8 A. Yes, I do.

9 Q. And what is that document?

10 A. My supplemental testimony.

11 Q. Do you have any additions or corrections
12 to make to that document today?

13 A. I have a correction to make regarding my
14 deposition.

15 Q. Well, I asked you about your testimony.

16 A. No, I do not.

17 Q. Well, have you received any further
18 appointments or educational appointments?

19 A. With regard to my background, since I put
20 this testimony together, I've accepted an appointment
21 as a senior fellow at the Mossavar-Rahmani Center for
22 business and government in the Kennedy School at
23 Harvard University.

24 Q. Let me direct you to page 9 of your
25 testimony, sir.

1 A. Yes.

2 Q. There is a figure there, is there not,
3 Figure 1?

4 A. Yes.

5 Q. Could you tell us what the source of that
6 figure is, please.

7 A. And this is what I was referring to in my
8 deposition. I had been asked about the source, and I
9 referred to the source in the footnote here which is
10 the source of the data. The source of this figure,
11 though, is the U.S. Department of Energy, 2009 Wind
12 Technologies Market Report published August, 2010.

13 Q. So the sources that are listed here were
14 the sources listed by the Department of Energy in
15 this report?

16 A. Yes.

17 Q. Other than the two things we've just
18 talked about, if I asked you the questions that
19 appear in Company Exhibit 42, would the answers be as
20 they appear in that document?

21 A. Yes.

22 MR. KUTIK: Thank you, your Honor.

23 EXAMINER ADDISION: Thank you, Mr. Kutik.

24 This witness is available for cross.

25 Do I have any volunteers to go first?

1 Mr. Olikar, thank you.

2 MR. OLIVER: Thank you, your Honor.

3 MR. OLIVER: Good afternoon.

4 MR. KUTIK: Good morning.

5 - - -

6 CROSS-EXAMINATION

7 By Mr. Olikar

8 Q. Good morning, Dr. Makovich.

9 A. Good morning.

10 Q. Just a few questions today. My name is
11 Joe Olikar, and I represent IGS Energy. In your
12 testimony when you are discussing whether it is
13 economic to retire a power plant, would you agree you
14 are not discussing the metrics that FirstEnergy
15 Solutions will consider when making the decision to
16 retire any power plants?

17 A. I've provided the metrics that you would
18 think of from an economic standpoint with regard to
19 the efficient decision to retire a power plant.

20 Q. So the answer is you haven't provided an
21 analysis of what FirstEnergy Solutions personally
22 would consider?

23 A. No, I have not.

24 Q. Okay. Thank you. And turning to page
25 15, when you are referring to whether cost-based

1 compensation would provide a subsidy, the basis for
2 your opinion is referring back to your analysis you
3 performed on page 11, correct?

4 A. I'm sorry, what line are you referring to
5 on page 15?

6 Q. I am referring to the Q and A on page 15
7 and 16 -- I'm sorry, on page 15, lines 16 and 17, and
8 that Q and A which addresses the question of whether
9 or not the PPA would be a uneconomic subsidy. And am
10 I correct that in -- I believe it's in the
11 parentheses on line 19, "because the cost of
12 continued operation is below the cost of closing the
13 Plants and replacing them with the lowest-cost source
14 of equivalent power supply," in that parenthetical
15 you are referring to the analysis you've done on
16 pages 11 and 12, correct?

17 A. What analysis are you referring to on 12,
18 did you say? 11 and 12?

19 Q. Yes, pages 11 and 12.

20 A. I'm not sure I understand your question.

21 Q. Am I correct that when you say "because
22 the cost of continued operation is below the cost of
23 closing the Plants and replacing them with the
24 lowest-cost source of equivalent power supply," you
25 are referring to your comparison of what it would

1 cost on a going-forward basis to build a natural
2 gas-fired power plant at \$1,400 a kilowatt?

3 A. No.

4 Q. What are you referring to?

5 A. What I am referring to here is the
6 testimony of Don Moul of FirstEnergy with regard to
7 the fact that it would be more expensive to replace
8 these plants than it would be to continue to operate
9 them.

10 Q. Do you have a reference to Mr. Moul's
11 testimony that you are referring me to?

12 A. I don't have his testimony here in front
13 of me.

14 MR. OLIKER: Can I have one second, your
15 Honor?

16 EXAMINER ADDISON: You may.

17 Q. Okay. So am I correct on page 15 in that
18 parenthetical that we have been referring to on line
19 19, you are relying on Mr. Moul?

20 A. Inside the parenthesis that the cost of
21 continued operation is below the cost of closing the
22 plants and replacing them, I am relying on the
23 testimony from Don Moul.

24 Q. Okay. Thank you. Now, referring back to
25 what we were talking about previously on page 11, you

1 refer to line 13, "Using IHS's internal metrics,
2 upfront capital costs would run around \$1,400/kW."
3 And then you indicate "with an annual levelized
4 carrying charge of 14%, the annual fixed cost would
5 be \$196/kW."

6 And am I correct that to get the \$196
7 number, you just multiply 1,400 by 14 percent?

8 A. Yes.

9 Q. And is the 14 percent a capital carrying
10 cost?

11 A. Well, the example here, I was trying to
12 put a simple example together about what that
13 levelized capital carrying charge rate would be.

14 Q. Am I correct 14 percent represents a
15 weighted average cost of debt and equity?

16 A. That would be part of it.

17 Q. What else is in there?

18 A. You would have things like depreciation,
19 taxes, and so forth.

20 Q. Okay. So am I correct the 14 percent
21 return that we are talking about here would be the
22 amount of compensation a new power plant would need
23 in addition to its cost of operation?

24 MR. KUTIK: Objection.

25 EXAMINER ADDISON: Grounds?

1 MR. KUTIK: Mischaracterizes the witness'
2 testimony. The witness didn't characterize this as a
3 return. He characterized this as a carrying charge
4 rate.

5 EXAMINER ADDISON: Care to rephrase,
6 Mr. Olikar?

7 MR. OLICKER: I think the witness, your
8 Honor, did identify it as a form of return. If
9 that's not true, he can correct me. I would like to
10 start with that point to figure out what he means in
11 his testimony, your Honor.

12 EXAMINER ADDISON: Do you agree that what
13 you testified to is a return?

14 THE WITNESS: No.

15 Q. (By Mr. Olikar) And why is that?

16 A. The capital carrying charge rate includes
17 as one of the components, it's a rate that's going to
18 recover the capital, the return of the capital as
19 well as a return on the capital, and there are other
20 factors that go into it as well with regard to taxes
21 and so forth. So it's an annual levelized capital
22 carrying charge rate.

23 Q. And is the taxes you refer to federal
24 income tax?

25 A. It would include federal income taxes, or

1 if there were a state tax, it could include state
2 taxes as well, income taxes.

3 Q. Okay. And so the way to determine is --
4 below your 14 percent number, then you also provide
5 the amount of megawatt-hour compensation the plant
6 would need, correct?

7 A. I'm sorry. I am not sure what you are
8 referring to.

9 Q. So you provide a -- you identify on lines
10 15 and 16 \$26 a megawatt-hour cost. Is that the
11 amount of cost you believe the plant would need to
12 recover their costs at 85 percent power factor?

13 A. No. What I've done there is simply to
14 take the \$196 per kW and express it in an equivalent
15 dollar per megawatt-hour.

16 Q. Right. Okay. So assuming the power
17 plant operates at 85 percent at the time, is that
18 what that represents?

19 A. That's right.

20 Q. And the way we convert 196 on an annual
21 basis is \$26 a megawatt-hour to recover the 196. So
22 am I correct the \$26 per megawatt-hour is a profit --

23 MR. KUTIK: Can I have the question
24 reread?

25 EXAMINER ADDISON: If you could maybe

1 restate it, Mr. Olikier.

2 MR. OLIER: I will restate it, your
3 Honor.

4 Q. (By Mr. Olikier) There is another way to
5 do this. So am I correct that the \$26 per
6 megawatt-hour cost you identified on line 16 is
7 compensation the plant would have to earn in addition
8 to its variable costs?

9 A. The way I have characterized it is that
10 \$26 per megawatt-hour is the cost component that's
11 going to cover that annualized capital carrying
12 charge.

13 Q. And that has to be compensation in
14 addition to variable cost, right?

15 A. Yes, yes.

16 Q. Okay. And can you identify going back to
17 the 14 percent what portion of that relates to debt
18 and what portion relates to equity?

19 A. I have not included any kind of breakdown
20 of the components of this. When I put my testimony
21 together, I wanted to put together a simple example
22 of what I thought was a very low estimate of what the
23 costs of entry for a baseload plant would be to show
24 that the current cash flows in the PJM market are not
25 supporting it. So I haven't provided any kind of

1 detailed background. These are just what I would
2 consider to be reasonable estimates of what a capital
3 carrying charge rate would be and the upfront costs
4 of a plant.

5 Q. So do you believe these are real numbers
6 in your testimony on lines 13 through 23, or are they
7 just hypothetical numbers?

8 A. I'm not sure what you mean by real versus
9 hypothetical.

10 Q. Are you offering these numbers that are
11 contained in your testimony on 13 through 23 as
12 numbers the Commission should consider for upfront
13 capital costs of a power plant?

14 A. The reason I've included these in my
15 testimony are to provide some perspective to the
16 current level of capacity and energy prices, which,
17 with my example I'm showing, don't cover even what I
18 consider to be a low estimate of what it would cost
19 to provide baseload power.

20 Q. Okay. Would you agree that if we were to
21 lower the \$1,400 per kilowatt number, the \$196
22 kilowatt number would also become smaller?

23 A. Well, with this hypothetical, if all else
24 were equal, then there's a direct relationship
25 between that \$1,400 a kW and the 196, and that's

1 based on the 14 percent capital carrying charge we
2 used.

3 Q. Would you agree -- the \$1,400 a kilowatt
4 number, is that independent of the 14 percent number?

5 A. Yes.

6 Q. Okay. So we talked a little bit about
7 the level of debt and equity in the 14 percent. Do
8 you have an idea of what the cost of debt was that
9 was utilized in that number?

10 A. As I said, I was just trying to provide a
11 simple example here with what I thought would be
12 typical numbers that people would recognize as far as
13 a levelized capital carrying charge rate and the cost
14 of building one of these power plants.

15 Q. Well --

16 A. And as I said, in my mind this is a low
17 estimate of the costs you would need for new entry on
18 a baseload plant.

19 Q. Okay. So using typical numbers, what
20 should be assumed for debt-to-equity ratio?

21 A. Well, it varies specific to a company.
22 There is quite a range of capital structures that we
23 review in the industry. So I don't have any analysis
24 in front of me to tell me what typical is. I mean,
25 we see people use a range of these capital

1 structures.

2 Q. So your analysis to come to the
3 14 percent number, you don't know what you used?

4 A. What I am saying is I've done these
5 analyses with different capital structures and
6 different costs of capital and different tax rates
7 from state to state and so forth. And my testimony
8 is that a levelized annual carrying charge rate of
9 around 14 percent is something that is -- is a
10 typical kind of rate.

11 Q. Okay. Would a debt rate of 4-1/2 percent
12 be reasonable?

13 A. Reasonable for what?

14 Q. For the 14 percent rate as part of the
15 weighted average cost to capital.

16 A. Well, if we are talking about building a
17 merchant power plant that's going to have to live and
18 die off of the revenue streams from this marketplace,
19 to me that sounds low.

20 Q. Okay. Moving down to line 22, going on
21 to line 23, where you say, "The capacity price in PJM
22 recently cleared around \$40/per kW year," would you
23 agree that the 2018-19 transition auction cleared
24 around \$60 a kilowatt-year, which would simply be 165
25 times .365.

1 A. Let's see, the -- are you talking about
2 the most recent capacity auction?

3 Q. Yes.

4 A. I will have to check the numbers. My
5 impression was it was more around \$120 per
6 megawatt-day.

7 Q. Do you review capacity auction results
8 often?

9 A. I do it periodically.

10 Q. When was the last capacity auction that
11 you reviewed?

12 A. Well, since I filed this testimony we had
13 a capacity auction in PJM, and I have looked at the
14 results.

15 MR. OLIKER: Mr. Kutik, does he still
16 have the exhibits that have been marked previously, a
17 very large stack, on the stand?

18 MR. KUTIK: They are next to him.

19 MR. OLIKER: Is there a document there --
20 a stack of IGS exhibits?

21 MR. KUTIK: There should be.

22 MR. OLIKER: Could you try to locate
23 those that are on the stand, Mr. Makovich?

24 MR. KUTIK: May I help the witness, your
25 Honor?

1 EXAMINER ADDISON: You may.

2 MR. OLIKER: We can go off the record for
3 a second.

4 EXAMINER ADDISON: Let's go off the
5 record.

6 (Discussion off the record.)

7 EXAMINER ADDISON: Let's go back on the
8 record.

9 Q. (By Mr. Oliker) Dr. Makovich, do you
10 recognize the document that's been marked as IGS
11 Exhibit 5, which contains 2018-19 PJM base residual
12 auction results?

13 A. I have that in front of me, yes.

14 Q. Does that document refresh your
15 recollection to the capacity performance product
16 clearing price of \$165 per megawatt-day?

17 A. The print is very small. I am trying to
18 find what you are referring to.

19 Q. I think it should be on the first page.

20 A. And your question was what?

21 Q. Would you agree the 2018-19 performance
22 product clearing price was \$165 per megawatt-day?

23 MR. KUTIK: And I assume you are
24 referring to the rest of the RTO price.

25 MR. OLIKER: Yes.

1 A. Yes, I see rest of RTO price here of
2 164.77.

3 Q. Okay. Which I think we've established
4 now is different than the price you offered to me a
5 few minutes ago, correct?

6 A. I thought you had asked about the '17-'18
7 auction. This is the '18-'19 auction.

8 Q. Easy confusion to make.

9 A. Okay.

10 Q. Would you agree, getting back to he
11 earlier question, the kilowatt-year compensation for
12 \$165 per megawatt-day is simply 165 times .365?

13 A. I'm sorry, say that again.

14 Q. If we want to convert a megawatt-day to a
15 kilowatt-year, we just times the megawatt-day price
16 times .365.

17 A. To make the conversion.

18 Q. And converting 165 to a kilowatt-year
19 gives you a kilowatt-year price of about 60, correct?

20 A. Okay.

21 Q. And if we compare that to the price you
22 used on lines 22 and 23, would you agree that it's
23 50 percent higher?

24 A. Yes.

25 Q. And all else being equal, using \$60 per

1 kilowatt-year, you shrink the shortfall in cash flows
2 you've identified on this Q and A, correct?

3 A. Well, it would depend on what you are
4 assuming out in '18-19 your energy contribution would
5 be.

6 Q. Okay. But all else being equal, you
7 would agree?

8 A. I would agree with what?

9 Q. That you would make the shortfall in cash
10 flow smaller?

11 A. As I said, this shortfall is going to be
12 a function of not just your capacity compensation but
13 what the energy market is going to be providing for
14 you out there as well.

15 Q. Okay.

16 A. And I haven't made any assumptions here
17 about what that's going to be out in the future.

18 Q. Okay. But getting back to the question,
19 if the energy compensation is the same as you've
20 identified in your example and we just increase the
21 capacity compensation, then the shortfall gets
22 smaller, right?

23 A. The analysis I provided here was to show
24 you a recent set of market conditions. We are now
25 talking about a future, further outset of market

1 conditions where the shortfall would be a function of
2 both that capacity price and the energy price, and we
3 haven't -- I haven't put any analysis together for
4 you on what I think the shortfall is going to be out
5 in the 2019 timeframe.

6 The purpose of this testimony here is to
7 show you that even with a low estimate of the costs
8 of new entry, we've had a situation in the past where
9 the prices are not high enough to cover the costs and
10 we have had a chronic shortfall.

11 MR. OLIKER: Your Honor, at this time I
12 would like to move to strike his answer and have the
13 witness directed to answer my question.

14 MR. KUTIK: Your Honor, the witness was
15 explaining why he could not agree with counsel's
16 hypothetical, and he should have an opportunity to
17 say that.

18 MR. OLIKER: Your Honor, that's why it's
19 a hypothetical. I would prefer he answer my question
20 and then feel free to disagree after the fact. But
21 he should at least have to answer the question that's
22 been posed to him.

23 MR. KUTIK: I think he has answered the
24 question several times. He can't do what counsel
25 wants him to do.

1 EXAMINER ADDISON: Thank you. At this
2 time I will deny the motion to strike. We have been
3 pretty consistent allowing the witness one bite of
4 the apple, so to speak, where they can elaborate on
5 their answer.

6 But from this point forward I will just
7 direct you to simply answer the counsel's question as
8 directly as you can. Mr. Kutik will be able to raise
9 any additional information up on redirect, so thank
10 you.

11 MR. OLIKER: Thank you, your Honor.

12 Q. (By Mr. Oliker) Okay. Dr. Makovich,
13 let's talk about the energy portion of the
14 compensation then you just identified. Would you
15 agree that \$3.50 per million MMBTU is significantly
16 higher than the current price for natural gas?

17 A. Than the current what? Forward price?

18 Q. Current price for natural gas.

19 A. It depends on what price you are talking
20 about.

21 Q. How about the Henry Hub?

22 A. Well, the Henry Hub is a spot price
23 delivered to a point in Louisiana that's quite
24 different from what the delivered price of gas would
25 be in Ohio.

1 Q. And would you agree TCO Pool and Dominion
2 South are significantly lower than Henry Hub because
3 of the base differentials?

4 A. I don't have the basis differentials in
5 front of me.

6 Q. Do you agree they are lower priced than
7 the Henry Hub?

8 A. Like I said, I don't have any of the
9 bases in front of me, either the current basis or
10 what they have been in the past.

11 Q. Okay. Let's go back to the Henry Hub.
12 Would you agree that the Henry Hub is the index price
13 for natural gas starting point for evaluation across
14 the country?

15 A. No. The Henry Hub is a benchmark price
16 that people often refer to because it's a very liquid
17 trading point in Louisiana. It may or may not be
18 used as an index price in a contract. I can't tell
19 you how often it's used.

20 Q. Okay. And would you agree that Henry Hub
21 is currently trading about a dollar per MMBTU lower
22 than what you've identified on line 17 of page 11?

23 A. You are talking about the current --

24 Q. Yes.

25 A. -- price as of today?

1 Q. Yes.

2 A. I don't know what it's currently trading
3 for right now, but as I've shown you in my graphics
4 here, that the Henry Hub price has very strong
5 seasonal movements, daily movements. Any daily Henry
6 Hub price is certainly not an indicator for what's
7 typical.

8 Q. Would you agree that since January of
9 2014 the Henry Hub price for spot gas has stayed
10 below \$3 per MMBTU?

11 A. I would have to -- since January
12 including the winter?

13 Q. 2015, I'm sorry. I misspoke.

14 A. What are we talking about now?

15 Q. The Henry Hub spot price has stayed below
16 \$3 per MMBTU since January of 2015, correct?

17 A. I would have to look at the data. My
18 recollection is that we saw some winter price spikes
19 down there.

20 Q. Could you identify where you believe the
21 spot gas prices have been since December of 2014?

22 A. As I said, I don't have any of that Henry
23 Hub data here in front of me.

24 Q. Would you agree that -- how often do you
25 review natural gas prices?

1 A. I review natural gas prices on a periodic
2 basis.

3 Q. And is it your testimony that natural gas
4 prices have been in the \$350 range for the past nine
5 months?

6 A. I didn't testify to that.

7 Q. They have been lower, right?

8 A. As I said, I don't have the data in front
9 of me to tell you what percentage of the time they
10 were higher than that or what percentage of the time
11 they were lower than that.

12 Q. Does CERA's forecast natural gas prices
13 for the future?

14 A. Yes, we do.

15 Q. Are you privy to those forecasts?

16 A. Yes.

17 Q. How often do you review them?

18 A. I review them periodically.

19 Q. When was the last time?

20 A. I'm often asked to come in and make
21 presentations on the power business world, talk about
22 the outlook of gas, so I have looked at them within
23 the last month.

24 Q. Are CERA's forecasts considered
25 proprietary?

1 A. Yes.

2 Q. Do you know where CERA is predicting
3 natural gas prices to be in 2016?

4 A. I don't have the latest version of our
5 forecast in front of me to tell you exactly what that
6 number is.

7 Q. Do you have a general idea?

8 A. Yes, I have a general idea.

9 Q. How about 2017?

10 A. Again, I just don't have the forecast in
11 front of me to give you exactly what these numbers
12 are.

13 Q. Do you know within a 50-cent range?

14 A. As I said, I don't want to testify to
15 numbers that I don't have in front of me. So, yeah,
16 my testimony is not about IHS's natural gas price
17 forecasts.

18 Q. The 3.50 per million MMBTU price
19 identified on page 11, was that provided from the
20 CERA forecast or where did you identify that number
21 from?

22 A. I used that number based upon a number
23 that reflects what people have been experiencing on a
24 delivered price of gas basis in the power sector.

25 Q. Experiencing from what time period?

1 A. Again, I was trying to present numbers
2 here that reflected recent conditions, so the typical
3 price over the past couple of years.

4 Q. Okay. Have you identified the levelized
5 carrying charge rate for the Davis-Besse or Sammis
6 power plants?

7 A. No, I have not.

8 Q. Which cost components would you consider
9 in creating that levelized carrying charge rate?
10 Maybe I can start and help you out, and let me know
11 if this is right. You would include a return on rate
12 base for the equity portion and return on rate base
13 for the debt portion, also federal income taxes,
14 state income taxes, and depreciation, correct?

15 A. Now you are asking me questions about
16 rate base, and --

17 Q. I can clarify, Dr. Makovich, if that will
18 help. When you are applying this 14 percent rate,
19 you're applying that to the total invested capital,
20 correct?

21 A. Yes.

22 Q. Okay. So maybe this will help. If we
23 were to look at the levelized carrying charge rate of
24 the Sammis plants, we would have to know the debt
25 rate and the equity rate, correct?

1 A. When we talk about the rates, you are
2 talking about the cost of debt and the cost of
3 equity?

4 Q. Yes.

5 A. Yes.

6 Q. You would have to know those two numbers?

7 A. Yes.

8 Q. And then we would multiply them by the
9 total invested capital reduced for ADIT, of course,
10 correct?

11 A. No. This is a rate per dollar, so a
12 capital carrying charge rate is a rate you apply per
13 dollar so it wouldn't depend on how much they had
14 invested.

15 Q. Isn't the investment based upon dollars?

16 A. Yes. The capital carrying charge rate is
17 a rate per dollar invested.

18 Q. Okay. So let's go back to that. We
19 would look at the weighted average cost of obtaining
20 capital, the debt and equity, and we would multiply
21 that number by all of the dollars that have been
22 invested in capital, right?

23 A. To come up with the capital carrying
24 charge rate?

25 Q. Yes, which is a portion of your levelized

1 rate, right?

2 MR. KUTIK: Well, objection, your Honor,
3 asked and answered.

4 EXAMINER ADDISON: Overruled.

5 A. I think you and I are having a problem
6 here because you are talking about a carrying charge
7 in absolute terms. I am talking about a carrying
8 charge here. It's a rate per dollar invested.

9 Q. What do you mean by "rate per dollar
10 invested"? I'm sorry. I am just not following you.

11 A. This annualized levelized carrying charge
12 of 14 percent is the annual levelized carrying charge
13 rate per dollar of investment.

14 Q. Okay. Maybe if we can put numbers on it,
15 maybe it would be easier. Imagine \$2 billion is
16 invested in the Sammis plant in a selective catalytic
17 production retrofit. Could you describe how your
18 carrying charge rate would apply to that investment?

19 A. Can I -- what did you say?

20 THE WITNESS: Could you read the question
21 back, please.

22 EXAMINER ADDISON: Yes, please.

23 (Record read.)

24 A. This capital -- this capital carrying
25 charge rate is something that I've said is a ballpark

1 number for this merchant generating plant. It's
2 going to be different for FirstEnergy. FirstEnergy
3 is going to have their own capital carrying charge
4 rate.

5 Q. What I am trying to understand is you
6 said it's a rate per dollar.

7 A. Yes.

8 Q. So in this \$2 billion investment, are you
9 saying it's a rate applied to that \$2 billion?

10 A. In the -- you would take a -- I think
11 it's doing what I'm doing here. You are taking an
12 annual levelized carrying charge rate per dollar, and
13 you are multiplying it by the dollar per kW to give
14 you a dollar per kW capital carrying charge.

15 Q. So we would need to know the megawatt
16 total; is that correct?

17 A. This -- this is on a per-kilowatt basis,
18 but I don't need to know the megawatt total here.

19 Q. Why not?

20 A. Because I've done this analysis on a
21 per-kilowatt and per-megawatt-hour basis.

22 Q. So that's -- you are just saying because
23 you have done it on a kilowatt basis, you just moved
24 some zeros and then you know the megawatt number,
25 right?

1 A. The conversion from kilowatt to megawatt,
2 yes, is a factor of a thousand.

3 Q. Okay. To determine -- is another way to
4 determine the upfront capital costs of a plant to
5 take the total -- is one way to determine the upfront
6 capital costs to a plant to take the total invested
7 capital and divide it by the kilowatts?

8 MR. KUTIK: May I have the question read,
9 please.

10 EXAMINER ADDISON: You may.

11 (Record read.)

12 A. Yes, the upfront capital costs I am
13 referring to there are all the capital that's been
14 deployed divided by size of the plant.

15 Q. Okay. And I just wanted to make sure I'm
16 clear about this. You haven't compared the
17 going-forward capital costs -- I'm sorry. Strike
18 that.

19 You haven't compared the levelized
20 carrying charge applicable to Sammis and Davis-Besse
21 and compared it to a new power plant, correct?

22 A. I have not.

23 MR. OLIKER: One minute, your Honor.

24 Q. Actually, just going back to the \$3.50
25 per MMBTU, if that number is, in fact, lower, all

1 else being equal, you would agree the plant will earn
2 more energy revenue?

3 A. No.

4 Q. And why is that?

5 A. Because there is a direct linkage between
6 the price of natural gas and the market clearing
7 price of electricity in allotted hours, so your
8 market price would also change if the gas prices
9 change.

10 Q. But all else being equal, if a market
11 clearing price does not change, then it will earn
12 more revenue, correct?

13 A. Well, you are posing a hypothetical
14 that's inconsistent. If the market clearing price is
15 determined by the competitive bidding of rival
16 generators based on their incremental generating
17 costs, which are largely based on their fuel costs,
18 that would have to move if we have got a movement in
19 the delivered price of gas to the competitors.

20 MR. OLIKER: Your Honor, I would move to
21 strike his answer which was not responsive to my
22 question.

23 EXAMINER ADDISON: Mr. Kutik.

24 MR. KUTIK: Again, your Honor, this
25 witness is not required to accept the hypothetical

1 that he says just can't happen.

2 MR. OLIKER: Your Honor, I would disagree
3 that he should answer the hypothetical, and then he
4 is free to disagree with it afterward and provide an
5 explanation.

6 EXAMINER ADDISON: I'll deny the motion
7 to strike. With that -- with your issue, with that
8 hypothetical being on the record, can you -- is there
9 any way to assume that the market prices will not
10 change? Are you able to answer Mr. Oliker's question
11 as posed, noting that you believe the hypothetical is
12 inconsistent with what would actually happen in
13 reality?

14 THE WITNESS: I believe the latter.

15 MR. OLIKER: Okay. I'll follow-up, your
16 Honor.

17 EXAMINER ADDISON: Thank you.

18 Q. (By Mr. Oliker) Let's assume coal prices
19 rise, and natural gas prices are \$2.50. In that
20 hypothetical, coal resources will probably set the
21 clearing price, correct?

22 A. Will probably what?

23 Q. Set the marginal clearing price at each
24 node.

25 A. As I said, there are -- I didn't say all

1 hours are set by natural gas prices. We've got some
2 off-peak hours when the incremental generating costs
3 of rival coal producers can be setting the prices,
4 but when we are talking about when these natural gas
5 plants are typically running, they are running over a
6 period of time when it's the gas price that's
7 typically setting the market clearing price.

8 Q. Would you agree coal resources are
9 currently setting the clearing price predominantly
10 throughout PJM?

11 THE WITNESS: Would you reread that
12 question, please.

13 (Record read.)

14 A. I'm not sure I can agree with that
15 statement, no.

16 Q. Why is that?

17 A. I've looked at this data. I think in the
18 majority of on-peak hours, natural gas prices are --
19 the rival generators fuel of natural gas is probably
20 setting the price. I think in the off-peak hours
21 what you say may be true, but I don't think it's true
22 for all hours.

23 Q. What data did you review to come to that
24 determination?

25 A. I periodically look at the data with

1 regard to the price level and the clearing of demand
2 and supply in these markets to see what units are
3 setting prices.

4 Q. What is the source of that data?

5 A. We have data with regard to hourly load
6 patterns in these power systems and data regarding
7 the marginal costs and capability on the supply side.

8 Q. Were you in the room when Judah Rose
9 testified that coal resources were currently setting
10 the clearing price?

11 A. I was not in the room.

12 Q. So you disagree with him?

13 A. As I said, I don't have the data in front
14 of me. My understanding is that that statement might
15 be true in the off-peak period in PJM. I don't think
16 that would -- but, again, I don't have the data in
17 front of me. I don't think that's true in the
18 on-peak period.

19 Q. Okay. And you also don't review ICF
20 International's forecast of upfront capital costs for
21 a natural gas combined cycle unit, correct?

22 MR. KUTIK: May I have the question read,
23 please?

24 EXAMINER ADDISON: You may.

25 (Record read.)

1 A. I do not review their forecasts.

2 MR. OLIKER: I believe that's all the
3 questions I have, your Honor.

4 Thank you, Dr. Makovich.

5 EXAMINER ADDISON: Thank you, Mr. Oliker.
6 Mr. Soules?

7 MR. SOULES: Thank you, your Honor.

8 - - -

9 CROSS-EXAMINATION

10 By Mr. Soules:

11 Q. Good morning, Dr. Makovich.

12 A. Good morning.

13 Q. My name is Michael Soules, and I
14 represent CERA in this proceeding. How are you?

15 A. Good thanks.

16 Q. Good. And am I pronouncing that
17 correctly, it's Makovich?

18 A. Makovich, yes.

19 Q. Great, thank you. And, Dr. Makovich, you
20 have been serving in your current position with IHS
21 Energy since 2004; is that correct?

22 A. That's when IHS purchased Cambridge
23 Energy Research Associates, but I have been with CERA
24 since '94, I think.

25 Q. Okay. Thank you. And could you please

1 turn to Attachment LM-1 of your testimony. Let me
2 know once you are ready.

3 A. Excuse me?

4 Q. Please let me know once you are ready.

5 A. You are talking about the "Value of U.S.
6 Power Supply Diversity" study?

7 Q. No, no.

8 MR. KUTIK: He is referring to your
9 vitae.

10 Q. And specifically to the last page of your
11 CV.

12 A. The last page?

13 Q. Yes.

14 A. Okay.

15 Q. Dr. Makovich, you testified before the
16 North Carolina Public Service Commission in July of
17 2014, correct?

18 A. Yes.

19 Q. And in that proceeding you testified on
20 behalf of Duke Energy, correct?

21 A. That's correct.

22 Q. And apart from that North Carolina
23 proceeding, you have never provided testimony to a
24 state utilities commission or public service
25 commission, correct?

1 A. Correct.

2 Q. Okay. And in your professional career
3 you've also testified before the U.S. Congress
4 several times, correct?

5 A. Yes.

6 Q. And looking at the last page of LM-1,
7 there appear to be three committee hearings that are
8 listed there. Do you see those?

9 A. Yes.

10 Q. And all of those committee hearings are
11 from January -- are from 2001, correct?

12 A. Yes.

13 Q. And have you testified before the U.S.
14 Congress on any occasion other than these three
15 committee hearings?

16 A. No.

17 Q. Before we talk about your written
18 testimony in more detail, there were just a couple of
19 preliminary points I wanted to cover. So, first of
20 all, if I refer to the Ohio Edison Company, The
21 Cleveland Electric Illuminating Company, and the
22 Toledo Edison Company as "the companies," will you
23 understand what I mean?

24 A. Yes.

25 Q. And if I refer to FirstEnergy Solutions

1 Corp. as "FES," will you understand what I mean?

2 A. Yes.

3 Q. And you are aware that FES owns a
4 4.85 percent interest in two Ohio Valley Electric
5 Corporation plants, correct?

6 A. Yes.

7 Q. And if I refer to those power plants as
8 "the OVEC plants," will you understand what I mean?

9 A. Yes.

10 Q. And if I refer to FES's ownership share
11 as the "OVEC entitlement," will you understand what I
12 mean?

13 A. Yes.

14 Q. And, Dr. Makovich, are you generally
15 aware of the proposed agreement under which FES would
16 sell to the companies the capacity, energy, and
17 ancillary services, from the Davis-Besse and Sammis
18 plants and the OVEC entitlement?

19 A. Yes.

20 Q. And if I refer to that proposed agreement
21 as the "proposed transaction," will you understand
22 what I mean?

23 A. Yes.

24 Q. Okay. And you are not familiar with the
25 specific terms and conditions of the proposed

1 transaction, correct?

2 A. I have read the term sheet so I have a
3 general awareness.

4 Q. At the time you submitted your testimony
5 in this proceeding, you had not read the term sheet,
6 correct?

7 A. That's true.

8 Q. And at the time you had your deposition
9 taken on May 27, 2015, you had not read the term
10 sheet, correct?

11 A. That's true.

12 Q. Okay. Do you know what return on equity
13 FES would receive for its plants under the proposed
14 transaction?

15 A. I don't have that in front of me, no.

16 Q. Okay. And you are not offering any
17 opinions in this case regarding the specific terms of
18 the proposed transaction, correct?

19 A. With regard to the terms of the -- of the
20 proposed transaction, no.

21 Q. Thank you. And Dr. Makovich, you have
22 not reviewed the direct testimony of companies'
23 witness Jay Ruberto, correct?

24 A. I have read it, yes.

25 Q. At the time that you submitted your

1 testimony in this proceeding, you had not reviewed
2 the testimony of Jay Ruberto, correct?

3 A. That's true.

4 Q. And that also was true as of the date you
5 had your deposition taken?

6 A. Yes.

7 Q. And you have not reviewed the direct
8 testimony of companies' witness Jason Lisowski,
9 correct?

10 A. I have read Lisowski's testimony.

11 Q. Okay. At the time you submitted your
12 testimony you had not reviewed Mr. Lisowski's
13 testimony, correct?

14 A. True.

15 Q. Have you reviewed the direct testimony of
16 companies' witness Judah Rose?

17 A. Yes.

18 Q. At the time you had submitted your
19 testimony in this proceeding, however, you had not
20 reviewed Mr. Rose's testimony, correct?

21 A. Yes.

22 Q. Okay.

23 EXAMINER ADDISON: Can we go off the
24 record for a moment?

25 (Discussion off the record.)

1 EXAMINER ADDISON: Let's go back on the
2 record.

3 MR. SOULES: Your Honor, may I have the
4 last question and answer read back?

5 EXAMINER ADDISON: You may.

6 (Record read.)

7 MR. SOULES: Thank you for rereading it.

8 EXAMINER ADDISON: You're welcome.

9 Q. (By Mr. Soules) Dr. Makovich, when you
10 said "yes," you were agreeing you had not reviewed
11 Mr. Rose's testimony, correct?

12 A. I hadn't reviewed it prior to submitting
13 my testimony, correct.

14 Q. And you also had not reviewed it prior to
15 having your deposition taken on May 27, correct?

16 A. That's correct.

17 Q. And you are aware that companies' witness
18 Donald Moul filed supplemental testimony in this
19 case?

20 A. Yes.

21 Q. And you have not reviewed Mr. Moul's
22 supplemental testimony, correct?

23 A. I have reviewed his supplemental
24 testimony.

25 Q. At the time your testimony was submitted

1 in this case, however, you had not reviewed
2 Mr. Moul's supplemental testimony?

3 A. That's right.

4 Q. Nor had you reviewed it prior to your
5 deposition on May 27, correct?

6 A. That's right.

7 Q. And you have reviewed Mr. Moul's direct
8 testimony, correct?

9 A. Yes.

10 Q. Okay. If we could please turn to page 12
11 of your supplemental testimony, please let me know
12 once you are there.

13 A. Yes, I am on page 12.

14 Q. Okay. Great. Thank you. Starting on
15 line 8 there is a sentence that reads, "I discuss it
16 here in my testimony to appropriately form the
17 discussion on how the Plants at issue in this case
18 can be exceptional assets from an operations
19 perspective but nevertheless be financially
20 challenged." That's your testimony, correct?

21 A. Yes.

22 Q. Okay. And it's your opinion that the
23 Sammis plant is an exceptional asset from an
24 operational perspective, correct?

25 A. Yes.

1 Q. And you are relying on the direct
2 testimony of Donald Moul for that opinion, correct?

3 A. Yes.

4 Q. And that opinion is based entirely on
5 Mr. Moul's direct testimony, correct?

6 A. Well, the subsequent testimony from
7 Ruberto I think also supports the assertion.

8 Q. The subsequent testimony from Ruberto?

9 A. That I reviewed from Ruberto I think also
10 substantiates the assertion.

11 Q. At the time you made the assertion
12 reflected on page 8 of your written testimony, you
13 were relying solely on Mr. Moul's direct testimony,
14 correct?

15 A. Yes.

16 Q. And you're not offering any independent
17 opinions in this case regarding the Sammis plant's
18 operational characteristics, correct?

19 THE WITNESS: Could you reread the
20 question, please.

21 (Record read.)

22 A. Well, I am testifying that this plant
23 operates as part of a diverse power supply portfolio
24 of peaking, cycling, and baseload units with good
25 fuel diversity, and these characteristics are quite

1 valuable.

2 MR. SOULES: Your Honor, could I have the
3 last answer read back.

4 EXAMINER ADDISON: You may.
5 (Record read.)

6 MR. SOULES: Thank you.

7 Q. But you are not offering any specific
8 opinions regarding the Sammis plant's operational
9 characteristics, correct?

10 MR. KUTIK: Objection, asked and
11 answered. Same question he just asked.

12 EXAMINER ADDISON: Sustained.
13 Can you rephrase your question? Maybe
14 provide a little more clarification as to what you
15 mean by "operational characteristics."

16 MR. SOULES: Be happy to, your Honor.
17 Thank you.

18 EXAMINER ADDISON: Thank you.

19 MR. SOULES: Your Honor, may we approach?

20 EXAMINER ADDISON: You may.

21 Q. (By Mr. Soules) Dr. Makovich, you have
22 just been provided a copy of the transcript for your
23 deposition on May 27, 2015.

24 A. Yes.

25 Q. Do you recall having your deposition

1 taken on that date?

2 A. Yes, I do.

3 Q. And you were under oath for that
4 deposition, correct?

5 A. Yes.

6 Q. Okay. Could you please turn to page 31
7 of the transcript.

8 A. Yes.

9 Q. In looking at starting on line 13 of page
10 31 where you were asked the following question and
11 did you provide the following answer: Question,
12 "Okay. Are you offering any independent opinions in
13 this case regarding the Sammis plant's operational
14 characteristics?

15 Mr. Kutik: "Objection."

16 The Witness: "No."

17 A. That's not inconsistent with what I just
18 said.

19 Q. Did you provide that answer to that
20 question during your deposition?

21 A. The term "operational characteristics"
22 here, we're talking about the specific availability
23 or the efficiency and so forth of Sammis, so what I
24 said here is true, "No."

25 But Sammis is part of the portfolio that

1 I've been commenting on here. Its operations are
2 part of that portfolio. I was just trying to clarify
3 what the definition here is of operating
4 characteristics. When I answered this question, I am
5 assuming it's very, very specific with regard to
6 things like availability and fuel management and so
7 forth.

8 And it's correct, I haven't analyzed
9 Sammis' specific operating characteristics. I wanted
10 to make sure that we're talking about the same thing.
11 My analysis certainly does pertain to the operation
12 of Sammis in this diverse portfolio.

13 Q. Okay. Thank you for that clarification,
14 Dr. Makovich. It's your opinion that the Davis-Besse
15 plant is also an exceptional asset from an operations
16 perspective, correct?

17 A. Yes.

18 Q. And that opinion is based on the direct
19 testimony of Donald Moul, correct?

20 A. Yes.

21 Q. And you are relying entirely on the
22 direct testimony of Donald Moul for that opinion,
23 correct?

24 A. Yes.

25 Q. And looking back at page 12 of your

1 written testimony.

2 A. Yes, I am on page 12.

3 Q. Okay. And specifically looking at the
4 sentence that begins on line 15, your testimony
5 identifies reliability, price stability, and supply
6 diversity as benefits of coal and nuclear baseload
7 plants, correct?

8 A. Yes.

9 Q. And you are offering an opinion in this
10 proceeding about the reliability of the Davis-Besse
11 plant, correct?

12 A. As I said, I am relying on Don Moul's
13 testimony with regard to the reliability of Sammis.

14 Q. I'm sorry, my question was about
15 Davis-Besse.

16 A. Oh, I'm sorry.

17 THE WITNESS: Could you reread the
18 question, please?

19 (Record read.)

20 A. Again, with regard to the specific
21 operational characteristics of Davis-Besse, I am
22 relying on the testimony of Don Moul.

23 Q. And the direct testimony of Mr. Moul,
24 correct?

25 A. Yes.

1 Q. Okay. And you did not review any
2 specific data related to the reliability of the
3 Davis-Besse plant, correct?

4 A. Subsequent to putting the testimony
5 together, as I said, I reviewed Ruberto's testimony.
6 As I recall, he's got some benchmarking work there
7 with regard to how these plants compare to industry
8 peers.

9 Q. But at the time you submitted your
10 testimony in this case, you had not reviewed any
11 specific data relating to the reliability of
12 Davis-Besse, correct?

13 A. That's right.

14 Q. And at the time you submitted your
15 testimony in this case, you had not reviewed any
16 other documents related to the reliability of
17 Davis-Besse, correct?

18 A. Well, that's a pretty broad question. I
19 mean, Davis-Besse is part of PJM, and I've looked at
20 reliability assessments in all of PJM. Again, I want
21 to make sure we are talking about the same thing. I
22 have not looked at any specific reliability study on
23 the plant itself.

24 Q. Okay. Great. Thank you. And you are
25 offering no opinion in this proceeding about the

1 reliability of the Sammis plant, correct?

2 A. I'm not sure I understand your question.
3 What -- as I said, with regard to the reliability
4 of -- are you talking Davis-Besse?

5 Q. Now we are talking Sammis.

6 A. Now we are talking Sammis. Okay. Like I
7 said, I relied on Don Moul's testimony with regards
8 to the specifics of these units, these plants.

9 Q. So that's equally true for both Sammis
10 and Davis-Besse, correct?

11 A. Yes.

12 Q. And you have not reviewed any specific
13 data regarding the Sammis plant's reliability,
14 correct?

15 A. I think -- didn't we already answer this?
16 I said, yes, I am relying on Don Moul's testimony
17 with regard to those plants' operating
18 characteristics, and I haven't reviewed the specifics
19 of these plants, yeah.

20 Q. Okay. Thank you.

21 MR. KUTIK: May we go off the record?

22 EXAMINER ADDISON: We may.

23 (Discussion off the record.)

24 EXAMINER ADDISON: Let's go back on the
25 record.

1 Q. (By Mr. Soules) And, Dr. Makovich, in
2 preparing your testimony for this case, did you not
3 perform any analysis of coal transportation issues as
4 they might pertain to the Sammis plant specifically,
5 correct?

6 A. That's correct.

7 Q. Okay. Again, going back to your written
8 testimony, still on page 12, on line 23 there is a
9 reference to "uneconomic retirements of cycling and
10 base load power plants." Do you see that reference?

11 A. Yes.

12 Q. Okay. And it's your understanding that
13 Sammis and Davis-Besse would be best characterized as
14 baseload units, correct?

15 A. Yes.

16 Q. If we could turn to page 13 of your
17 testimony, please let me know once you are there.

18 A. I am on page 13.

19 Q. Thank you. Starting on line 3 there is a
20 sentence that begins, "These power plants" and then
21 there are some words after that. Do you see that
22 sentence?

23 A. Yes.

24 Q. And when you referred to "these power
25 plants" on line 3, you are not referring specifically

1 to Sammis and Davis-Besse, correct?

2 A. That's correct.

3 Q. You are referring to cycling and baseload
4 plants generally, correct?

5 A. Yes. What I am trying to do here is
6 illustrate a basic economic tradeoff in efficient
7 power production.

8 Q. Thank you. If you could please turn to
9 page 15 of your written testimony.

10 A. I am on page 15.

11 Q. Okay. Thank you. In looking down at
12 lines 18 to 22, it's your opinion that the Sammis and
13 Davis-Besse plants are economic because the cost of
14 continued operation is below the cost of closing the
15 plants and replacing them with the lowest-cost source
16 of equivalent power supply, correct?

17 A. Yes.

18 Q. Okay. So let's take these two plants in
19 turn, starting with Sammis. You are relying on
20 Mr. Moul's direct testimony for your opinion
21 regarding the expected cost of continuing to operate
22 the Sammis plant, correct?

23 THE WITNESS: Could you read the question
24 back, please.

25 (Record read.)

1 A. Don Moul's testimony was that his
2 analysis indicated exactly what I said here, the
3 continued operation would be the -- below the cost of
4 closing the plants and replacing them.

5 Q. Dr. Makovich, I thank you for the
6 clarification about what was in Mr. Moul's testimony.
7 I don't believe you directly answered my question.

8 Are you relying on Mr. Moul's testimony
9 for your opinion regarding the expected continued
10 costs of operation of Sammis?

11 MR. KUTIK: Well, your Honor, I believe
12 he has answered the question. He directly cited
13 Mr. Moul's testimony and said what Mr. Moul said. So
14 I object to asked and answered.

15 MR. SOULES: Your Honor, I don't believe
16 he did directly answer my question.

17 EXAMINER ADDISON: May we have the
18 question read back, please.

19 (Record read.)

20 MR. KUTIK: Your Honor, he went on to say
21 what Mr. Moul basically said in his testimony in
22 response to that question.

23 MR. SOULES: And, your Honor, I think
24 it's a "yes" or "no" question or could be answered
25 with a "yes" or "no."

1 EXAMINER ADDISON: I'll overrule the
2 objection.

3 Please answer the question with a "yes"
4 or "no."

5 A. I repeated Don Moul's testimony because
6 he didn't break up the costs from the revenues. Your
7 question was am I relying on his estimates of the
8 cost stream. He didn't break them out. What he said
9 was that his analysis of these plants indicated that
10 it would cost more to close them and replace them
11 than it would to continue to operate them.

12 EXAMINER PRICE: Dr. Makovich, the
13 examiner asked you to answer "yes" or "no." You
14 should have answered "yes" or "no" or explained why
15 you couldn't answer "yes" or "no."

16 THE WITNESS: Okay. I can't answer yes
17 or no to the question because Don Moul's testimony
18 was about revenues versus costs, and you asked me a
19 question about just the costs.

20 MR. SOULES: Okay. Thank you, your
21 Honor.

22 THE WITNESS: I'm sorry. It's about the
23 relative costs of one plant versus another. He
24 didn't provide the cost estimates of the plant.

25 Q. (By Mr. Soules) And, Dr. Makovich, in

1 preparing your testimony you did not review any cost
2 estimates for Sammis, correct?

3 A. That's correct.

4 Q. Nor did you review any revenue estimates
5 for Sammis, correct?

6 A. That's correct.

7 Q. And your opinion regarding the Sammis
8 plant's economics is dependent entirely upon
9 Mr. Moul's direct testimony, correct?

10 A. That's correct.

11 Q. Thank you. Shifting to Davis-Besse, you
12 were relying on Mr. Moul's direct testimony for your
13 opinion that the Davis-Besse plant is economic,
14 correct?

15 A. Yes. In all of these cases that you are
16 asking me about, the purpose of my testimony is to
17 try to give people an understanding about why some
18 well-run power plants that are part of a
19 cost-effective portfolio with a lot of important
20 diversity characteristics are not able to get the
21 cash flows out of the marketplace to keep running.

22 So, yes, my -- the purpose of my
23 testimony here is to try to explain why somebody like
24 Don Moul can conclude that I've got plants that --
25 that he's got plants that are economic to keep

1 operating rather than close and replace and yet the
2 market won't support them.

3 MR. SOULES: Your Honor, could I have the
4 last question and answer read back?

5 EXAMINER ADDISON: You may.

6 (Record read.)

7 MR. SOULES: Your Honor, I move to strike
8 everything after the first "yes" in Dr. Makovich's
9 response.

10 EXAMINER ADDISON: Mr. Kutik.

11 MR. KUTIK: Your Honor, I believe the
12 witness was reexplaining his answer, putting his
13 answer in context in terms of the rest of his
14 testimony.

15 EXAMINER ADDISON: Motion to strike will
16 be granted for everything after the initial "yes."

17 Dr. Makovich, if you could just please
18 limit your answers to counsel's questions, we would
19 appreciate it. Thank you.

20 MR. SOULES: Thank you, your Honor.

21 Q. (By Mr. Soules) Dr. Makovich, going back
22 to page 15 of your written testimony --

23 A. Yes, I am on page 15.

24 Q. Okay. On lines 20 to 21 there is a
25 reference to the "lowest-cost source of equivalent

1 power supply." Do you see that reference?

2 A. Yes.

3 Q. Okay. And you have not performed a
4 specific assessment to determine what type of
5 resource would be the lowest cost source of
6 equivalent power supply for Sammis and Davis-Besse,
7 correct?

8 A. Before I answer that question, can we
9 make sure we are on the same page as to what I mean
10 by "equivalent power supply"?

11 Q. Yeah. Dr. Makovich, please. Yeah. If
12 you need to clarify what's in your written testimony,
13 please take a moment to do so.

14 A. Okay. My testimony is that to
15 efficiently produce electricity, you need to have a
16 mix of peaking, cycling, and baseload units. And
17 if -- if you have a -- any one of those, say, it's a
18 peaking unit whose costs of continued operation are
19 higher than what it would cost to replace it, then it
20 makes sense to replace it with the lowest-cost source
21 of peaking. If you are a peaking plant, you need to
22 keep the right mix of peaking, cycling, and baseload.
23 So that's what I mean by replacing it with the lowest
24 cost of equivalent power supply.

25 Q. Okay. Thank you for that clarification.

1 In looking at page 15 of your written testimony,
2 lines 18 to 22, that sentence is specifically
3 discussing the Sammis and Davis-Besse plants,
4 correct?

5 A. Yes.

6 Q. Thank you. And you have not performed a
7 specific assessment to determine what specific
8 resource would be the lowest-cost source of
9 equivalent power supply for Sammis and Davis-Besse,
10 correct?

11 A. Correct.

12 Q. And you have not analyzed whether a
13 subset of the Sammis units could be retired without
14 requiring an equivalent power supply, correct?

15 A. That's correct.

16 Q. Thank you.

17 EXAMINER PRICE: Dr. Makovich, do you
18 place great weight on the definitions of baseload,
19 cycling, and peaking power supply?

20 THE WITNESS: I do.

21 EXAMINER PRICE: Thank you.

22 MR. SOULES: Thank you, your Honor.

23 Q. (By Mr. Soules) And, Dr. Makovich, again
24 staying with this portion of your testimony, it's
25 your opinion that the Sammis plant is at risk of

1 retirement, correct?

2 A. Yes.

3 Q. But you have not put a probability on the
4 likelihood of Sammis's retirement, correct?

5 A. That's correct.

6 Q. And you do not have an opinion as to
7 whether some of the Sammis units are more likely to
8 retire than other units, correct?

9 A. That's correct.

10 Q. And you have not been privy to any
11 internal discussions at FES regarding the possible
12 retirement of the Sammis plant, correct?

13 A. Well, I have been involved for a long
14 time with the FirstEnergy company talking about a lot
15 of different topics, but I have not sat down and
16 talked about this specific decision with them.

17 Q. What topics have you discussed with the
18 FirstEnergy companies?

19 A. Well, the topics that I'm covering in
20 testimony, among others, that there is a substantial
21 value to the fuel diversity and technology diversity
22 in the current generation mix, and I've also talked
23 to them about the problem that interventions to
24 mandate renewables are disproportionately suppressing
25 cash flows for baseload units and creating this

1 problem of uneconomic and premature closures of
2 baseload power plants.

3 Q. And those topics were discussed in
4 presentations that you gave to FirstEnergy?

5 A. Among other ways of communicating, yes.

6 Q. Are there any other topics on which you
7 have provided information to FirstEnergy?

8 A. In many cases I'll talk about a prepared
9 set of topics they have asked me about and then there
10 are questions and answers, so I have covered a broad
11 range of topics concerning the power industry
12 landscape with folks at FirstEnergy.

13 Q. And FirstEnergy is a retainer client of
14 your company; is that correct?

15 A. The company being IHS, and just for -- to
16 make sure we are on the same page here, that as a
17 retainer client, we have people that pay us a fee
18 every year to get a flow of research into a specific
19 area, this being energy, in general, but the power
20 sector, in particular.

21 Q. And is that contractual relationship with
22 FirstEnergy Service Company?

23 A. I don't handle the commercial terms on
24 the contracts. I am not sure exactly who has signed
25 it. It was a counterparty to the IHS service

1 contract.

2 Q. Okay. How long --

3 MR. KUTIK: Your Honor, may we go off the
4 record?

5 (Discussion off the record.)

6 EXAMINER ADDISON: Let's go back on the
7 record.

8 MR. SOULES: Thank you, Mr. Kutik.

9 Q. (By Mr. Soules) How long has FirstEnergy
10 been a retainer client of IHS?

11 A. Again, I would have to go back and check
12 the client files, but it's been a number of years.

13 EXAMINER PRICE: More than five?

14 THE WITNESS: I think so. But, again
15 sometimes we have clients that are with us and the
16 contract runs out or takes a while to renew it, so
17 technically they are not a client for a while and
18 then they are again, so I don't have any of that
19 information at my disposal really.

20 Q. Does IHS provide FirstEnergy with natural
21 gas price forecast information?

22 A. I'm not sure of the full range of
23 services that they provide. I interact with them to
24 talk about our research in the power circuit.

25 Q. Thank you.

1 EXAMINER PRICE: How long has -- what you
2 describe as the missing money problem, how long has
3 it been since you identified that there is a missing
4 money problem?

5 THE WITNESS: Well, it was a problem that
6 I identified prior to the California power prices.
7 And I said that there didn't seem to be a reliable
8 mechanism that would support the necessary investment
9 and, as a result, a shortage would be likely.

10 EXAMINER PRICE: Had you described what
11 you call the missing money problem to FirstEnergy
12 from the beginning of your relationship with them?

13 THE WITNESS: It's been a topic that I
14 have been talking to people about for quite a few
15 years because it's kind of the reason why all these
16 power markets have been trying to evolve a capacity
17 market along with the energy markets.

18 So even in the case of PJM, it started
19 off in 1997 with both an energy and capacity market,
20 they've evolved that capacity market substantially to
21 deal with this missing money problem, the first
22 dimension that I talk about. And it's only been over
23 the past 10 or 15 years that this second dimension,
24 that the level of intervention to mandate renewables,
25 has started to suppress the power prices,

1 particularly off-peak, enough that we are really
2 starting to see some problems.

3 EXAMINER PRICE: And do you think, just
4 off the top of your head, you probably would have
5 advised FirstEnergy of this missing money problem?
6 And when I say "FirstEnergy," I mean the entire
7 corporate entity, because you are not clear where --
8 who you interact with. Do you think you would have
9 advised FirstEnergy of this problem as of 2013?

10 A. I would have to go back and look at the
11 kind of presentation outlines and things I talked
12 about then and so forth. But this whole issue of the
13 complexity of getting a power market right and how
14 the institutions need to evolve is something I have
15 been talking to our clients, including FirstEnergy,
16 about for over a decade.

17 MR. HAYS: Your Honor, I missed the last
18 answer.

19 EXAMINER PRICE: Could you read back the
20 last answer.

21 (Record read.)

22 MR. HAYS: Thank you.

23 EXAMINER PRICE: Thank you, Mr. Soules.

24 MR. SOULES: Thank you, your Honor.

25 Q. (By Mr. Soules) And, Dr. Makovich,

1 shifting gears to Davis-Besse, it's your opinion that
2 Davis-Besse plant is also at risk of retirement,
3 correct?

4 A. Yes.

5 Q. And you have an output of probability of
6 the likelihood of Davis-Besse retiring, correct?

7 A. Correct.

8 Q. And that opinion is based upon the direct
9 testimony of Donald Moul, correct?

10 A. That's right.

11 Q. Thank you.

12 A. Could I add something to that answer that
13 my assessment of the probability, I think what Don is
14 saying is something that we've seen elsewhere, and I
15 provide examples of the Kewaunee nuclear plant the
16 Vermont Yankee nuclear plant, where I think we've got
17 cases where it is more expensive to replace them than
18 it was to keep them running, but the market cash
19 flows weren't high enough and they have closed down,
20 so this is something that really happens.

21 Q. And those examples are discussed in the
22 study that's in attachment LM-2 to your testimony,
23 correct?

24 A. I refer to it there, and I believe I
25 refer it in my direct as well, but, yes, I do talk

1 about them in the study.

2 Q. Okay. Thank you. If you could look at
3 the sentence that begins on line 23 of page 15, that
4 sentence reads, "Indeed, when PJM capacity and energy
5 cash flows increase in future years to cover the
6 costs of a diverse power supply portfolio, then
7 customers will be further benefited from the Economic
8 Stability Program in place." Do you see that
9 sentence in your testimony?

10 A. Yes.

11 Q. Okay.

12 MR. KUTIK: Dr. Makovich, you need to
13 wait until he finishes his question before you
14 answer.

15 THE WITNESS: Oh, sorry.

16 MR. SOULES: Thank you, Mr. Kutik.

17 Q. (By Mr. Soules) You are not offering any
18 specific opinion that energy or capacity cash flows
19 will increase in future years, correct?

20 A. That's right.

21 Q. And, Dr. Makovich, you're aware that the
22 proposed economic stability program also relates to
23 FES's share of the OVEC plants, correct?

24 A. Yes.

25 Q. And you are not offering any opinions in

1 this case regarding the operational characteristics
2 of the OVEC plants, correct?

3 A. Again, we are talking about the specific
4 operational characteristics of those plants, not
5 their operation in the bigger power system, right.

6 Q. Yeah. That was the context.

7 A. So, yes.

8 Q. And you are relying on Mr. Moul's direct
9 testimony for any opinions regarding the OVEC plants
10 cost of continued operation; is that correct?

11 A. Yes.

12 Q. And with respect to whether the OVEC
13 plants are economic, any opinion that you are
14 offering in this case relies upon the direct
15 testimony of Mr. Moul, correct?

16 A. Yes.

17 Q. And with respect to whether the OVEC
18 plants are at risk of retirement, any opinion that
19 you would have is described in Mr. Moul's direct
20 testimony, correct?

21 A. He doesn't describe my opinion.

22 Q. Well -- thank you. That's a good
23 clarification. With respect to whether the OVEC
24 plants are at risk of retirement, you are also
25 relying on the direct testimony of Mr. Moul, correct?

1 A. That's right.

2 Q. Could you please turn to page 4 of your
3 written testimony.

4 A. Yes, I am on page 4.

5 Q. Thank you. Starting on line 15, there is
6 a sentence that refers to "equivalent power supply."
7 Do you see that sentence?

8 A. Starting on line 15, did you say?

9 Q. Yes.

10 A. Yes.

11 Q. Okay. And one of the things that's
12 embedded in equivalent power supply is environmental
13 impact management, correct?

14 A. Yes.

15 Q. And in your testimony you describe
16 environmental impact management as a system benefit,
17 correct?

18 A. Yes.

19 Q. Okay. Could you please now turn to page
20 14 of your written testimony.

21 A. I'm on page 14.

22 Q. Okay. The very last sentence on that
23 page starting on line 22 refers to the plants, and
24 then on the carryover page there is a reference to
25 the plants providing "environmental impact

1 management." Do you see that reference?

2 A. Yes.

3 Q. So -- so it's your testimony that the
4 plants provide environmental impact management; is
5 that a fair statement?

6 A. Yes.

7 Q. Okay. And talking about the Sammis plant
8 specifically, you do not review any specific
9 information about the Sammis plant's environmental
10 controls, correct?

11 A. That's correct.

12 Q. And you did not review any specific
13 information about pollutant emissions from the Sammis
14 plant, correct?

15 A. That's correct.

16 Q. Okay. And if we could again turn back to
17 page 4 -- I apologize for the flipping.

18 A. Okay.

19 Q. And, again, looking at the sentence that
20 begins on line 15, I had a few -- few more questions
21 about the OVEC plants. You're not offering any
22 specific opinions in this case about the
23 environmental impact management that the OVEC plants
24 might provide, correct?

25 A. Well, I said that as part of the

1 portfolio, you've got an environmental impact. I
2 said all sources of power supply have an environment
3 impact. To the extent these are part of the power
4 supply portfolio, they affect the environmental
5 footprint of power generation. That's what I am
6 talking about here on the page.

7 Q. I appreciate the clarification. I
8 understand that this sentence is speaking in general
9 terms. And my question is referring specifically to
10 the OVEC plants. So you are not offering a specific
11 opinion whether the OVEC plants provide environmental
12 impact management, correct?

13 A. I'm not sure I get your question. The
14 previous question was had I done any analysis about
15 specifics with regard to environmental controls and
16 so forth. But this is a slightly different question.
17 You are asking me does it have an impact
18 environmentally within the entire power system and
19 I've said yes. You need to think of the
20 environmental impact of the system as a whole.

21 Q. Okay. And just so that we're on the same
22 page, my earlier questions about environmental
23 controls were related to Sammis.

24 A. Yeah.

25 Q. Now we are shifting gears to the OVEC

1 plants.

2 A. Right. And in the previous questions
3 were you asking me had I analyzed things like had
4 they installed scrubbers or electrostatic
5 precipitators, that's how I understood your question.
6 Had I done any specific analysis on environmental
7 controls at that plant? Is that what you were
8 asking?

9 Q. Well, I think the record will reflect my
10 earlier questions but, yeah, my question about the
11 OVEC plants is broader than may questions were about
12 the Sammis plant.

13 A. Okay, okay.

14 Q. Yeah. Are you offering any opinions in
15 this proceeding -- I'm sorry. Strike that, please.
16 You're not offering any specific opinions in this
17 proceeding about any environmental impact management
18 benefits that the OVEC plants might provide, correct?

19 THE WITNESS: Can you read me the
20 question back, please.

21 (Record read.)

22 A. That question is still so broad I think
23 it's hard to answer given what I've said here that
24 when you are analyzing the environmental impact of
25 power generation, that it's important to look at the

1 whole.

2 Q. And my question is have you looked at
3 OVEC specifically?

4 A. That's a different question. So if you
5 are asking me if I looked at the specific
6 environmental controls that are on the OVEC plants,
7 my answer is no, I haven't done an analysis of those.

8 Q. And you have not reviewed any pollutant
9 emission data relating to the OVEC plants, correct?

10 A. No, I haven't looked at their specific
11 pollution data, emissions data.

12 Q. Looking on line 17 of page 4, there is a
13 reference to "cost risk management." Do you see that
14 reference?

15 A. Yes.

16 Q. With regard to any cost risk management
17 benefits that the OVEC plants may provide, you are
18 relying on the direct testimony of Donald Moul; is
19 that correct?

20 A. Not entirely.

21 MR. SOULES: Your Honor, could I have
22 that last question and answer read back.

23 EXAMINER ADDISON: You may.

24 (Record read.)

25 Q. What else are you relying upon?

1 A. Well, you are asking these very broad
2 questions now and as I provided in my testimony, that
3 these plants are part of a larger power supply
4 portfolio around because of the diversity in that
5 portfolio, the portfolio itself provides very
6 valuable cost risk management to the production cost
7 of electricity.

8 EXAMINER PRICE: When you say these
9 plants are part of a portfolio, I'm not clear what
10 you mean. Do you mean the portfolio that consists of
11 the plants at issue here, Davis-Besse, Sammis, OVEC
12 entitlement? Do you mean the portfolio that FES
13 operates? Do you mean the portfolio that is PJM
14 West, or do you mean the portfolio that's PJM? Or
15 the United States?

16 THE WITNESS: Right. The answer I am
17 providing -- the analysis that I've done analyzed
18 portfolios for the three interconnections in the
19 United States where you have the synchronous
20 production of electricity and different kinds of
21 power flows we have. You can think of that as an
22 integrated power supply system where you have a lot
23 of diversity benefits.

24 But the general principles that I
25 identified there that this is an awful lot of value

1 to fuel and technology diversity is true if you are
2 looking at smaller subsets of the power supply
3 system.

4 You know, you have got places where, you
5 know, you have got zones within these power systems
6 where at one time or another they are acting more or
7 on their own than they are necessarily part of a
8 bigger system if transmission constraints go away,
9 they are part of the bigger system.

10 But the general principle here is that we
11 identified really strong and significant value
12 diversity in a power system is something that's
13 interconnection level down to the smaller subsets of
14 power supply systems.

15 EXAMINER PRICE: Okay. Thank you.

16 MR. SOULES: Thank you, your Honor.

17 Q. (By Mr. Soules) Dr. Makovich, in
18 preparing your testimony for this case, you did not
19 review any cost data related to the OVEC plants,
20 correct?

21 A. That's correct.

22 Q. And you did not review any revenue data
23 relating to the OVEC plants, correct?

24 A. That's correct.

25 Q. And you did not review any information

1 regarding how frequently the OVEC plants are
2 dispatched into PJM, correct?

3 A. That's correct.

4 Q. And you did not review any outage data
5 related to the OVEC plants, correct?

6 A. That's correct.

7 Q. There's a reference on line 18 of page 4
8 to "grid locational benefits." Do you see that
9 reference?

10 A. Yes.

11 Q. You did not perform any specific analysis
12 related to the OVEC locational benefits, correct?

13 A. That's correct.

14 Q. And shifting to Davis-Besse, you did not
15 perform any analysis related to Davis-Besse's
16 potential grid locational benefits, correct?

17 A. That's correct.

18 Q. And you have not specifically analyzed
19 the grid implications of Davis-Besse's potential
20 retirement, correct?

21 A. That's correct.

22 Q. If we would move to the sentence starting
23 on line 13 of page 4 of your written testimony.

24 A. Okay.

25 Q. Okay. It looks like we've lost our mics

1 there for a moment.

2 There is a reference there to the cost of
3 closing the plant. Do you see that reference?

4 A. We are on page -- we are on line 13 of
5 page 4?

6 Q. Well, the reference is on line 14, page
7 3.

8 THE WITNESS: Can you read back the
9 question?

10 EXAMINER PRICE: Please.

11 (Record read.)

12 A. Yes.

13 Q. Okay. Thank you. In this case you have
14 not evaluated the potential costs of closing the
15 Sammis plant, correct?

16 A. That's correct.

17 Q. And you have not evaluated the potential
18 cost of closing the Davis-Besse plant, correct?

19 A. By evaluate, we're clear that I am
20 relying on Don Moul's testimony with regard to the
21 costs of continued operation versus the cost of
22 closure and replacement.

23 Q. So to the extent you have an opinion
24 about the potential cost of closing the Davis-Besse
25 plant, that opinion relies entirely upon Mr. Moul's

1 direct testimony; is that correct?

2 A. That's correct.

3 Q. And the same holds true for the potential
4 costs of closing the OVEC plants?

5 A. Yes.

6 Q. Thank you. Now, Dr. Makovich, previously
7 you performed a study that looked at the value of
8 diversity in our country's power supply portfolio,
9 correct?

10 A. Yes.

11 Q. And that study was issued in July of
12 2014, correct?

13 A. Yes.

14 Q. And that study was prepared prior to your
15 involvement in this case, correct?

16 A. That's correct.

17 Q. And that's the same study that's attached
18 as LM-2 to your written testimony, correct?

19 A. Yes.

20 Q. And in the study you compare the
21 country's current power supply portfolio to a
22 hypothetical less diverse portfolio, correct?

23 A. Well, rather than hypothetical, I call it
24 a counterfactual.

25 Q. Is there a significance to your

1 distinction between hypothetical and counterfactual?

2 A. Well, the -- I call it a counterfactual
3 because I think the term "hypothetical" connotes a
4 certain possibility for, as we saw earlier, dreaming
5 up things that maybe even don't make sense. So I
6 have characterized these as a counterfactual because,
7 as my report identifies, I see trends that are
8 pushing U.S. power supply towards this much less
9 diverse end state, and so I don't consider it a
10 hypothetical.

11 And the end state that I think we're
12 moving toward and the analysis involved if we were
13 there over the period 2010, '11 and '12, what would
14 the results of the U.S. power sector have looked
15 like.

16 Q. And so the comparison is using historical
17 information from 2010 through '12, correct?

18 A. That's right.

19 Q. And then you compare that to a portfolio
20 that does not -- that did not actually exist during
21 those years, correct?

22 A. That's right.

23 Q. Okay. In the counterfactual less diverse
24 portfolio that you considered included no coal or
25 nuclear generation, correct?

1 A. That's right.

2 Q. Okay. You have a general understanding
3 of the current generation mix within PJM, correct?

4 A. Yes.

5 Q. And you agree that it's unlikely that
6 coal-fired power will be eliminated from PJM's
7 generation mix within the next five years, correct?

8 A. I think there is a low probability that
9 that would happen. Yes.

10 Q. And you agree that the probability is low
11 that coal fired will be eliminated from PJM's mix
12 within the next 10 years, correct?

13 A. I think as we start to get further out,
14 it's harder to judge these probabilities, but I think
15 that it's likely we will still have some coal in the
16 generation mix, but it gets more and more difficult
17 to predict how much.

18 Q. Thank you. And you agree that the
19 probability is low that nuclear power will be
20 eliminated from PJM's generation mix within the next
21 five years, correct?

22 A. Yes, there's a low probability.

23 EXAMINER PRICE: Do you know the total
24 generating capacity of coal-fired plants that would
25 have to be retired in PJM to get to zero?

1 THE WITNESS: To get to zero?

2 EXAMINER PRICE: Zero coal-fired
3 generation in PJM.

4 THE WITNESS: So you want to know the
5 total installed capacity of coal in PJM?

6 EXAMINER PRICE: Right.

7 THE WITNESS: Yeah. Well, let's see,
8 coal makes up 41 percent of the installed capacity in
9 PJM, and the installed capacity -- I will have to get
10 what the exact numbers are.

11 EXAMINER PRICE: I don't need the exact
12 numbers. I am just a lawyer.

13 THE WITNESS: Well, let's's see. It's
14 probably closer to 160 gigawatts. I could find you
15 the exact numbers, so 41 percent of that gives you a
16 sense for roughly how much coal is in the mix.

17 EXAMINER PRICE: 40 percent of 160, you
18 have got a calculator. Do the math for me. You have
19 two calculators.

20 THE WITNESS: Yeah.

21 EXAMINER PRICE: You are prepared.

22 THE WITNESS: So we are probably talking
23 about close to 70,000 megawatts would be installed
24 coal capacity.

25 EXAMINER PRICE: To get to zero, 70,000

1 megawatts would have to retire.

2 THE WITNESS: To get to zero, sure.

3 EXAMINER PRICE: To get to zero for
4 nuclear generation, how many megawatts would have to
5 retire?

6 THE WITNESS: Let's see, nuclear is 18
7 percent of the installed capacity, so about 30,000
8 megawatts.

9 EXAMINER PRICE: So to get to zero,
10 30,000 megawatts would have to retire. And how many
11 megawatts is Davis-Besse?

12 THE WITNESS: I don't have those numbers
13 here in front of me.

14 EXAMINER PRICE: Could we agree it's
15 roughly 900?

16 THE WITNESS: I was going to say a
17 thousand, yeah.

18 EXAMINER PRICE: So what percentage of
19 megawatts is Davis-Besse?

20 THE WITNESS: Of the nuclear? We said
21 30, so we are talking 130.

22 EXAMINER PRICE: 130, and what percentage
23 of the coal-fired generation would it be to retire
24 Sammis?

25 THE WITNESS: Yeah, I don't have those

1 numbers but, we are probably talking single digit
2 kind of percentages of the total.

3 EXAMINER PRICE: Okay. Thank you. Thank
4 you.

5 MR. SOULES: Thank you, your Honor.

6 Q. (By Mr. Soules) Dr. Makovich, you have
7 not evaluated what the optimal mix of generation
8 sources for PJM is from a supply diversity
9 perspective, correct?

10 A. Could I comment to make sure we are on
11 the same page as what we mean by optimal?

12 Q. If -- yeah, if you wish to respond. Why
13 don't you explain what you are going to say and then
14 you can go from there.

15 A. Okay. The analysis I did did not, on
16 purpose, try to analyze and define what the optimal
17 generation mix is in order to try to provide some
18 indication of where we ought to be trying to move.
19 The analysis I did reflects the fact that the kind of
20 criteria I am talking about, fuel diversity,
21 environmental footprint, cost risk management, these
22 are things that have influenced the development of
23 the current diverse generating mix that we have in
24 U.S. power supply, so the mix of peaking,
25 intermediate and cycling.

1 This isn't news to anybody. This has
2 been things that have influenced the diversity that
3 we've got. So it's -- you are never going to be
4 optimal because expectations change and people would
5 disagree on that, but suffice it to say I believe
6 that the current diverse fuel and technology mix we
7 have in the U.S. reflects these criteria that people
8 use to try to come up with an optimal, so we are
9 starting from a pretty good place.

10 And that's why I think it's important to
11 quantify the value of what we've got because, as I
12 say in the report, I think people take it for
13 granted, and we are at risk of losing it given
14 current trends.

15 Q. Thank you for that explanation. Your
16 prior answer was discussing the national generation
17 portfolio, not PJM specifically, correct?

18 A. No. I think the point I made is also
19 true about the portfolio within PJM, that we've got a
20 very valuable fuel and technology diversity in PJM
21 that became very apparent in the past two winters
22 when one of our important sources of supply of
23 natural gas was very constrained, and the diversity
24 of fuels and technologies in this mix really showed
25 its value in PJM.

1 Q. Okay. So now that you've laid groundwork
2 about your thoughts on the national portfolio and
3 within PJM, it remains the case you have not
4 evaluated what the optimal fix of generation source
5 for PJM is for the supply diversity perspective,
6 correct?

7 A. As I just testified, the objective of
8 this study was not to identify an optimal mix so, no,
9 that was not a focus of the study.

10 Q. And apart from that study, you have not
11 also evaluated an optimal mix of generation sources
12 for PJM, correct?

13 A. That's correct.

14 Q. Thank you. Could you please turn to
15 Figure 1 in your written testimony.

16 EXAMINER PRICE: Before we leave this
17 topic, I just have a couple of follow-up questions at
18 page 31 of your study. Let's say that everything in
19 your counterfactual comes to be true within -- let's
20 just limit this to PJM.

21 Let's say everything in your
22 counterfactual becomes true and the Commission
23 approves this peak -- this proposed transaction and
24 rider RSS so that Davis-Besse and Sammis are not
25 retired. But all of the other coal, all of the other

1 nuclear retire and we get the portfolio you have
2 predicted here. Would the existence of Davis-Besse
3 and the continued operation of Davis-Besse and Sammis
4 have any impact at all upon your conclusions?

5 MR. KUTIK: Your Honor.

6 EXAMINER PRICE: Yes.

7 MR. KUTIK: If others had asked this
8 question, I would have objected on two grounds. One,
9 is there's no evidence that the companies are seeking
10 approval of the proposed transaction. And, second,
11 the rider here is RRS.

12 EXAMINER PRICE: Both fair objections.
13 Thank you for the clarification.

14 If the proposed transaction is
15 consummated and the Commission approves rider RRS and
16 Davis-Besse stays in operation and Sammis stays in
17 operation, they both represent roughly 3 percent of
18 the respective coal or overall nuclear, would that
19 have any impact at all upon the bad outcomes that you
20 are predicting?

21 THE WITNESS: And I would say yes, based
22 on the example we have that I talk about in the study
23 that we are a very small percentage of the portfolio
24 that's oil-fired today, so we are talking -- I have
25 got the numbers in here. It's, you know -- was it .4

1 percent? I will have to check the number. But it's
2 a very small percent. Yet when we had the extreme
3 stress of the polar vortex and just this past winter,
4 the oil-fired capacity played a very critical role in
5 relieving pressure on the gas pipelines.

6 So it was a very small component of the
7 portfolio, but at the time both the oil-fired and
8 dual-fired, a very small percentage had an outsized
9 impact on managing the challenge in those winter
10 periods. So, yes, a small piece of diversity like
11 we're talking about can have a very significant
12 impact.

13 EXAMINER PRICE: Just saving these two
14 plants from retirement could have a significant
15 impact?

16 THE WITNESS: Yeah. These are big
17 important pieces of the power supply portfolio, and
18 as I have said in this study, it's not that you
19 either have diversity or you don't. It's a matter of
20 degree, and that we've got some very troubling forces
21 right now pushing us towards a much less diverse
22 power supply, and this is one of those instances
23 where we could lose some very valuable sources of
24 diversity because of the price suppression we have
25 got in these off-peak power prices.

1 EXAMINER PRICE: Okay. Fair enough.

2 Thank you.

3 MR. KUTIK: Your Honor, may we go off the
4 record?

5 EXAMINER ADDISON: Let's go off the
6 record.

7 (Discussion off the record.)

8 EXAMINER ADDISON: At this time we will
9 take a brief recess and come back at 11:20.

10 Let's go off the record.

11 (Recess taken.)

12 EXAMINER ADDISON: Let's go back on the
13 record.

14 MR. SOULES: Thank you, your Honor.

15 Q. (By Mr. Soules) Dr. Makovich, could you
16 please turn to page 9 of your written testimony.

17 A. I'm on page 9.

18 Q. Thank you. In looking specifically at
19 Figure 1, the figure entitled "Key Results from
20 Selected Wind Energy Integration Cost Studies," do
21 you see that figure?

22 A. I see that figure.

23 Q. Okay. And you did not personally prepare
24 this figure, correct?

25 A. By personally prepare, we formatted it to

1 put it in the record. But, no, as I started off
2 today, I told you the source of that, which was the
3 U.S. Department of Energy 2009 Wind Technologies
4 Market Report published in August of 2010.

5 Q. Okay. And the actual graphic was
6 prepared by IHS Energy, correct?

7 A. The -- this is right out of that report.

8 Q. And did the Department of Energy rely
9 upon IHS Energy to provide this graphic for that
10 report?

11 A. No. The graphic, the picture comes right
12 out of the report that I told you from DOE. We added
13 the sources down on the bottom, which were below the
14 table that was on the other page behind these
15 numbers, but the actual scatter graphic there is
16 right out of that publication.

17 Q. Okay. And I apologize, I have not had a
18 chance to review that report since I learned of it
19 today. If I went to that report, would I see the IHS
20 logo in that graphic?

21 A. No.

22 Q. So that was added after it was pulled
23 from the report, correct?

24 A. That's what I am saying. We formatted it
25 for the report, and that gets added to the IHS

1 material we put together.

2 Q. Got it, okay. Thank you. And you have
3 reviewed some of the studies that are represented in
4 the data points of this graphic, correct?

5 A. I have reviewed some integration studies
6 that power systems have performed, yes.

7 Q. Do you know if you have specifically
8 reviewed any of the studies that are cited at the
9 bottom of this graphic?

10 A. I would have to -- for example, I've
11 reviewed one of the California ones. I'm not sure if
12 it's the one that's in this graph or not, but I've
13 reviewed some integration studies and this was a
14 compilation of these studies that the DOE put
15 together.

16 Q. Okay. And all of the studies that are
17 represented in this graphic were performed on or
18 before 2010, correct?

19 A. I believe so, yes.

20 Q. Thank you. We can set-aside that figure.

21 So, generally speaking, in preparing your
22 testimony for this case, I just wanted to walk
23 through the documents that you reviewed. So I think
24 we've established you reviewed Mr. Moul's testimony
25 in preparing your testimony, correct?

1 A. Yes.

2 Q. And you, obviously, also reviewed the two
3 attachments that are appended to your testimony,
4 correct?

5 A. Yes.

6 Q. And you also reviewed data on the power
7 prices that cleared at the AEP Dayton Hub in 2014,
8 correct?

9 A. Yes.

10 Q. And apart from those items we've just
11 discussed, there was nothing else that you reviewed
12 in preparing your testimony, correct?

13 A. We just talked about this DOE study. I
14 don't think you had that in your list.

15 Q. Okay. So apart from the DOE study, the
16 attachments to your testimony, the 2014 energy price
17 data, and Mr. Moul's direct testimony, there was
18 nothing else you reviewed in preparing your testimony
19 for this case, correct?

20 A. Well, Figure 2 is energy price data from
21 the Velocity Suite. That's a different source.

22 Q. Isn't Figure 2 the 2014 energy price data
23 we just discussed?

24 A. The -- yeah, so we are talking about
25 sources. I am not sure you had identified that that

1 was the source. The capacity data comes from a
2 different source than the Velocity Suite. We were
3 talking about capacity prices earlier.

4 Q. Earlier I had asked you about energy
5 prices. Did you also review capacity price
6 information in developing --

7 A. Earlier today we were talking about these
8 capacity prices that have recently cleared, and I do
9 mention the capacity prices that had cleared around
10 the Dayton Hub in my testimony on page 11.

11 Q. Okay. Thank you. Thank you for that.

12 A. Then there are numerous sources that I
13 refer to in The value of U.S. fuel -- Power Supply
14 Diversity, numerous reports and sources that I relied
15 on there to pull that together.

16 Q. So those are the sources that were used
17 in preparing the report you did last year, correct?

18 A. Yes.

19 Q. Apart from the documents and data we've
20 just discussed over the past few minutes, do you
21 recall reviewing any other documents in preparing
22 your testimony for this case?

23 A. I mentioned the Cramton and Stoft
24 article. I mentioned the Dupuit article, so there
25 are other things that I've looked at.

1 Q. Okay. Thank you. Could you please turn
2 to page 11 of your written testimony.

3 A. I'm on page 11.

4 Q. On line 12 there is a reference to \$55
5 per megawatt-hour. Do you see that reference?

6 A. Yes.

7 Q. And that \$55 per megawatt figure is
8 based, in part, on your assumption that upfront
9 capital cost for a combined cycle plant would run
10 \$1,400 per kilowatt, correct?

11 A. Yes.

12 Q. And the \$1,400 figure is expressed in
13 2015 dollars, correct?

14 A. Yes.

15 Q. And that \$1,400 figure was developed
16 using information that IHS received from its
17 interaction with clients, correct?

18 A. Yes.

19 Q. And then on line 14 -- and I believe you
20 discussed this with Mr. Olier earlier -- there is a
21 reference to an "annual levelized carrying charge
22 rate of 14%." Do you see that reference?

23 A. Yes.

24 Q. Would you agree that that rate will vary
25 depending upon how quickly an asset is depreciated?

1 A. Yes.

2 Q. And so if you had a longer depreciation
3 schedule, everything else being equal, that rate
4 would go down, correct?

5 A. All else being equal, yes, the annual
6 capital carrying charge rate would be lower, the
7 depreciation rate or longer.

8 Q. And do you know what depreciation
9 schedule is assumed for purposes of that 14 percent
10 figure?

11 A. As I testified earlier, I was just trying
12 to provide some basis for people to judge the level
13 of these prices. So I put this together as an
14 example of how you can get to a low estimate of what
15 the costs would be for a baseload power. So it's
16 just representing what somebody familiar with the
17 industry would say is where these capital levelized
18 capital -- levelized capital carrying charge rates
19 tend to be.

20 Q. Would you consider that 14 percent rate
21 to be a conservative rate?

22 A. Again, I tried to just present something
23 people would recognize as a reasonable ballpark
24 figure.

25 Q. If you were developing an annual

1 levelized carrying charge rate and you assumed that a
2 combined cycle plant was being depreciated over a
3 period less than 20 years, would you consider that to
4 be an unreasonable assumption?

5 A. Well, normally the depreciation rate on a
6 combined cycle gas plant I would think would be 20,
7 25 years, would be more typical.

8 Q. And you did not identify a specific
9 depreciation schedule in developing this 14 percent
10 assumption, correct?

11 MR. KUTIK: Objection, asked and
12 answered.

13 EXAMINER ADDISON: Sustained.

14 MR. SOULES: Could I have the last
15 question and answer read back?

16 EXAMINER ADDISON: You may.

17 (Record read.)

18 Q. So, Dr. Makovich, do you think that a
19 depreciation schedule of less than 20 percent would
20 be unreasonable?

21 A. The reasonableness of a depreciation rate
22 should roughly correlate to the expected life of the
23 asset, so there could be circumstances where
24 something less than 20 years is appropriate for a
25 particular plant. So I think the reasonableness is

1 how well it corresponds to the expected life of the
2 plant.

3 Q. Do you know over what number of years the
4 14 percent rate assumed for depreciation?

5 MR. KUTIK: Objection.

6 EXAMINER ADDISON: Grounds?

7 MR. KUTIK: This has all been covered,
8 your Honor. He has testified there is no specific
9 assumptions with respect to depreciation rate, that
10 the overall rate is a reasonable ballpark figure.
11 That's what it's meant represent.

12 EXAMINER ADDISON: Mr. Soules?

13 MR. SOULES: Your Honor, I can -- I can
14 rephrase.

15 EXAMINER ADDISON: Thank you.

16 MR. SOULES: Yes.

17 Q. (By Mr. Soules) Dr. Makovich, did you
18 rely upon any written documentation in developing
19 that 14 percent assumption?

20 A. As I said, I've done a number of projects
21 where we've calculated these things with different
22 lives and different cost to capital and different
23 capital structures, and I have simply used this to be
24 something that people recognize as a reasonable
25 ballpark.

1 Q. But you can't point me to a specific
2 source that would support that 14 percent figure,
3 correct?

4 A. I think I've answered your question. It
5 is not sourced from any published resource.

6 Q. If you were advising a developer of a
7 combined cycle gas plant and you were providing
8 financial information about what the expected costs
9 of that plant might be, would you use this 14 percent
10 rate?

11 MR. KUTIK: May I have the question read,
12 please?

13 EXAMINER ADDISON: You may.

14 (Record read.)

15 A. The use of this 14 percent rate reflects,
16 in part, my experience in discussing power
17 development with power developers. As I've
18 mentioned, if you look at the Energy Information
19 Administration, their publication on 2020 levelized
20 costs that shows up in their Annual Energy Outlook
21 2015, which came out in June of 2015, they looked at
22 this conventional natural gas-fired combined cycle
23 plant with an 87 percent capacity factor rather than
24 85, but pretty close, in 2013 dollars, and they come
25 up with a total of not 55, but they come up with a

1 total of \$75 a megawatt-hour, and they say that the
2 range for these costs would go from 70 to 85.

3 In my experience interacting with power
4 developers I, think most of them would regard that as
5 something that's probably high and that they can do
6 better. I reflected something here that I think is
7 at the low end of what a power developer would
8 possibly be figuring going forward on a project
9 that -- that their pro formas would make it at the 55
10 level. So it does reflect the interaction that I've
11 had in discussing these issues with power developers.

12 Q. Dr. Makovich, were you just reading from
13 a document while providing that answer?

14 A. I have a note here on the Energy
15 Information Administration 2020 levelized costs.

16 MR. SOULES: Your Honor, would I be
17 permitted to see the note the witness is referring to
18 while answering my question?

19 EXAMINER ADDISON: You may.

20 MR. SOULES: May I approach?

21 EXAMINER ADDISON: You may.

22 MR. SOULES: Do you have another copy of
23 this?

24 MR. KUTIK: No, I don't.

25 MR. SOULES: I'm sorry, your Honors, just

1 a moment. There is a lot of information here.

2 EXAMINER ADDISON: Let's go off the
3 record of the.

4 (Discussion off the record.)

5 EXAMINER ADDISON: Let's go back on the
6 record.

7 MR. SOULES: Thank you, your Honor.

8 Q. (By Mr. Soules) Dr. Makovich, the EIA
9 information that you referenced in your earlier
10 answer, those figures are based upon the cost of new
11 entry, correct?

12 A. Yes. It's their estimate of the cost to
13 build a conventional natural gas-fired combined
14 cycle.

15 Q. In the notes that you were referring to
16 in providing your earlier answer, were those drafted
17 at the direction of counsel?

18 A. No. I put these together anticipating
19 that there might be some questions on this.

20 Q. When did you prepare those notes?

21 A. Yesterday or day before yesterday. I
22 traveled yesterday. Day before yesterday.

23 MR. SOULES: Nothing further for this
24 witness. Thank you your Honor.

25 EXAMINER ADDISON: Thank you, Mr. Soules.

1 EXAMINER PRICE: Dr. Makovich, do you
2 need the information supplied by the -- I know it's
3 EIA, and I am going to assume what EIA means, Energy
4 Information Agency; is that correct?

5 THE WITNESS: Energy Information Agency.

6 EXAMINER PRICE: Great. Do you need the
7 information provided by the EIA to be reliable?

8 THE WITNESS: Yes. The EIA provides a
9 lot of basic data that we have to rely on. It's one
10 of the place where you get the primary data
11 collection in the energy sector.

12 EXAMINER PRICE: Do you think that their
13 energy price projections are also reliable?

14 THE WITNESS: Well, forecasting work,
15 there is a difference between data and forecasting.

16 EXAMINER PRICE: I understand.

17 THE WITNESS: And like any forecasting
18 exercise, I think it's important to understand the
19 assumptions that they are making, the models that
20 they are using. But, you know, I think that they can
21 reliably translate a set of assumptions and
22 expectations into projections, although a lot of the
23 assumptions that they make or expectations they have
24 could -- are often different from what I am
25 expecting.

1 EXAMINER PRICE: Do you think, in your
2 experience, that their projections tend to be -- the
3 projected prices tend to be higher or lower than what
4 you would otherwise predict based upon the
5 assumptions that you are talking about?

6 MR. KUTIK: Your Honor, I'll object. In
7 terms of what time period are we talking about?
8 Forever? Last five years? Last year?

9 EXAMINER PRICE: The last two years.
10 That's a fair point. 2015, 2014, you can limit it to
11 that.

12 THE WITNESS: I can't tell you
13 specifically how they've done in their projections of
14 just the recent couple of years. And the only
15 observation I would make is having looked at -- you
16 know, if you go back 10 years and look at an EIA
17 forecast and see where we are at today, it
18 illustrates that it is very difficult to predict
19 what's going to happen in the energy sector in
20 general or the power sector in particular because
21 there's a lot of uncertainty.

22 And you look at fuel prices, for example,
23 you know, just step back a couple of years at what
24 people were saying oil prices would be, and I think
25 EIA was probably in the same boat, you know,

1 projecting the hundred-dollar prices would continue
2 and so forth. So I think they suffer from the same
3 kind of forecast errors as other prognosticators in
4 that they are trying to forecast a complicated and
5 uncertain future.

6 EXAMINER PRICE: That's a fair answer.
7 Thank you. While we are talking, I would like to go
8 to your bridge analogy that you discussed briefly
9 earlier. I lost the page. Do you know what page
10 your bridge discussion is on?

11 THE WITNESS: Pages 6 and 7.

12 EXAMINER PRICE: Thank you. In fact, in
13 the 1800s many bridges were public utilities; isn't
14 that correct?

15 THE WITNESS: Yes, I believe so.

16 EXAMINER PRICE: And that's because of
17 the very economic issues that you are raising; is
18 that correct?

19 THE WITNESS: Yes. The example here says
20 if you were relying on the marketplace to deliver
21 your bridges, you might have a problem.

22 EXAMINER PRICE: So instead they were
23 given monopolies by the Crown --

24 THE WITNESS: Or built by public funds.

25 EXAMINER PRICE: Or built by public

1 funds, and those that were built by private funds
2 were going monopolies and able to charge an amount
3 set by the government; is that correct?

4 THE WITNESS: I believe you are right,
5 yes.

6 EXAMINER PRICE: So is the import of your
7 analogy that the state policymakers should go back to
8 regulating markets, market prices, for electricity?
9 Is that the logical conclusion to your analogy?

10 THE WITNESS: No, that wasn't my intent.

11 EXAMINER PRICE: Is it a fair, logical
12 conclusion to draw?

13 THE WITNESS: No. What I -- what I am
14 trying to point out here is that sometimes the
15 conditions of the technologies that provide the goods
16 and services that we want don't have the cost
17 characteristics that if you try to produce those
18 goods and services in a competitive market, you are
19 going to get the result you want.

20 And this -- the reason I wanted to point
21 this out was that this problem exists to some degree
22 in the power business. And so it does say that if
23 you are going to run a competitive power market and
24 it's an energy-only market, which is how California
25 started out, it's how MISO started out, you are going

1 to have a problem because of this characteristic that
2 Dupuit identified, that your prices aren't going to
3 be high enough to keep supply and demand in balance
4 in the long run. The -- that doesn't mean a market
5 can't work. What it means is you have got to address
6 this inherent flaw, which is what capacity market
7 constructs are largely designed to do.

8 And so we've seen a continued evolution
9 of constructs and capacity markets to try to address
10 this problem. The second dimension of this problem
11 is that we also have prices that are too low because
12 of these environmental interventions, so even if we
13 have capacity markets that ensure we have enough
14 installed capacity, this other market defect, the
15 suppressed price, is going to produce an inefficient
16 mix because we will have too many peakers and cycle
17 units and not enough baseload. So a market can be
18 set up to work well, but you've got to understand the
19 fundamental engineering economics to get the rules
20 and institutions right.

21 EXAMINER PRICE: And let's break those
22 two issues up just a bit. Do you believe that PJM's
23 capacity market with performance capacity today has
24 solved the market issues, or do you still think it
25 will inevitably lead to failure?

1 THE WITNESS: I think that PJM is a very
2 interesting case in the way it's evolved. It started
3 off with a capacity market that I would say didn't
4 look like it had high potential for solving the
5 problem. It's gone through a number of revisions
6 through time, the most recent being the capacity
7 performance change.

8 I think that the PJM market comes close
9 to addressing the challenge of this implicit flaw in
10 the marketplace. Time will tell if it's fully
11 addressed the problem.

12 EXAMINER PRICE: Let's talk about the
13 environmental mandates.

14 MR. KUTIK: Your Honor, could we go off
15 the record?

16 EXAMINER PRICE: Yes.

17 (Discussion off the record.)

18 EXAMINER PRICE: Let's go back on.

19 Let's talk about the price of suppression
20 testimony because I am not sure if I fully
21 understand. Maybe it's just because it's unusual for
22 a utility witness to testify that the environmental
23 mandates are actually reducing overall prices.

24 So is your testimony that the
25 environmental mandates are actually causing customers

1 to pay lower prices than they otherwise would pay in
2 the absence of the mandates?

3 THE WITNESS: What you've said is the
4 environmental mandates are suppressing the
5 wholesale -- market clearing wholesale electric
6 energy price. And so to the extent that that would
7 flow through into retail rates would affect your
8 retail rates.

9 And I might add that if you look at the
10 2014 PJM Market Monitor Report, it says, and I quote,
11 "Environmental requirements in renewable energy
12 mandates at both the federal and state levels have a
13 significant impact on the cost of energy and capacity
14 in PJM markets."

15 And it goes on to say that "Wind output
16 in PJM is generally higher in off-peak hours and
17 lower in on-peak hours," which is why we've -- the
18 problem I am talking about is that we've got more
19 price suppression in the off-peak hours -- in the
20 off-peak periods, and this is disproportionately
21 affecting the cash flows for baseload units.

22 EXAMINER PRICE: Thank you. We will have
23 a chance to talk to Dr. Bowring shortly.

24 One last question. Is your testimony --
25 your testimony today would be equally true if the

1 generation mix in the proposed transaction consisted
2 of two nuclear plants and one coal plant, wouldn't
3 it?

4 THE WITNESS: I believe allowing two
5 nuclear plants and one coal plant would be moving
6 away from the cost-effective generation mix, so yes.

7 EXAMINER PRICE: Would it be equally true
8 if it were two nuclear plants and two coal plants?

9 THE WITNESS: Again, losing that baseload
10 it is, yes, that's likely the case.

11 EXAMINER PRICE: Would it be equally true
12 if all of FES's generation were subject to the
13 proposed transaction?

14 THE WITNESS: I think that this
15 suppression of prices, predominantly off-peak period,
16 affects baseload generation predominantly, so I'm --
17 I'm not testifying that you would necessarily have to
18 have all the peaking units, for example, covering
19 because between, you know, the capacity and energy
20 prices, I'm not as concerned about the going-forward
21 economics on the peaking units, for example. Where I
22 see a problem right now is on the baseload side.

23 EXAMINER PRICE: And that's irrespective
24 of whether or not PJM dispatches on an economic
25 basis; is that right?

1 THE WITNESS: As opposed to dispatching
2 how?

3 EXAMINER PRICE: Well, I mean, they
4 dispatch the lowest marginal plant, irrespective of
5 whether it's a baseload or a cycling or a peaker;
6 isn't that right?

7 THE WITNESS: Under the constraints, the
8 security constraints that they have, yes. It's
9 economic dispatch based on the bids that competition
10 drives to the short marginal cost, yes.

11 EXAMINER PRICE: Thank you. I said my
12 last question, and I lied. Would you characterize --
13 the term "load following," do you understand the term
14 "load following"?

15 THE WITNESS: Yes.

16 EXAMINER PRICE: Would you characterize a
17 load-following plant as the same as cycling? Or
18 would you say it's the same as baseload?

19 THE WITNESS: It's really a matter of
20 degree. A cycling unit, its role in a cost-effective
21 generation mix is to do much of the load following,
22 but that doesn't mean that baseload plants don't do
23 any. But which is why you can -- since baseload
24 plants don't have to do a lot of cycling, you can
25 trade off some inflexibility for lower costs. But in

1 the cycling mode you really do need that flexibility,
2 so you can't use baseload. The technologies that are
3 best for baseload with a little bit of load following
4 aren't necessarily going to be the cost effective
5 ones for a lot of the load following, which is what
6 the cycling role typically is.

7 EXAMINER PRICE: If a unit was designed
8 to be load following, you would not characterize that
9 as a baseload unit?

10 THE WITNESS: I characterize baseload as
11 being more a function of the utilization rate that
12 you observe. So if you have got a unit that's
13 running close to its technical potential, you know,
14 then you are talking about something -- you know,
15 these high utilization rates of plants, so the
16 typical natural gas-fired combined cycle plant in PJM
17 runs at about a 40 percent plant factor, so I think
18 that indicates it's a lot of cycling, whereas your
19 typical nuclear plant is running, you know, in the
20 U.S. I think we are up around 90 percent of plant
21 factors. That is clearly baseload.

22 EXAMINER PRICE: Okay. Thank you. Thank
23 you.

24 EXAMINER ADDISON: Ms. Fleisher.

25 MS. FLEISHER: Sure.

1 - - -

2 CROSS-EXAMINATION

3 By Ms. Fleisher:

4 Q. Mr. Makovich -- Dr. Makovich, sorry. My
5 name is Madeline Fleisher. I represent the
6 Environmental Law & Policy Center.

7 I believe this morning you clarified that
8 figure -- the figure on page 9 of your testimony
9 comes from the 2009 Department of Energy Wind
10 Technologies Market Report; is that correct?

11 A. Yes.

12 Q. Okay. Do you know whether there is a
13 2013 DOE Wind Technologies Market Report?

14 A. I do not.

15 Q. Okay. Have you reviewed any DOE Wind
16 Technologies Market Reports more recent than the 2009
17 one?

18 A. I don't believe I have.

19 Q. Why did you use that 2009 report?

20 A. I've used this graphic in a number of
21 instances where I'm discussing this challenge of the
22 missing money problem because besides the price
23 suppression that renewables introduce into the
24 marketplace, particularly off-peak hours, the other
25 thing that the mandates for renewables introduces is

1 that the net loads -- so take all the aggregate
2 customer demand of minus the wind and solar
3 generation, that becomes more variable, and it means
4 that it's more expensive for the load-following power
5 plants to run.

6 And this illustrates that additional
7 costs of integrating these intermittent sources of
8 power supply, and so the effect is to lower the price
9 which is generating revenues and increase the costs
10 and that's how the cash flow for these power plants
11 is getting squeezed.

12 MS. FLEISHER: Could you read back the
13 answer, please.

14 EXAMINER ADDISON: Please.

15 EXAMINER PRICE: Could we have the
16 question, too.

17 (Record read.)

18 MS. FLEISHER: Move to strike everything
19 after "missing money problem," which is I think just
20 a little bit nonresponsive. I asked him if he used
21 this 2009 document. The rest of it was just an
22 explanation of his overall point.

23 MR. KUTIK: And that's the point of the
24 question. The point of the question, why did you use
25 it? So he explained.

1 MS. FLEISHER: Your Honor, I think
2 he's -- Dr. Makovich has several times today sort of
3 gone beyond the scope of the question. I think this
4 is another instance where I asked about a specific
5 document, not about what his overall point was.

6 MR. KUTIK: Why did you use the 2009
7 study? And he used this as an example of the
8 phenomenon that he is reporting on, a squeeze of the
9 costs going up and the prices going down.

10 EXAMINER PRICE: Didn't he introduce a
11 new thought when he began the sentence with "the
12 other thing"? I mean, that's a whole new topic,
13 isn't that, Mr. Kutik?

14 MR. KUTIK: I don't think so, your Honor,
15 because I think what he is talking about is what this
16 other thing that it explains.

17 EXAMINER ADDISON: Well, wasn't the
18 question, did you use that 2009 rather than why?

19 MR. KUTIK: I thought it was why.

20 MS. FLEISHER: I do, actually. That was
21 a mistranscription. I believe I did say "why."

22 EXAMINER ADDISON: Apologies.

23 MR. KUTIK: That's what I wrote down.

24 EXAMINER ADDISON: I am going to grant
25 the motion to strike beginning after "the missing

1 money problem."

2 MS. FLEISHER: Thank you, your Honor.

3 EXAMINER ADDISON: I will direct the
4 witness to simply answer counsel's question from this
5 point forward.

6 Q. (By Ms. Fleisher) Dr. Makovich, do you
7 know whether there have been other wind energy
8 integration cost studies performed for United States
9 power grids since 2009?

10 A. There have been additional studies
11 performed.

12 Q. Okay. Have you reviewed any of those?

13 A. I periodically look at integration
14 studies for a variety of reasons.

15 Q. Have you reviewed any performed regarding
16 PJM?

17 A. I don't remember the last time I looked
18 at a PJM integration study.

19 MS. FLEISHER: Your Honors, may I
20 approach?

21 EXAMINER ADDISON: You may.

22 MS. FLEISHER: Can we have this marked
23 ELPC Exhibit 22?

24 EXAMINER ADDISON: So marked.

25 (EXHIBIT MARKED FOR IDENTIFICATION.)

1 MS. FLEISHER: For the record this is a
2 document titled "PJM renewable Integration Study,
3 Executive Summary Report, and it says -- it's dated
4 February 28, 2014.

5 Q. Dr. Makovich, have you reviewed this
6 document?

7 A. I am not sure I have ever reviewed this
8 document before.

9 Q. Okay. Do you have any knowledge
10 regarding whether PJM has analyzed renewable
11 integration costs for the PJM grid?

12 A. Only a general awareness this is an issue
13 that all these grids, you know, try to analyze.

14 Q. And in preparing your testimony, did you
15 look into whether PJM had done any studies of
16 renewable integration costs for the PJM grid?

17 A. As I tried to explain, the integration
18 study graphic that I have included here was done to
19 make -- to illustrate a couple of important points.
20 The focus of my testimony was not a review of all
21 current integration studies in PJM.

22 MS. FLEISHER: Your Honor, I would move
23 to strike, and if you could direct him to answer my
24 question as to whether he looked into any PJM
25 renewable integration studies in preparing his

1 testimony.

2 EXAMINER ADDISON: Mr. Kutik, response?

3 MR. KUTIK: Yes, your Honor. I think he
4 was putting what he did in context and explaining
5 what he looked at and what he didn't look at. That
6 should be helpful for the Bench.

7 MS. FLEISHER: Well, your Honor, he
8 didn't actually answer my question as to whether he
9 had looked at those particular issues, and as for the
10 rest of that wasn't -- I didn't ask for context. I
11 asked for a "yes" or "no" answer.

12 MR. KUTIK: I think the answer is clear
13 in terms of what he did and didn't do.

14 EXAMINER ADDISON: Thank you. At this
15 time I'll deny the motion to strike. But I'll have
16 Ms. Fleisher's last question reread.

17 And please answer with a "yes" or "no"
18 response.

19 (Record read.)

20 A. No.

21 Q. And can you go to your testimony at page
22 12, lines 15 to 19?

23 A. I'm on page 12.

24 Q. And here you state that one of the
25 benefits of the plants is they could "supply

1 diversity, including the system reliability and price
2 stability benefits provided by coal and nuclear base
3 load plants with on-site fuel supply"; is that
4 correct?

5 A. Yes, you have read what I have there.

6 Q. And you also say that "Ohio may also
7 decide that the Plants have value-of-service
8 attributes that include economic impact (jobs, tax
9 basis) and environmental externalities"; is that
10 correct?

11 A. That's what I've written.

12 Q. And your testimony does not address
13 whether supply-side resources, such as energy
14 efficiency can address any of these issues, correct?

15 THE WITNESS: Could you please read that
16 question back.

17 (Record read.)

18 A. By "energy efficiency" are you talking
19 about the efficiency at a power plant of turning fuel
20 into electricity, or are you talking about the
21 efficiency of customers using electricity?

22 Q. I am referring to any and all energy
23 efficiency resources. Do you need more clarification
24 beyond that?

25 A. Yeah. It's not clear to me exactly what

1 you are asking me.

2 Q. I am asking whether your testimony speaks
3 to the role of supply-side resources in addressing
4 system reliability.

5 A. As I have said, the -- the objective
6 of --

7 Q. I apologize. Demand, demand-side
8 resources. I can see where I am causing confusion.

9 MR. KUTIK: Can we have the question put
10 to the witness again, your Honor?

11 MS. FLEISHER: Yes.

12 Q. (By Ms. Fleisher) So I'm asking whether
13 your testimony addresses whether demand-side
14 resources -- sorry -- what the role of demand side
15 resources is with respect to system reliability?

16 MR. KUTIK: May I have the question read,
17 please?

18 EXAMINER ADDISON: You may.

19 (Record read.)

20 A. Is there a particular point in my
21 testimony where you're referring to me discussing
22 this?

23 Q. No. I am asking -- I guess I can strike
24 it and ask it probably more clearly.

25 Is it true that your testimony does not

1 address the role of demand-side resources with
2 respect to system reliability?

3 A. I do not treat the topic of demand-side
4 resources and reliability in my testimony.

5 Q. And is it true that your testimony does
6 not address the role of demand-side resources with
7 respect to price stability?

8 THE WITNESS: Can you reread the
9 question, please?

10 (Record read.)

11 A. My testimony focuses on the power supply
12 portfolio, so it does not focus on the demand side.

13 MS. FLEISHER: Thank you. And I am done.

14 EXAMINER ADDISON: Thank you,
15 Ms. Fleisher.

16 At this time we will break for lunch, and
17 we'll come back at 1:15.

18 (Thereupon, at 12:13 p.m., a lunch recess
19 was taken until 1:15 p.m.)

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1 Thursday Afternoon Session,
2 September 24, 2015.

3 - - -

4 EXAMINER ADDISON: Let's go back on the
5 record.

6 Ms. Hussey.

7 MS. HUSSEY: Thank you, your Honor.

8 - - -

9 CROSS-EXAMINATION

10 By Ms. Hussey:

11 Q. Good afternoon, Dr. Makovich.

12 A. Good afternoon.

13 Q. Aside from the Sammis plant, to your
14 knowledge does FirstEnergy Solutions own other
15 coal-fired generating units in Ohio?

16 A. As I understand it, they do, but I don't
17 have any of the portfolio information in front of me.

18 Q. Okay. So you don't know how many?

19 A. No.

20 Q. And aside from Davis-Besse, to your
21 knowledge does FirstEnergy Solutions own other
22 nuclear generating units in Ohio?

23 A. As I said, I don't have their portfolio
24 information in front of me.

25 Q. You are an economist, correct?

1 A. Yes.

2 Q. You've testified in your supplemental
3 testimony and your testimony here today that granting
4 the economic stability program would provide benefits
5 for retail consumers because it will prevent the
6 plants from retiring before it's economic to do so;
7 is that accurate?

8 A. Are you reading that directly from my
9 testimony? It seems --

10 Q. Largely, yes. If you would refer to page
11 3, line 4. Yes.

12 A. At page 3, line 4, I say, "The Economic
13 Stability Program will produce benefits for retail
14 customers because it will prevent the Plants from
15 retiring before it's economic to do so."

16 Q. Thank you. And you mentioned earlier
17 that you've reviewed the term sheet for the proposed
18 transaction, correct?

19 A. Yes.

20 Q. Are you aware that there is an 11.15
21 percent return on equity for FirstEnergy Solutions
22 that's built into the proposed transaction?

23 A. As I said, I read it. I didn't memorize
24 the terms and conditions so I can't verify whether or
25 not that's the number in it.

1 Q. Okay. But you are aware that there is a
2 return on equity built in?

3 A. Again, I don't have that in front of me,
4 but I remember there is a formula there that does
5 involve a cost of capital component.

6 Q. In your estimation, would the benefits
7 you allege will result from approving the economic
8 stability program still be realized if the return on
9 equity for FirstEnergy Solutions that's built into
10 the proposed transaction was reduced?

11 A. I have no basis to opine on what the
12 appropriate rate of return is in terms of the deal.

13 MS. HUSSEY: Okay. Thank you very much.
14 No further questions.

15 EXAMINER ADDISON: Thank you.

16 Mr. Petricoff.

17 MR. PETRICOFF: Thank you.

18 - - -

19 CROSS-EXAMINATION

20 By Mr. Petricoff:

21 Q. Good afternoon, Dr. Makovich. I am
22 Howarth Petricoff, and I represent the Electric Power
23 Supply Association, the Retail Energy Supply
24 Association, Constellation, and Exelon, and I just
25 have a couple of questions for you.

1 If you would, turn to your direct
2 prepared testimony, page 6, line 5. And when you get
3 there, read that sentence that starts on line 5 and
4 ends on line 8. I have a couple of questions for you
5 about that sentence.

6 A. Is the sentence that begins with "In
7 PJM"?

8 Q. That's correct.

9 A. "In PJM, as in other markets" --

10 Q. Oh, that's okay, you don't have to read
11 it. Just read it to yourself, and then when you are
12 ready, I will ask you the questions.

13 MR. KUTIK: So you don't want him to read
14 it out loud?

15 MR. PETRICOFF: I see no reason to. I
16 assume he can read it faster if he doesn't read it
17 out loud.

18 A. I am on page 6.

19 Q. Okay. Great. Now, at the end of line 5
20 it says, "In PJM, as in other markets," if you could
21 define for me what you mean by "markets" there? Do
22 you mean other retail transmission organizations?

23 A. When I am talking about other markets, we
24 do see power markets are defined by the bounds of the
25 transmission networks that physically connect the

1 buyers and sellers. Now, transfer capability is
2 seldom absolute, but the bounds of the transmission
3 system is generally what's defining the bounds of
4 these markets. So people talk about ERCOT market,
5 for example, the Texas market. It is a fairly well
6 defined power market.

7 Q. Okay. So expanding on your thought here
8 on line 5, then when we are talking about markets, we
9 are looking at individual regional transmission
10 organization boundaries with maybe some adjustments
11 that could be required if you have a congested or
12 constrained area?

13 MR. KUTIK: May I have the question read,
14 please.

15 EXAMINER ADDISON: You may.

16 (Record read.)

17 A. What I said was the bounds of the
18 transmission network are really what I think of as
19 defining the interaction of buyers and sellers in a
20 power market, and whether that lines up exactly with
21 the RTO or whether you can consider an RTO as being
22 controlling two separate markets, you know, it's
23 really the balance of the transmission network that I
24 think of as the defining characteristic for a
25 marketplace.

1 Q. In general, though, would they, in your
2 opinion, line up with the RTO boundaries?

3 A. In RTOs, their boundaries as -- as you
4 probably are aware, you have got a lot of pricing
5 points within the RTOs, and prices tend to be fairly
6 highly correlated in their movements, which suggests
7 that the transmission network is getting us close
8 enough together that we have got some similar market
9 forces at work. But it's actually -- you know,
10 clearly defining the bounds of a power market is not
11 as black and white as a lot of people think. That's
12 all I'm saying.

13 Q. Okay. Let's move on then to line 6 in
14 that sentence. You have the word -- oh, about midway
15 in the sentence the word "*chronically*," and it's in
16 italics, and I assume that's for emphasis. What did
17 you mean when you wrote "*chronically*"? What were you
18 trying to convey?

19 A. The missing money problem is something
20 that's not unique to PJM. It's not unique to Ohio.
21 It's something that is characteristic of power
22 markets in general. And we've seen this problem and
23 the need to deal with it in most efforts to
24 restructure the power business.

25 Q. Let me try -- let me try this again. By

1 "chronically" do you mean that the prices would be --
2 that the prices wouldn't be too low to cover costs
3 all the time or most of the time?

4 A. By "chronically" I mean as you look back
5 over the past 25 years or so of restructuring efforts
6 in power systems and around the world, that more
7 often than not what we are seeing is the market-based
8 cash flows are showing signs of the missing money
9 problem.

10 Q. Let me try "chronically" a different way.
11 If you had a power plant which for over a 15-year
12 period produced sufficient monies to be profitable
13 except for three years, would that be chronically
14 deficient as used in line 6?

15 A. Well, I think an individual power plant
16 is not the test you would want to use. The missing
17 money problem doesn't say that any power -- it
18 doesn't say that nobody can be profitable because
19 power plants have very different cost structures one
20 to the next. The chronic problem is that the prices
21 and the cash flows they generate are not high enough
22 to provide sufficient power supply and generating mix
23 that you are after.

24 Q. Well, let's go back because I'm -- I am
25 still trying to settle on the word -- a definition

1 for the word "chronically." Let's assume that we are
2 now talking about a large population of power plants
3 within an RTO or within a functioning grid area, and
4 for all but a couple of the years out of a 15-year
5 period there is sufficient revenue to cover costs.
6 Would you have a missing money problem?

7 A. Well, I think the observation that
8 probably helps answer the question that you've posed
9 is if we look back over this period you suggest of 10
10 or 15 years, if you look at the major merchant power
11 suppliers, so Calpine or NRG, they've typically gone
12 through a bankruptcy -- a bankruptcy reorganization
13 at least once, and that's what I mean by chronically,
14 that for quite some time now the market-based cash
15 flows are creating this chronic cost recovery
16 shortfall.

17 MR. PETRICOFF: Your Honor, I move to
18 strike that answer as not responsive.

19 EXAMINER ADDISON: Mr. Kutik?

20 MR. KUTIK: I think he was trying to
21 explain what he meant by "chronically" by referring
22 to certain companies and certain firms in the energy
23 markets and what's happened to them to explain
24 Mr. Petricoff's problem with understanding what
25 Dr. Makovich means by chronically.

1 MR. PETRICOFF: I would rather explain I
2 think this is closer to Presidential candidates
3 giving their talking points regardless of what the
4 question is.

5 EXAMINER PRICE: Can I have the question
6 back again.

7 (Record read.)

8 EXAMINER ADDISON: Can I have the answer
9 as well.

10 (Record read.)

11 EXAMINER ADDISON: We will go ahead and
12 grant the motion to strike.

13 Can I have Mr. Petricoff's question asked
14 one more time, and then the witness is directed to
15 answer the question posed.

16 (Record read.)

17 A. And my answer is I haven't defined a
18 missing money problem as a certain number of years of
19 shortfall. I tried to answer the question with
20 regard to chronically because the companies I
21 mentioned have had numerous assets within large RTO
22 markets over the past 15 years, which is what the
23 nature of your question was. And I've explained to
24 you that I see a chronic problem there because they
25 go bankrupt and have written down billions of dollars

1 in merchant plant investment.

2 Q. But for those plants that you
3 mentioned -- well, actually it was stricken.

4 Isn't it true for any particular company
5 that goes bankrupt, there could be a myriad of
6 reasons why they did it, in addition to just in the
7 power industry there's just missing money?

8 A. I'm sorry, could you please reread the
9 question for me.

10 Q. Actually, I am going to withdraw the
11 question. Let me go back. I am trying to work out a
12 meaningful -- "chronically" for you. Is it
13 sufficient to define chronically here as long --
14 prolonged periods for the population of power plants
15 needed to provide reliability and efficient power
16 where the revenues don't equal the costs?

17 THE WITNESS: Can you read me back the
18 question, please.

19 (Record read.)

20 A. I think we are in agreement that chronic
21 is something that's not temporary but it is
22 longstanding.

23 Q. Right. And at this point you are
24 uncomfortable putting years or months into that
25 definition.

1 A. I am uncomfortable with that.

2 Q. Okay.

3 EXAMINER PRICE: When you say
4 "chronically," is it more than just over time? Is it
5 also structural, or are you just saying it's just
6 over time?

7 THE WITNESS: Well, when we look at this
8 problem over time, the difficulty I am having here
9 is -- take California, for example. You had prices
10 for many years leading up to the crisis that were too
11 low to support investment. So you get a shortage,
12 and then the prices spike up and go through the roof.

13 And that's not evidence that there is no
14 longer a missing money problem, that prices are
15 spiked up and gone through the roof because you have
16 got a shortage. That is a consequence of this
17 problem, and you are not going to have a stable power
18 market if you are going to rely on periodic crisis
19 shortages to generate the revenues you are missing
20 the other parts of the time.

21 So this question of how many years do you
22 need to be good versus bad, the chronic problem I am
23 talking about here I think is best described by the
24 longstanding financial distress we've seen in the
25 merchant power sector.

1 EXAMINER PRICE: Thank you.

2 Q. (By Mr. Petricoff) Okay. Let's see if we
3 can approach it from another angle. You described
4 before the problem in California. Would it be fair
5 to say that the problem in California was that the
6 prices that were authorized were not of a level that
7 would meet the long-term marginal cost of generating
8 power there?

9 A. I am not sure what you mean by
10 "authorized."

11 Q. Okay. Let's go two words down to
12 "artificially," and maybe we can work an answer to
13 that -- to that question back. What did you mean
14 when you said that the -- that the market-based cash
15 flows were artificially too low? What made them --
16 what makes them artificially low?

17 A. That constructing a workable power market
18 involves getting the rules and institutions right to
19 produce well-functioning capacity and energy markets.
20 I've made the observation that the development of
21 those rules is a product of compromise and
22 negotiation of the stakeholders on these RTO
23 governance boards, and that process does not always
24 produce the right answer, and in some cases there is
25 a inclination to allow the missing money problem to

1 persist until you get something like a shortage.

2 Q. Okay. And you would agree with me that
3 an RTO is a quasi-governmental agency?

4 MR. KUTIK: Well, I'll object to the
5 extent it calls for a legal conclusion.

6 MR. PETRICOFF: I'm sorry, I didn't hear
7 the grounds.

8 MR. KUTIK: Legal conclusion.

9 Q. (By Mr. Petricoff) Do you believe -- I'll
10 rephrase.

11 EXAMINER ADDISON: I apologize. Thank
12 you, Mr. Petricoff.

13 Q. Do you mean that the RTO is a
14 quasi-governmental agency?

15 MR. KUTIK: Same objection.

16 EXAMINER ADDISON: Are you an attorney,
17 Dr. Makovich?

18 THE WITNESS: No, I am not.

19 EXAMINER ADDISON: To the extent you are
20 not an attorney, you can answer the question.

21 THE WITNESS: I actually don't really
22 know what he means by "quasi-governmental."

23 Q. Okay. That's an acceptable answer. Let
24 me ask it this way. Is an example of an artificial
25 constraint in the market PJM implementing a price cap

1 on a clearing price in the hourly or day-ahead
2 market? Is that artificial?

3 A. A price cap certainly can be an
4 artificial intervention. So my point here being that
5 some of these low prices are the result of people not
6 being able to do what it takes to solve the problems.

7 Q. Let's turn to and discuss PJM
8 specifically. I think you indicated to the hearing
9 examiner that you were familiar with the capacity
10 performance rule that came out by PJM, I think, in
11 June of this year.

12 A. I said I was generally aware, yes.

13 Q. All right. And did you testify that the
14 new capacity performance rule would be a step forward
15 towards meeting the missing money problem in PJM?

16 A. We discussed this earlier, that it was a
17 development that occurred after I filed my testimony
18 and that I see it as part of the evolution that
19 continues within PJM to address one dimension of this
20 missing money problem.

21 Q. Okay. In comparison to the other RTOs,
22 is PJM further ahead in terms of addressing the
23 missing money problem?

24 A. There is not a "one size fits all"
25 solution for power systems to address either

1 dimension of the missing money problem. So in the
2 work that I've done, we've looked at 13 different
3 approaches that we see power systems employ and
4 concluded that eight of them would have a likelihood
5 of being able to meaningfully address the problem
6 under the right conditions.

7 Q. Okay. And is PJM one of the eight?

8 A. So the approach that PJM is using is one
9 that falls within the eight that we think can work
10 under the right circumstances.

11 Q. Okay. On page 11 of your testimony,
12 lines 6 and 7.

13 MR. KUTIK: I'm sorry, what page?

14 MR. PETRICOFF: Page 11 of the direct
15 prepared, lines 6 and 7.

16 Q. You compare the shortfall against the
17 annual levelized cost of new entry, which you then
18 label with the acronym CONE. Do you see where I am
19 directing you?

20 A. Page 11, line 6 and 7.

21 Q. Yes. Okay. Is one of the reasons that
22 you believe that PJM may be on the road to dealing
23 with the missing money problem because it has now
24 introduced the CONE concept into its capacity
25 pricing --

1 MR. KUTIK: May I have the question read
2 please.

3 Q. -- auction?

4 MR. KUTIK: May I have the question read?

5 EXAMINER ADDISON: You may.

6 (Record read.)

7 A. I don't think your question is accurately
8 characterizing my testimony.

9 Q. Okay. I wasn't characterizing your
10 testimony. I had introduced the -- I am pointing out
11 CONE to you there only to get the concept of CONE in.
12 If that's confusing, I'll restate the question.

13 MR. KUTIK: Well, I'll object, your
14 Honor. I think the mischaracterization was to the
15 preamble to the question.

16 MR. PETRICOFF: I will reask the question
17 without -- without the preamble.

18 EXAMINER ADDISON: Thank you.

19 Q. You're familiar with the concept of CONE
20 pricing, correct?

21 A. CONE stands for cost of new entry, but I
22 don't know what you mean by CONE pricing.

23 Q. Okay. Prior to the capacity performance
24 rules at PJM, okay, are you familiar with how the
25 limits were set by what the maximum price could be

1 when you bid into the base residual auction?

2 A. I'm generally familiar with it if what I
3 think you are talking about is kind of the way they
4 developed the demand curve.

5 Q. That's correct.

6 A. Yes.

7 Q. Okay. And do you think that the new
8 rules by adding the concept of CONE improves PJM's
9 chances of addressing the missing money problem?

10 A. The concept of CONE has been around in
11 PJM prior to this recent capacity performance change,
12 so I'm not sure what you mean by the introduction.

13 Q. Okay. Under the -- under the new
14 capacity performance rules, is it clear that a power
15 supplier bidding in could bid in a price that was up
16 to the cost of the new entry regardless of what their
17 cost of operation was?

18 A. I would have to have the specifics of the
19 program in front of me here before I could testify to
20 any of the exact terms and conditions.

21 MR. PETRICOFF: Okay. I think that's --
22 I think that's fair enough. I have no further
23 questions for this witness. Thank you.

24 EXAMINER ADDISON: Thank you.

25 Mr. Dougherty?

1 MR. DOUGHERTY: Yes. Thanks. Just a
2 couple of questions.

3 - - -

4 CROSS-EXAMINATION

5 By Mr. Dougherty:

6 Q. My name is Trent Dougherty, and I am
7 representing the Environmental Council and the
8 Environmental Defense Fund.

9 Just to clarify one thing I think you
10 mentioned to Mr. Petricoff, that the way to address
11 the missing money problem is not a "one size fits
12 all" solution. Is that somewhat paraphrasing what
13 you were saying?

14 A. Yes.

15 Q. And so understanding that your doctorate
16 is not a juris doctorate and you are not an attorney
17 and you are not providing a legal conclusion, is it
18 then fair to say that the Public Utilities Commission
19 of Ohio cannot fix the missing money problem by
20 approving the economic stability program in this
21 case?

22 A. My testimony discusses the missing money
23 problem in two dimensions. The first dimension I
24 refer to as the inherent dimension because there are
25 inherent characteristics of electric generating

1 technologies that cause a missing money problem to
2 arise in an energy-only market as we saw in
3 California and elsewhere, and that capacity markets
4 are one of the eight approaches that can work under
5 the right circumstances to address that dimension of
6 the problem.

7 The second dimension of the problem that
8 I discuss is the imposed problem which is arising
9 from state-level mandates of renewables that are
10 creating disproportionately off-peak power price
11 suppression and creating the additionally higher
12 operating costs for the baseload units. That
13 dimension of the missing money problem does look like
14 it can be addressed with this proposal that we are
15 considering today.

16 Q. So your answer is, yes, the missing money
17 problem can be solved. I understand that you gave
18 the explanation part, but it's a "yes" or "no" to my
19 initial question.

20 MR. KUTIK: Well, I object, your Honor.
21 It's not a "yes" or "no," and the witness explained
22 that.

23 EXAMINER ADDISON: I agree. I think he
24 was giving an explanation as to why it couldn't be a
25 "yes" or "no" question.

1 Q. (By Mr. Dougherty) In a response to a
2 question from Mr. Soules you had referenced a
3 document you said were your notes on -- to answer a
4 particular question. And Mr. Soules had reviewed
5 that document. Is that -- do you recall that?

6 A. The document was reviewed when I was
7 talking about the Energy Information Administration's
8 2020 levelized costs that appeared in the Annual
9 Energy Outlook 2015.

10 Q. The document that you said were your
11 notes that you had prepared, I believe you said, two
12 days ago.

13 A. Yes.

14 Q. That's correct?

15 A. Yes.

16 Q. And I believe you also in response to a
17 question by Attorney Examiner Price quoted from
18 another document, which I think you said "and I
19 quote" and then you read a piece. Do you recall
20 that?

21 A. I believe I was referring to the 2014
22 State of the Market Report for PJM where I quoted the
23 passages where they note that environmental
24 requirements and renewable mandates at both the
25 federal and state levels have a significant impact on

1 the cost of energy and capacity in PJM markets and
2 that wind output in PJM is generally higher in
3 off-peak hours and lower in on-peak hours, and if you
4 also look at that report, you will see the vast
5 majority of renewable output in PJM is wind.

6 MR. DOUGHERTY: Your Honor, I just asked
7 if he recalled that he answered your question with
8 this document. I didn't ask him to read this
9 document into the -- into the record so I move to
10 strike.

11 EXAMINER ADDISON: Mr. Kutik, response?

12 MR. KUTIK: I think he was -- he was
13 explaining what he did.

14 MR. DOUGHERTY: And I think that the
15 record previously in which he answered the question
16 in which he quoted in his question, and the question
17 asked by Attorney Examiner Price spoke for itself. I
18 was just asking whether he recalled that.

19 MR. KUTIK: Well, your Honor, there has
20 been a lot of questions asked of this witness, and I
21 think this witness is appropriately making sure that
22 we are on the same page as to what specifically he
23 was reading and what quote we are talking about as a
24 potential agreement as we go forward with
25 questioning. So I think it's appropriate for the

1 witness to point that out.

2 EXAMINER ADDISON: At this time I am
3 going to grant the motion to strike for everything
4 after the word "passages." If you want to raise any
5 additional issues upon redirect, you are free to do
6 so at that time.

7 And I will again just instruct you,
8 Dr. Makovich, that you need to answer counsel's
9 question and just limit your answer to that.

10 Q. (By Mr. Dougherty) And like -- strike
11 that.

12 Were either of the two documents that I
13 just asked about part of your supplemental testimony
14 marked as Exhibit 42, Companies' Exhibit 42, I
15 believe?

16 A. The paper that had notes on it included
17 the source for Figure 1, which is part of my
18 testimony because when we started the testimony, I
19 wanted to be able to accurately describe the report.
20 So some things on these notes did appear in my
21 testimony.

22 Q. And by that, some things that appear on
23 that document were not part of your testimony,
24 correct?

25 A. As I said, these were notes I prepared in

1 preparation for the discussion we are having today.

2 Q. And how many pages of notes like that do
3 you have with you today?

4 A. I have three pages.

5 MR. DOUGHERTY: Thank you, your Honor.
6 No more questions.

7 EXAMINER ADDISON: Mr. Hays?

8 MR. HAYES: No questions. Thank you,
9 your Honor.

10 EXAMINER ADDISON: Thank you.

11 Mr. Kurtz, any questions?

12 MR. KURTZ: No questions.

13 EXAMINER ADDISON: Mr. Sauer?

14 MR. KURTZ: Although I would like to hear
15 about those 13 different power markets, but I won't.

16 EXAMINER ADDISON: Mr. Sauer?

17 MR. SAUER: Thank you, your Honors.

18 - - -

19 CROSS-EXAMINATION

20 By Mr. Sauer:

21 Q. Good afternoon, Mr. Makovich. My name is
22 Larry Sauer. I am an attorney with the Office of
23 Ohio Consumers' Counsel.

24 If you could turn your attention to page
25 5, lines 1 through 16 of your testimony, this is

1 where you were analyzing a less diverse U.S. power
2 supply based on your account of factual assumptions
3 of zero percent coal and zero percent nuclear,
4 correct?

5 A. I'm on page 5?

6 Q. Page 5, lines 1 through 16.

7 EXAMINER ADDISON: Can we go off the
8 record for a moment?

9 (Discussion off the record.)

10 EXAMINER ADDISON: Let's go back on the
11 record.

12 A. I am looking at page 5.

13 THE WITNESS: Could you reread the
14 question, please.

15 EXAMINER ADDISON: Yes, please.

16 (Record read.)

17 A. That's not correct. The analysis isn't
18 there. The analysis is in the attached study, LM-2.

19 Q. Okay. Could your analysis have been
20 conducted at the PJM level?

21 A. Yes.

22 Q. Were you not asked to do such a study of
23 PJM?

24 A. I was not asked to do that.

25 Q. Could your analysis have been done at the

1 Sammis and Davis-Besse plant level?

2 A. I'm having difficulty envisioning exactly
3 how this analysis of a portfolio would apply to just
4 these couple of plants. It is an analysis for a
5 power supply portfolio.

6 Q. Is the fact that those plants are such a
7 small piece of the overall portfolio that it wouldn't
8 be a meaningful analysis?

9 A. Well, they are part of a bigger portfolio
10 so it really wouldn't be the, kind of, focus of the
11 analysis.

12 Q. There's also line 14 you talk about, "The
13 less diverse power supply case produced monthly power
14 bills that were 25 percent higher, and twice as
15 variable." Do you see that?

16 A. Yes.

17 Q. And you were comparing to current power
18 bills; is that correct?

19 A. The current power bills were during the
20 period that the counterfactual involved was 2010,
21 '11, and '12.

22 Q. Are those current power bills a
23 reflection of the U.S. average of current power
24 bills?

25 A. We did this calculation for the typical

1 level of power bills in each of the three
2 interconnections that were analyzed.

3 Q. Did you do an analysis of what the impact
4 would have been on power bills in Ohio?

5 A. No.

6 Q. Okay. If you could look at page 6, lines
7 5 through 8.

8 A. I'm on page 6.

9 Q. Okay. Have you compared the relative
10 missing money problem to, say, the PJM RTO versus the
11 MISO RTO?

12 A. Yes.

13 Q. And would you say the missing money
14 problem is more prevalent in the PJM RTO or the MISO
15 RTO?

16 A. Well, as I said, there's two dimensions
17 to this problem, and I have been comparing and
18 contrasting the different approaches in MISO and PJM
19 to the first dimension of this problem, which is how
20 different their capacity market mechanisms are in
21 their designs.

22 Q. And have you concluded one way or the
23 other whether MISO is more -- has a larger missing
24 money problem than PJM?

25 A. As I look at what MISO is doing in its

1 capacity market right now, it has a design that's --
2 they are three years into it, and it's very similar
3 to the design that PJM had when it started its
4 market, and after a number of years, PJM found that
5 the prices this design produced were quite volatile.
6 They were either kind of boom or bust. And -- and
7 PJM evolved to address that, and so I think I
8 characterize them as being in different stages of
9 evolution right now.

10 Q. Are you aware that at one time
11 FirstEnergy was a member of MISO?

12 A. Now that you say that, I know there have
13 been a few companies that have switched back and
14 forth. I would have to check if that's the fact, but
15 there have been a number of companies that have
16 switched.

17 Q. Were you retained by FirstEnergy to
18 assist them in making a decision to move from MISO to
19 PJM?

20 MR. KUTIK: Objection.

21 EXAMINER ADDISON: Grounds?

22 MR. KUTIK: Relevance.

23 EXAMINER ADDISON: Mr. Sauer?

24 MR. SAUER: This witness is an expert on
25 missing money problems and RTOs, and I am just

1 curious if they -- if FirstEnergy relied on his
2 expertise at the time they were making a decision to
3 move from one RTO to another.

4 MR. KUTIK: With respect, Mr. Sauer's
5 curiosity doesn't define the bounds of relevance.
6 It's not relevant to any issue in this case or his
7 testimony.

8 MR. SAUER: It might be relevant to his
9 credibility as a witness if he wasn't relying upon or
10 felt to be an expert at the time they were making a
11 decision to move RTOs.

12 EXAMINER ADDISON: I will give Mr. Sauer
13 a little leeway.

14 You can answer the question. Do you need
15 it read back?

16 A. It's actually difficult to answer. As I
17 said, FirstEnergy is among a number of retainer
18 research clients that we have at IHS. I produce a
19 stream of research on a number of different topics.
20 It goes into organizations, and I don't know how much
21 it does or does not influence the decisions that they
22 make.

23 Q. Well, were you personally involved at the
24 time FirstEnergy made a decision to move from MISO to
25 PJM?

1 A. Personally involved in the research, or
2 hired under a consulting contract to work with them?

3 Q. First we'll go with involved preparing
4 any research.

5 A. As I said, I have been doing research
6 into the power sector at IHS and CERA for over 20
7 years now, so I think that might span the period of
8 time you are talking about.

9 Q. Were you personally retained under a
10 consultant contract to assist FirstEnergy with the
11 decision to move from MISO to PJM?

12 A. No.

13 MR. SAUER: I have no further questions,
14 your Honor.

15 EXAMINER ADDISON: Thank you.

16 Mr. Lindgren?

17 MR. LINDGREN: Yes. Thank you, your
18 Honor.

19 - - -

20 CROSS-EXAMINATION

21 By Mr. Lindgren:

22 Q. Good afternoon, Dr. Makovich. My name is
23 Tom Lindgren, and I represent the Commission staff in
24 this proceeding.

25 A. Good afternoon.

1 Q. I believe you testified that you reviewed
2 the testimony of Judah Rose in this case; is that
3 right?

4 A. Yes, I have read the testimony.

5 Q. Yes. And didn't Mr. Rose project that he
6 anticipates that market prices for electrical energy
7 and capacity will increase on both a nominal and a
8 real basis over the 20 years starting January 1st of
9 2015; is that right?

10 A. Again, I don't have his testimony in
11 front of me to verify whether you are accurately
12 reflecting what he said.

13 Q. Would you agree that he testified that he
14 anticipates a long-term increase in market prices for
15 electricity?

16 MR. KUTIK: Your Honor, I object.
17 Mr. Rose's testimony is what it is.

18 EXAMINER ADDISON: Mr. Lindgren,
19 response?

20 MR. LINDGREN: I am just trying to test
21 his familiarity with other testimony in the case.

22 EXAMINER ADDISON: Objection overruled.

23 A. So as I said, I read Judah Rose's
24 testimony. I am not sure -- I can't really describe
25 for you when exactly his numbers are at turning

1 points and so forth.

2 Q. Thank you. Well, would you consider that
3 a rational generation owner would take into account
4 future projections of market prices when making a
5 decision as to whether to retire a plant?

6 A. Well, retiring a plant is an investment
7 decision, and when it comes to that, to an investment
8 decision, you're making a decision under uncertainty,
9 so there is a set of expectations with regard to how
10 the future is going to play out and there is also
11 risks around that, so an investment decision has to
12 reflect an assessment of the tradeoffs you've got
13 between risk and reward.

14 Q. Thank you. And a generational owner
15 might well be willing to incur losses over the
16 short-term in anticipation of profits over the longer
17 term; is that right?

18 A. Well, the -- a generation owner is
19 something that's subject to the reactions of capital
20 markets and the risk tolerance, and expectations of
21 capital markets, you know, play into the investment
22 decision that a generator owner has to make, so I
23 think it's very difficult from the outside to look at
24 a set of conditions on potential risks and rewards
25 and predict how somebody is going to decide.

1 MR. LINDGREN: Thank you. I have no
2 further questions.

3 EXAMINER ADDISON: Thank you.

4 EXAMINER PRICE: Dr. Makovich, you
5 describe a kind of global problem with the missing
6 money problem. Can you explain how -- and that's a
7 wholesale market problem; is that right? Can you
8 explain to the Bench how you're solving this problem
9 or the Commission will be solving this problem if
10 the -- if the proposed transaction is consummated
11 with respect to only two power plants out of the
12 entire PJM footprint?

13 THE WITNESS: So I think we are in
14 agreement this is a problem that's bigger than just
15 these plants under consideration. So the proposal
16 here would be solving a part of the problem, but I
17 haven't testified it would solve the problem overall.

18 EXAMINER PRICE: But it will solve the
19 problem with respect to these two plants.

20 THE WITNESS: It goes a long way to
21 addressing that second dimension of the missing money
22 problem for these plants.

23 EXAMINER PRICE: And the other dimension
24 with respect to environmental mandates, they are what
25 they are. They are not -- are you aware of whether

1 these are Commission rules or these are statutory
2 requirements?

3 THE WITNESS: The environmental rules?

4 EXAMINER PRICE: Yes.

5 THE WITNESS: Are you talking like the
6 Clean Power Plan?

7 EXAMINER PRICE: I am talking do you know
8 if Ohio has a renewable energy standard?

9 THE WITNESS: Yes.

10 EXAMINER PRICE: Do you know that it's
11 statutory; it's not something that the Commission
12 decides upon?

13 THE WITNESS: In my report we have a map
14 that shows Ohio as one that has mandatory
15 requirements.

16 EXAMINER PRICE: So that's something you
17 would agree the Commission can't change, to the best
18 of your knowledge.

19 THE WITNESS: That's my understanding.

20 EXAMINER PRICE: Can you turn to page 15,
21 please. Your answer to the question on lines 9
22 through 11, you indicate using long-term contracts is
23 a reasonable approach; is that right?

24 THE WITNESS: Yes.

25 EXAMINER PRICE: As an economist,

1 wouldn't you agree that a better result would be
2 obtained -- if you wanted to protect two power
3 plants, that a better result for consumers would be
4 obtained if you competitively bid out which two power
5 plants were going to be protected?

6 THE WITNESS: You know, I would have to
7 think about your example. I am not sure where you
8 end up when you have people bidding against each
9 other for a fix to a shared problem. I'm not sure
10 where you end up with that approach.

11 EXAMINER PRICE: Fair enough. Thank you.

12 EXAMINER ADDISON: Mr. Kutik, any
13 redirect?

14 MR. KUTIK: Your Honor, may we have a few
15 minutes?

16 EXAMINER ADDISON: You may. Let's go off
17 the record.

18 (Recess taken.)

19 EXAMINER ADDISON: Let's go back on the
20 record.

21 Mr. Kutik, any redirect?

22 MR. KUTIK: Yes, your Honor. May I
23 proceed?

24 EXAMINER ADDISON: You may.

25 - - -

REDIRECT EXAMINATION

By Mr. Kutik:

Q. Dr. Makovich, counsel for Sierra Club read to you a portion of your deposition I would like to return to quickly, page 31 of your deposition. Are you there?

A. I am at page 31.

Q. And you read the question and answer that begins on line 13, which reads, "Okay. Are you offering any independent opinions in this case regarding the Sammis's plant's operational characteristics?"

And your answer was "No."

He didn't read the next question and answer. Could you read it, please?

A. "And is it your opinion that the Davis-Besse plant is an exceptional asset from an operations perspective?"

Q. And what was your answer?

A. My answer was "Yes."

Q. Thank you. Now, in response to one of Attorney Examiner Price's questions, you talked a little bit about whether the missing money problems have been in existence since 2013, at least, and whether you had been talking to FirstEnergy Solutions

1 or FirstEnergy around that time. Has the missing
2 money problem changed in type or magnitude since
3 2013?

4 A. Yes, which is why in my report I focus on
5 the two dimensions. The first dimension that we've
6 talked about where the root cause is the technologies
7 employed for power generation and their associated
8 cost structures was the most pressing problem as
9 markets got going, for example, as PJM got going in
10 the late '90s, which has been the primary driver for
11 the evolution of these capacity markets.

12 Now, PJM, in particular, has made
13 significant progress in addressing this dimension of
14 the missing money problem, so this dimension is
15 getting less pressing and, in contrast, the second
16 dimension, it was only about 15 years ago or so that
17 we got the first set of state mandates for renewable
18 power, and then it took a number of years for those
19 mandates to turn into implementation so that right
20 now this second dimension where we're getting amounts
21 of renewable power that are having meaningful impact
22 on wholesale power prices to suppress them
23 disproportionately off-peak period.

24 That's a dimension of the missing money
25 problem that is now getting to be a bigger problem

1 and a more pressing concern as the success in
2 addressing the first dimension continues.

3 Q. Dr. Makovich, you were asked some
4 questions about Figure 1 on page 9 of your
5 supplemental testimony. What does that figure show?

6 A. This figure shows that as a power system
7 adds more and more renewable -- intermittent
8 renewable power to its generation mix, the costs to
9 integrate that power supply go up, and I've included
10 it because the distortion that we see from the
11 renewable mandates that are suppressing the price is
12 affecting the revenue side of a baseload generator's
13 cash flow.

14 And the impact on their operations, to
15 the extent that they are part of these higher
16 operating costs to integrate these resources, are
17 something that's affecting them on the cost side so
18 that the cash flows are being squeezed from both the
19 revenue and the cost side.

20 Q. And, lastly, you were asked some
21 questions about whether you had done specifically for
22 this case an analysis of PJM or an analysis relating
23 to Ohio. Is the fact that you -- does the fact that
24 you did not do a specific analysis for this case for
25 PJM or Ohio mean that the conclusions that you have

1 drawn do not apply to PJM or Ohio?

2 A. No. The conclusions that I have drawn do
3 apply to PJM and Ohio.

4 Q. Why?

5 A. The analysis that we performed at the
6 interconnection level showed the value of technology
7 and fuel diversity, first of all, to provide the most
8 efficient generating mix to meet the pattern of power
9 demand, and that will be true at an interconnection
10 level, at a PJM level, or at a utility level.

11 They all need to have an open -- you
12 know, a good cost-effective mix of peaking, cycling,
13 and baseload. In addition, the kind of inherent
14 risks that a portfolio can manage, for example, the
15 fuel price risk, natural gas prices are strongly
16 cyclical, strongly seasonal, and prone to price
17 spikes. The good news is that coal prices also vary
18 across time but in a very different pattern.
19 Similarly, nuclear fuel prices vary through time but
20 in a very different pattern.

21 So fuel diversity when you've got these
22 uncorrelated price movements allows you to manage the
23 overall impact on your cost of power production.
24 That's true at a PJM level. It's true at a utility
25 level, as well as at an interconnection level, as

1 well as managing the risks from nonprice movements.

2 For example, interruptions in natural gas
3 supply is a challenge that an interconnection level
4 has to manage, PJM has to manage, and a utility would
5 have to manage, so the benefits of a diverse fuel and
6 technology portfolio are something that we find
7 consistently at an interconnection RTO or utility
8 level.

9 MR. KUTIK: Thank you, your Honor.
10 That's all I have.

11 EXAMINER ADDISON: Thank you, Mr. Kutik.

12 Mr. Soules, recross?

13 MR. SOULES: Your Honor, could we have
14 like five minutes to confer before we proceed?

15 EXAMINER ADDISON: You may.

16 MR. SOULES: Thank you.

17 EXAMINER ADDISON: Let's go off the
18 record.

19 (Recess taken.)

20 EXAMINER ADDISON: Let's go back on the
21 record.

22 Mr. Soules.

23 MR. SOULES: No recross from Sierra Club,
24 your Honor.

25 EXAMINER ADDISON: Thank you.

1 Ms. Fleisher?

2 MS. FLEISHER: Yes, thank you, your
3 Honor.

4 - - -

5 RECROSS-EXAMINATION

6 By Ms. Fleisher:

7 Q. Dr. Makovich, with respect to your
8 discussion of the asserted price suppression from
9 renewable policies, you haven't analyzed the effects
10 of any alleged price suppression on Sammis's
11 revenues, correct?

12 A. I have not done a specific analysis of
13 the cash flows to Sammis.

14 Q. And you haven't analyzed the effect of
15 any alleged price suppression on the cash flows for
16 Davis-Besse, correct?

17 A. My testimony is I relied on the analysis
18 of Don Moul.

19 Q. Can you answer me "yes" or "no" on that?

20 THE WITNESS: Would you reread the
21 question?

22 (Record read.)

23 A. That's correct.

24 Q. And you haven't analyzed the effect of
25 any alleged price suppression on the revenues for

1 OVEC, correct?

2 A. That's correct.

3 Q. And with respect to your analysis in
4 Attachment LM-2, did that -- or is it correct that
5 that did not analyze a mix with 40 percent coal
6 versus a mix with 50 percent coal?

7 A. As I said, there's just two mixes we
8 analyzed there. One was the actual over those three
9 years and the other was the counterfactual.

10 Q. And is it correct that your analysis in
11 Attachment LM-2 didn't analyze a mix with renewables
12 at the current levels as they exist in Ohio?

13 A. I am not sure I understand your question.

14 Q. Do you know what the current level of
15 renewable generation is in Ohio?

16 A. The current percentage? I don't have
17 that data in front of me.

18 Q. Okay. And is it correct that your
19 analysis in Attachment LM-2 doesn't address a case
20 involving a mix particular to Ohio?

21 A. Well, only to the extent that the
22 counterfactual is comparing what actually happened in
23 these interconnections '10, '11, and '12, Ohio being
24 part of what actually happened and comparing that to
25 the counterfactual.

1 MS. FLEISHER: Can you reread that
2 question and answer.

3 EXAMINER ADDISON: Yes, please.

4 (Record read.)

5 MS. FLEISHER: That's all I have, your
6 Honor. Thank you.

7 EXAMINER ADDISON: Thank you.

8 Ms. Hussey?

9 MS. HUSSEY: No questions your Honor.

10 EXAMINER ADDISON: Thank you.

11 Mr. Petricoff?

12 MR. PETRICOFF: No questions.

13 EXAMINER ADDISON: Mr. Dougherty?

14 MR. DOUGHERTY: No questions.

15 EXAMINER ADDISON: Mr. Hays?

16 MR. HAYS: No questions.

17 EXAMINER ADDISON: Mr. Kurtz?

18 MR. KURTZ: No questions.

19 EXAMINER ADDISON: Mr. Sauer?

20 MR. SAUER: No questions, your Honor.

21 EXAMINER ADDISON: Mr. Lindgren?

22 MR. LINDGREN: No questions, your Honor.

23 EXAMINER ADDISON: All right. Thank you,
24 Dr. Makovich. You are excused.

25 THE WITNESS: Okay. Thank you.

1 MR. KUTIK: Your Honor, at this time the
2 companies move for the admission of Company Exhibit
3 42.

4 EXAMINER ADDISON: Any objection?

5 Seeing none, it will be admitted.

6 (EXHIBIT ADMITTED INTO EVIDENCE.)

7 EXAMINER ADDISON: Ms. Fleisher.

8 MS. FLEISHER: Yes, your Honors. I would
9 request that you take administrative notice of ELPC
10 22 which is a publicly available PJM study. It's up
11 on PJM's website. It's readily verifiable and it
12 relates directly to the figure in Mr. --
13 Dr. Makovich's testimony.

14 EXAMINER ADDISON: Any objection?

15 MR. KUTIK: Yes, your Honor. There has
16 been no foundation laid other than the representation
17 of counsel. This witness specifically said he wasn't
18 familiar with the document nor was he familiar with
19 the studies of this type for PJM. There has been no
20 foundation laid in the record for this document.

21 EXAMINER ADDISON: Ms. Fleisher,
22 response?

23 MS. FLEISHER: I'm not -- I just can't
24 recollect off the top of my head whether he said he
25 wasn't aware of any for PJM. He certainly said he

1 was aware of other renewable integration studies that
2 he had not reviewed, and given that he is testifying
3 about PJM, I feel like the PJM renewable integration
4 study is certainly relevant. And, you know, to the
5 extent there is no foundation, that would be why I am
6 requesting administrative notice just to the extent
7 this is just a publicly available document.

8 Certainly if the companies have any dispute that it
9 was authentic, they can come back with that.

10 MR. KUTIK: The problem, your Honor, is
11 with all of these type of documents we have no
12 ability to cross-examine whatever the assumptions and
13 other analyses that were done, so it is just a
14 document floating in space and just because it was
15 submit to PJM doesn't mean it's right or doesn't mean
16 you should take administrative notice of it.

17 EXAMINER ADDISON: Ms. Fleisher, last
18 word?

19 MS. FLEISHER: Certainly. I think that
20 certainly the Bench or the Commission doesn't have to
21 take this as -- this study as being right but simply
22 as being another study that exists that Dr. Makovich
23 did not take account of in his testimony which I'll
24 note was, you know, filed well after the deadline for
25 intervenor testimony, so we would have had no

1 opportunity to, you know, to get this in.

2 MR. KUTIK: That's not true at all.

3 MS. FLEISHER: Well, it's -- I guess I'll
4 just say that I'm not saying that the Commission
5 couldn't give this the weight that it feels
6 appropriate, but I think it's fair to
7 administratively notice it's a document that exists.

8 EXAMINER PRICE: Would the companies
9 stipulate that this PJM study was done and that
10 Dr. Makovich did not consult it?

11 MR. KUTIK: No.

12 EXAMINER PRICE: Okay.

13 MR. KUTIK: I don't know what it is. I
14 have just seen this document. It's the first time I
15 have seen it ever. I am not going to stipulate to
16 it.

17 EXAMINER PRICE: Not stipulate to the
18 document.

19 MR. KUTIK: No, no, I understand but
20 certainly what this witness testified to was that he
21 has not seen this study. When asked about whether he
22 was aware that other studies were in PJM, he said he
23 was aware PJM was looking into the issue. That was
24 it.

25 EXAMINER ADDISON: We will not take

1 administrative notice of the exhibit marked ELPC 22.

2 But thank you, Ms. Fleisher.

3 MS. FLEISHER: Thank you, your Honor.

4 EXAMINER ADDISON: All right. We will
5 adjourn until --

6 EXAMINER PRICE: Let's go off the record.

7 (Discussion off the record.)

8 EXAMINER PRICE: Let's go back on the
9 record.

10 Mr. Kutik, you may call your next
11 witness.

12 MR. KUTIK: Yes, your Honor, the
13 companies call as their next witness Joanne M.
14 Savage.

15 (Witness sworn.)

16 EXAMINER PRICE: Please be seated and
17 state your name and business address for the record.

18 THE WITNESS: My name is Joanne M.
19 Savage. My business address is 76 South Main Street,
20 Akron, Ohio 44308.

21 EXAMINER PRICE: You can please proceed,
22 Mr. Kutik.

23 MR. KUTIK: Your Honor, at this time we
24 have provided to the court reporter and we would ask
25 that they be marked as the following -- the documents

1 be marked as the following: Company Exhibit 43, the
2 direct testimony of Joanne M. Savage; Company Exhibit
3 44 would be the Joanne M. -- Joanne Savage errata
4 sheet; and Company Exhibit 45 would be the direct
5 testimony of Meghan C. Jurica.

6 EXAMINER PRICE: They will be so marked.

7 (EXHIBITS MARKED FOR IDENTIFICATION.)

8 MR. KUTIK: May I proceed your Honor?

9 EXAMINER PRICE: You may.

10 - - -

11 JOANNE M. SAVAGE

12 being first duly sworn, as prescribed by law, was
13 examined and testified as follows:

14 DIRECT EXAMINATION

15 By Mr. Kutik:

16 Q. Please introduce yourself.

17 A. My name is Joanne M. Savage, and I am an
18 analyst in the rates and regulatory affairs
19 department of FirstEnergy Service Company.

20 Q. And do you have before you what's been
21 marked for identification as Company Exhibits 43, 44,
22 and 45?

23 A. I do.

24 Q. And do you also have before you what has
25 previously been marked and admitted as Company

1 Exhibit 5?

2 A. I do.

3 Q. What is Company Exhibit 43?

4 A. Company Exhibit 43 is my direct
5 testimony.

6 Q. What is Exhibit 44?

7 A. That is an errata to my testimony.

8 Q. What is Exhibit 45?

9 A. Exhibit 45 is the direct testimony of
10 Meghan Jurica which I am assuming.

11 Q. You are adopting Ms. Jurica's testimony
12 as your own?

13 A. Yes.

14 Q. And does Exhibit 5 also contain errata
15 relating to those direct testimonies?

16 A. It does.

17 Q. Do you have any further additions or
18 corrections to make to either your direct testimony
19 or the direct testimony of Ms. Jurica?

20 A. I do not.

21 Q. If I asked you the questions that appear
22 in Exhibits 43 and 45, would they be the same as
23 modified by Exhibits 44 and Exhibit 5?

24 A. Yes, they would.

25 MR. KUTIK: That's all I have, your

1 Honor.

2 EXAMINER PRICE: Thank you.

3 At this time we will adjourn for the
4 evening. We will reconvene at 9 o'clock tomorrow
5 to -- for the cross-examination of this witness.
6 Thank you all.

7 We are off the record.

8 (Thereupon, at 2:52 p.m., the hearing was
9 adjourned.)

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1 CERTIFICATE

2 I do hereby certify that the foregoing is
3 a true and correct transcript of the proceedings
4 taken by me in this matter on Thursday, September 24,
5 2015, and carefully compared with my original
6 stenographic notes.

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10
11 Karen Sue Gibson, Registered
Merit Reporter.

12 (KSG-6095)

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Case No(s). 14-1297-EL-SSO

Summary: Transcript In the Matter of the application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company hearing held on 09/24/15 - Volume XVII electronically filed by Mr. Ken Spencer on behalf of Armstrong & Okey, Inc. and Gibson, Karen Sue Mrs.