

IN 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. :

- - -

DEPOSITION

of Lawrence J. Makovich, Ph.D. taken before me,
Carolyn D. Ross, Registered Professional Reporter,
and a Notary Public in and for the State of Ohio, at
the offices of FirstEnergy Corporation, 76 South Main
Street, Akron, Ohio, on Wednesday, May 27, 2015, at
9:00 a.m.

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ARMSTRONG & OKEY, INC.
222 East Town Street, Second Floor
Columbus, Ohio 43215-4620
(614) 224-9481 - (800) 223-9481
FAX - (614) 224-5724

- - -

1 APPEARANCES:

2 FirstEnergy Corp.
3 By Mr. James W. Burk
4 76 South Main Street
5 Akron, Ohio 44308

6 Jones Day
7 By Mr. David A. Kutik
8 901 Lakeside Avenue
9 Cleveland, Ohio 44114

10 On behalf of the Applicants.

11 Bruce E. Weston, Ohio Consumers' Counsel
12 By Mr. Larry Sauer (via speakerphone)
13 Assistant Consumers' Counsel
14 10 West Broad Street, Suite 1800
15 Columbus, Ohio 43215-3485

16 On behalf of the Residential
17 Consumers of Ohio Edison Company,
18 The Cleveland Electric Illuminating
19 Company, and The Toledo Edison
20 Company.

21 Earthjustice
22 By Mr. Michael Soules (via speakerphone)
23 1625 Massachusetts Avenue NW, Suite 702
24 Washington, D.C. 20036

On behalf of the Sierra Club.

Bricker & Eckler, LLP
By Mr. Dylan Borchers (via speakerphone)
100 South Third Street
Columbus, Ohio 43215-4291

On behalf of the NOPEC.

IGS Energy
By Mr. Joseph Olikier (via speakerphone)
6100 Emerald Parkway
Dublin, Ohio 43016

On behalf of the IGS Energy.

1 APPEARANCES: (Continued)

2 Vorys, Sater, Seymour & Pease, LLP
3 By Mr. Michael Settineri (via speakerphone)
4 52 East Gay Street
5 Columbus, Ohio 43215

6 On behalf of RESA, EPSA, and the PJM
7 Power Providers Group.

8 Carpenter Lipps & Leland LLP
9 By Ms. Rebecca Hussey (via speakerphone)
10 and Ms. Kimberly W. Bojko (via speakerphone)
11 280 North High Street, Suite 1300
12 Columbus, Ohio 43215

13 On behalf of the Ohio Manufacturers'
14 Association Energy Group.

15 Environmental Law & Policy Center
16 By Ms. Madeline Fleisher (via speakerphone)
17 1207 Grandview Avenue, Suite 201
18 Columbus, Ohio 43212

19 On behalf of the Environmental Law &
20 Policy Center.

21 ALSO PRESENT:

22 Mr. Ryan O'Rourke, PUCO Staff.

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1 Wednesday Morning Session,
2 May 27, 2015.

3 - - -

4 LAWRENCE J. MAKOVICH, Ph.D.,
5 being by me first duly sworn, as hereinafter
6 certified, deposes and says as follows:

7 CROSS-EXAMINATION

8 BY MR. SOULES:

9 Q. Good morning, Dr. Makovich.

10 A. Good morning.

11 Q. My name is Michael Soules, and I'm
12 representing Sierra Club in this proceeding.

13 Could you please state your name for the
14 record?

15 A. My name is Lawrence J. Makovich.

16 Q. Thank you. What is your business
17 address, Dr. Makovich?

18 A. My business address is 55 Cambridge
19 Parkway, Cambridge, Massachusetts.

20 Q. Okay. And you're employed by IHS
21 Energy; is that correct?

22 A. I'm employed by, yes, IHS.

23 Q. Thank you. And what is your current
24 position with IHS?

1 A. I am a vice-president at IHS.

2 Q. Okay. And you've been serving in your
3 current position since 2004; is that correct?

4 A. Yes. IHS purchased CERA, and that's
5 when I began working for IHS.

6 Q. Thank you. Can you describe generally
7 what your current job responsibilities are?

8 A. I conduct research into the electric
9 power business and share that research with IHS
10 clients.

11 Q. Okay. Any other job responsibilities?

12 A. Some management responsibilities, as
13 well I have a small team, as well as work with others
14 in the company on broader research initiatives,
15 including some of the events that we put on.

16 Q. Okay. Thank you.

17 Who at IHS do you report to?

18 A. Atul Arya, A-r-y-a.

19 MR. KUTIK: Want to spell -- excuse me,
20 why don't you spell the first name.

21 THE WITNESS: A-t-u-l.

22 MR. KUTIK: Michael, I'm sorry, since I
23 was asking him to spell the name, we didn't get your
24 question.

1 MR. SOULES: Okay. No. Thank you,
2 David.

3 BY MR. SOULES:

4 Q. Dr. Makovich, does anyone report to you?

5 A. Yes.

6 Q. And how many people report to you?

7 A. I have two people.

8 Q. And what are their job responsibilities?

9 A. To support our team's research efforts.

10 Q. Okay. Thank you.

11 Now, in your professional career, you've
12 testified before the US Congress several times; is
13 that correct?

14 A. Yes.

15 Q. And if we could turn to Attachment LM-1,
16 which is a copy of your curriculum vitae. Please let
17 me know when you have that ready.

18 A. Yeah.

19 Q. Great. So on the final page of that
20 attachment, there's a heading entitled "Testimony."
21 Beneath that there are five entries. Do you see
22 that?

23 A. Yes.

24 Q. And three of those entries refer to

1 Congressional committee hearings from 2001, correct?

2 A. Yes.

3 Q. Have you testified before the US
4 Congress on any occasion other than those three
5 committee hearings?

6 A. No.

7 Q. Okay. Now, earlier this year you
8 testified before a committee of the Michigan House of
9 Representatives, correct?

10 A. Yes.

11 Q. And the subject of your testimony was
12 retail open access policy, correct?

13 A. Yes.

14 Q. Okay. And generally speaking, what were
15 your conclusions about retail open access policy?

16 A. That the proposal to reform the process
17 there had merit.

18 Q. And why did it have merit?

19 A. The partial retail open access creates
20 an unfair cost distribution in the power sector.

21 Q. Okay. And so the proposal that was
22 before the Michigan House would address that problem?

23 A. Yes.

24 Q. Okay. When you appeared before the

1 Michigan House of Representatives committee, were you
2 representing another organization besides IHS?

3 A. No.

4 Q. Okay. Were you testifying solely on
5 your own behalf?

6 A. Yes.

7 Q. And did the Michigan legislature
8 compensate you for your appearance before the
9 committee?

10 A. No.

11 Q. Have you testified before a state
12 legislature on any other occasion other than this
13 committee hearing in Michigan?

14 A. No.

15 Q. Dr. Makovich, have you ever testified in
16 a court case?

17 A. Yes.

18 Q. Okay. What case -- court case?

19 A. There were some court cases regarding
20 the tax basis of power plants.

21 Q. And what court were those cases in?

22 A. One was in Michigan and one was in New
23 York.

24 Q. And were these state court proceedings?

1 A. Yes.

2 Q. And in the Michigan proceeding, on whose
3 behalf did you testify?

4 A. It was the Midland Cogeneration Venture.

5 Q. And do you recall approximately when
6 that court case was going on?

7 A. I do not remember.

8 Q. Okay. Do you remember what the subject
9 of your testimony was?

10 A. Yes.

11 Q. And what was that?

12 A. In regard to the discounted cash flow of
13 the Midland Cogeneration Venture.

14 Q. Did you have your deposition taken in
15 that case?

16 A. No.

17 Q. And then you also referenced a New York
18 state case; is that correct?

19 A. Yes.

20 Q. And on whose behalf did you testify in
21 that proceeding?

22 A. I'm not -- I don't remember.

23 Q. Okay. Do you remember approximately
24 when that case was ongoing?

1 A. Again, it was quite a while ago; so I
2 don't remember the date.

3 Q. Okay. Did you have your deposition
4 taken for that case?

5 A. No.

6 Q. Do you remember the name of either the
7 Michigan case or the New York case?

8 A. The ownership of the plants in New York
9 had changed a number of times. I believe it was
10 Dynegy that owned the plants, but I would have to
11 check that.

12 Q. Okay. Thank you.

13 Apart from the Michigan case and the New
14 York case, have you testified in any court cases?

15 A. Those are the two.

16 Q. Okay. Thank you.

17 Now, you previously testified before the
18 North Carolina Public Service Commission; is that
19 correct?

20 A. Yes.

21 Q. And that was in July of 2014, correct?

22 A. Yes.

23 Q. And on whose behalf did you provide
24 testimony in that proceeding?

1 A. Duke Energy.

2 Q. Did you have your deposition taken in
3 that proceeding?

4 A. No.

5 Q. Okay. Apart from this North Carolina
6 proceeding, have you ever provided written testimony
7 to a state public utility commission or public
8 service commission?

9 A. No.

10 Q. Okay. And apart from the North Carolina
11 proceeding, have you ever provided live testimony to
12 a state public utility commission or public service
13 commission?

14 A. No.

15 Q. Okay. Thank you.

16 So let's just talk about your testimony
17 here. Now, in this case you're testifying on behalf
18 of the Ohio Edison Company, The Cleveland Electric
19 Illuminating Company, and The Toledo Edison Company;
20 is that correct?

21 A. Yes.

22 Q. And if I refer to those three utilities
23 collectively as the companies, will you understand
24 what I mean?

1 A. Yes.

2 Q. Great. And for your testimony in this
3 case, did IHS contract directly with the companies?

4 A. Yes.

5 Q. Okay. So the contract is with the Ohio
6 Edison Company, The Cleveland Electric Illuminating
7 Company, and The Toledo Edison Company?

8 A. I have not seen the contract; so I am
9 not familiar with exactly what the language is.

10 Q. Okay. Did somebody else at IHS handle
11 the contract?

12 A. Yes.

13 Q. Have you -- apart from any conversations
14 with counsel, have you communicated with anyone who
15 is employed by any of the companies?

16 A. I'm not sure which -- could you rephrase
17 that question?

18 Q. Yes. Have you spoken to anyone who is
19 employed by the companies?

20 A. I've had a long-standing, ongoing
21 relationship with these FirstEnergy companies; so I
22 have communicated with people at FirstEnergy.

23 Q. Okay. Are there particular people
24 within the FirstEnergy companies that you regularly

1 communicate with?

2 A. Yes.

3 Q. And who are those people?

4 A. Lauren Quam.

5 Q. Okay. Anyone else besides Lauren Quam?

6 A. Well, I have had discussions with a
7 number of people in these companies through time.

8 Q. Okay. So does IHS have a consulting
9 agreement with the FirstEnergy companies outside of
10 your work in this case?

11 A. No.

12 Q. Has IHS Energy previously had consulting
13 agreements with FirstEnergy companies?

14 A. I'm -- I'm not aware of the complete
15 history of IHS and FirstEnergy on the consulting side
16 of the business.

17 Q. Okay. In the communications that you've
18 had with employees of the FirstEnergy companies, is
19 that just because you're both in the same -- you
20 know, you're both dealing with utility issues or was
21 there a business relationship?

22 A. There's a business relationship.

23 Q. Okay. What was the nature of that
24 business relationship?

1 A. FirstEnergy is a retainer client of IHS.

2 Q. What types of services does IHS provide
3 FirstEnergy?

4 A. As a retainer client, they are entitled
5 to access the research we do in the electric power
6 sector.

7 Q. Okay. Are there any other services that
8 you're aware of that IHS provides FirstEnergy?

9 A. Yes.

10 Q. And what are those services?

11 A. We have provided presentations at the
12 request of FirstEnergy.

13 Q. Presentations to FirstEnergy or
14 presentations to other entities?

15 A. Presentations to FirstEnergy.

16 Q. Okay. Apart from that, are there any
17 other services that IHS provides FirstEnergy?

18 A. No.

19 Q. Thank you. Did anyone at IHS assist you
20 with your testimony for this proceeding?

21 A. Yes.

22 Q. And what type of assistance did they
23 provide?

24 A. Assembling some of the graphics, and I

1 have coauthors on the report attached as LM-2.

2 Q. Okay. Apart from LM-2 and the
3 assistance with the graphics, did anyone at IHS
4 assist you with your testimony?

5 A. No.

6 Q. Dr. Makovich, if I refer to the Public
7 Utilities Commission of Ohio simply as the
8 Commission, will you understand what I mean?

9 A. Yes.

10 Q. Okay. And you're familiar with the
11 Economic Stability Program that the companies had
12 proposed for Commission approval, correct?

13 A. Yes.

14 Q. And the Economic Stability Program
15 includes the companies' proposed Retail Rate
16 Stability Rider, correct?

17 A. Yes.

18 Q. And if I refer to that proposed rider as
19 Rider RRS, will you understand what I mean?

20 A. Yes.

21 Q. Does the Economic Stability Program
22 include any components other than Rider RRS?

23 A. I do not know.

24 Q. All right. Are you aware of the

1 proposed agreement under which FirstEnergy Solutions
2 worked --

3 THE COURT REPORTER: I'm sorry, I need
4 you to repeat that.

5 MR. KUTIK: You need to restate it. The
6 court reporter didn't get your question.

7 BY MR. SOULES:

8 Q. Okay. Thank you.

9 Are you aware of the proposed agreement
10 under which FirstEnergy Solutions would sell its
11 capacity, energy, and ancillary services from
12 generating plants to the company?

13 A. I'm sorry, repeat the question.

14 MR. SOULES: Could we have the question
15 reread back?

16 (Record read back as requested.)

17 THE WITNESS: Yes.

18 BY MR. SOULES:

19 Q. Okay. And do you know which generating
20 plants are the subject of this proposed agreement
21 between the companies and FirstEnergy Solutions?

22 A. Yes.

23 Q. And what plants are the subject of the
24 agreement?

1 A. It involves the Davis-Besse nuclear
2 power station, the WH Sammis coal-fired power plant,
3 and it also involves two generating plants owned and
4 operated by the Ohio Valley Electric Corporation, of
5 which FirstEnergy has a share of the output.

6 Q. And are those two -- those two
7 additional plants the Kyger Creek and Clifty Creek
8 plant?

9 A. I believe so, yes.

10 MR. SOULES: Has somebody just joined
11 the deposition?

12 MR. SETTINERI: Yes. This is Mike
13 Settineri with the law firm of Vorys, Sater,
14 Seymour & Pease on behalf of the P3 Power Providers
15 organization and EPSA and RESA.

16 MR. SOULES: Good morning. Sounds like
17 someone needs to put their phone on -- okay. Thank
18 you.

19 BY MR. SOULES:

20 Q. Dr. Makovich, do you know how
21 FirstEnergy Solutions would be compensated under this
22 proposed agreement?

23 A. Yes.

24 Q. And how will FirstEnergy Solutions be

1 compensated?

2 A. Under a 15-year contractual payment.

3 Q. Can you elaborate on that 15-year
4 contractual payment?

5 A. I'm not familiar with the actual terms
6 and conditions of the long-term contract arrangement.

7 Q. Okay. Do you know what return on equity
8 FirstEnergy Solutions would receive for its plants
9 under the proposed agreement?

10 A. No.

11 Q. Do you know whether the companies in
12 FirstEnergy Solutions had executed a final contract
13 for this proposed agreement?

14 A. No.

15 Q. And are you offering any opinions in
16 this proceeding about this proposed agreement?

17 MR. KUTIK: Objection.

18 THE WITNESS: I'm sorry, would you
19 repeat the question?

20 BY MR. SOULES:

21 Q. Sure. Are you offering any opinion in
22 this proceeding about this proposed agreement?

23 A. Yes.

24 Q. And what opinion are you offering?

1 A. My opinion is that this is a way to
2 address a problem in the revenue stream for these
3 baseload power plants.

4 Q. And what are you -- what are you relying
5 on in support of that?

6 A. Research into the value of power supply
7 diversity and the missing money problem.

8 Q. Okay. Dr. Makovich, have you reviewed
9 the term sheet that relates to this proposed
10 agreement?

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

13 THE WITNESS: I have already told you
14 I've not seen the contract.

15 BY MR. SOULES:

16 Q. Okay. So you're not offering any
17 opinions regarding the specific terms of the proposed
18 agreement; is that correct?

19 A. That's correct.

20 Q. Thank you. Now, in this proceeding, you
21 have offered certain opinions about the Economic
22 Stability Program, correct?

23 A. Yes.

24 Q. Okay. Could we turn to Page 3 of your

1 written testimony?

2 A. Okay.

3 Q. Okay. Starting on Line 4 it states, I'm
4 quoting, "The Economic Stability Program will produce
5 benefits for retail consumers because it will prevent
6 the Plants from retiring before it is economic to do
7 so. It makes economic sense for Ohio policy makers
8 and the Public Utilities Commission of Ohio (the
9 'Commission') to protect power supply diversity in
10 Ohio over the long-term by approving the Companies'
11 Economic Stability Program."

12 That's your testimony, correct?

13 A. Yes.

14 Q. And the reference to the plants on
15 page -- or, I'm sorry, the reference to the plants on
16 Line 5 is referring to the WH Sammis plant and the
17 Davis-Besse plant, correct?

18 A. Yes.

19 Q. Okay. And are the benefits for retail
20 consumers referenced in this portion of your
21 testimony the same benefits that you describe on
22 Pages 12 to 16 of your testimony?

23 MR. KUTIK: Objection.

24 THE WITNESS: The benefits that I've

1 described on Pages 12 through 16, yes.

2 BY MR. SOULES:

3 Q. Okay. And are the benefits described on
4 Pages 12 to 16 the only benefits that you're
5 referring to here?

6 A. There may be additional benefits.

7 Q. Okay. Can you identify those additional
8 benefits?

9 A. I believe in my -- in my testimony, I do
10 refer to other analysis that's been done with regard
11 to employment and economic impacts.

12 Q. And, Dr. Makovich, are you referring to
13 Page 12, Line 17 through 19?

14 MR. KUTIK: Objection.

15 THE WITNESS: Yes.

16 BY MR. SOULES:

17 Q. Okay. So understanding that that's
18 inclusive of the benefits described on Pages 12
19 through 16, are there other benefits for retail
20 consumers that you're referring to?

21 A. There may be.

22 Q. Okay. Can you identify them?

23 A. Well, there are changes that are likely
24 to occur in the power business which may create

1 additional benefits from these plants.

2 Q. And what changes are you referring to?

3 A. Regulatory rule changes.

4 Q. Can you describe those regulatory rule
5 changes?

6 A. Well, they can cover lots of different
7 regulations that can change in the future.

8 Q. Okay. Let's set aside the potential
9 benefits for a minute. Apart from that potential
10 benefit and the benefits described on Pages 12 to 16,
11 are there other benefits for retail consumers that
12 you're referring to on Page 3?

13 A. I have included testimony with regard to
14 some of the benefits. I have not testified that this
15 is an exhaustive list of the benefits that these
16 plants can provide.

17 Q. Okay. Going back to the regulatory rule
18 changes you referenced a moment ago.

19 A. Yes.

20 Q. Can you give me some examples of those?

21 A. One example would be that within the
22 next several months, we expect the EPA to issue its
23 final rule on its Clean Power Plan that's going to
24 require state implementation plans to be developed.

1 Q. And that change relates to the Economic
2 Stability Program in what fashion?

3 A. The carbon footprint of these plants
4 will have to be part of the state implementation
5 plan.

6 Q. And that carbon footprint would provide
7 a benefit for retail consumers?

8 A. Without the final rule, I cannot tell
9 you what the costs or benefits will be other than
10 there's a possibility that these plants will produce
11 additional benefits beyond what I've testified to.

12 Q. Okay. And sitting here today, can you
13 identify any other benefits for retail consumers that
14 are not described on Pages 12 to 16 of your
15 testimony?

16 MR. KUTIK: Objection, asked and
17 answered.

18 THE WITNESS: As I said, I have not
19 testified that this is an exhaustive list of the
20 benefits.

21 BY MR. SOULES:

22 Q. So you cannot identify any other
23 benefits to retail consumers sitting here today,
24 correct?

1 MR. KUTIK: Objection, mischaracterizes
2 his testimony.

3 THE WITNESS: Would you reread the
4 question, please?

5 (Record read back as requested.)

6 THE WITNESS: No, that's not correct.

7 BY MR. SOULES:

8 Q. Okay. Can you please identify those
9 benefits?

10 MR. KUTIK: Objection. He already has;
11 so I object, asked and answered.

12 BY MR. SOULES:

13 Q. Apart from the one potential benefit
14 we've already discussed, can you identify any other
15 benefits for retail consumers that are not referenced
16 on Pages 12 to 16 of your testimony?

17 MR. KUTIK: Well, that also
18 mischaracterizes his testimony, but you can answer it
19 again.

20 THE WITNESS: I have said that there are
21 additional benefits that these plants may provide to
22 retail customers. I have not focused my testimony on
23 all of the benefits that these plants can provide,
24 but I've focused my testimony on some of the benefits

1 that they provide.

2 BY MR. SOULES:

3 Q. Have you performed any analyses to
4 identify other benefits for retail consumers that's
5 not described in your testimony?

6 THE WITNESS: I'm sorry, could you
7 reread that question?

8 (Record read back as requested.)

9 THE WITNESS: Can you rephrase that
10 question?

11 BY MR. SOULES:

12 Q. Sure. So for your testimony in this
13 proceeding, did you consider benefits for retail
14 consumers that would result from the Economic
15 Stability Program?

16 A. I focused my testimony on some of the
17 benefits that I see from the Economic Stability
18 Program. I've not testified that this is an
19 exhaustive list of the benefits that these power
20 plants can provide.

21 Q. And were there analyses relating to
22 benefits for retail consumers which are not described
23 in your testimony that you performed but did not
24 discuss in your testimony?

1 A. Can you rephrase that question?

2 Q. Sure. Sure. So when you were
3 considering the potential benefits for retail
4 consumers related to the Economic Stability Program,
5 did you perform a set of analyses related to a
6 category of benefits that are not discussed here at
7 all?

8 A. No.

9 Q. Okay. Could we turn to Page 12 of your
10 written testimony?

11 A. Yes.

12 Q. Okay. Starting on Line 8, there's a
13 sentence that reads, "I discuss it here in my
14 testimony to appropriately inform the discussion on
15 how the Plants at issue in this case can be
16 exceptional assets from an operations perspective but
17 nevertheless be financially challenged."

18 That's your testimony, correct?

19 A. Yes.

20 Q. What makes a generating unit an
21 exceptional asset from an operations perspective?

22 A. It is part of a cost-effective
23 generation mix.

24 Q. Are there specific characteristics that

1 a unit must have to be an exceptional unit?

2 A. Can you repeat that question?

3 Q. Yes. Are there specific characteristics
4 that a generating unit must have to be an exceptional
5 asset from an operations perspective?

6 A. The characteristics I refer to regard
7 the unit being part of a cost-effective generation
8 mix.

9 Q. What do you mean by "part of a
10 cost-effective generation mix"?

11 A. I testified that the lowest-cost way to
12 provide customers with the electricity they need when
13 they want it involves a mix of peaking, cycling, and
14 baseload plants in a generating portfolio.

15 Q. And are there any other specific
16 characteristics that a unit must have to be an
17 exceptional asset?

18 A. Yes.

19 Q. What characteristics are those?

20 A. Well, all units have parameters with
21 regard to cost and performance. Meeting those
22 parameters is something that's necessary for a
23 cost-effective generation mix.

24 MR. OLIKER: I'm sorry. I apologize.

1 Could I have his answer from three questions ago read
2 back?

3 (Record read back as requested.)

4 MR. OLIKER: Thank you.

5 MR. SOULES: I'm sorry, could I have the
6 last question read back?

7 (Record read back as requested.)

8 BY MR. SOULES:

9 Q. Dr. Makovich, which parameters
10 specifically are you referring to?

11 A. Well, for example, availability.

12 Q. Any other parameters?

13 A. Yes.

14 Q. Could you please list those parameters?

15 A. For example, the efficiency of turning
16 fuel into electricity.

17 Q. Any other parameters?

18 A. Yes.

19 Q. Okay. And what parameters?

20 A. That operation and maintenance expenses
21 are within the expected range.

22 Q. Any other parameters?

23 A. Yes.

24 Q. Okay. What parameters?

1 A. Well, there are numerous parameters from
2 an engineering and economic standpoint that describe
3 power plants, and these are all the things that are
4 involved in putting together a cost-effective mix.

5 Q. Okay. Are there any nuclear generating
6 units currently operating in the United States that
7 are not exceptional assets from an operations
8 perspective?

9 A. I don't have the current data in front
10 of me with regard to the distribution of nuclear
11 plant performance.

12 Q. Okay. And are you aware of any
13 coal-fired generating units currently operating in
14 the United States that are not exceptional assets
15 from an operations perspective?

16 A. Similarly, I don't have plant-specific
17 information on coal unit cost and performance in
18 front of me here to be able to provide you an answer.

19 Q. Okay. And is it your opinion that the
20 Sammis plant is an exceptional asset from an
21 operations perspective?

22 A. Yes.

23 Q. And why do you believe that Sammis is an
24 exceptional asset from an operations perspective?

1 A. The testimony of Don Moul.

2 Q. And are you referring to Mr. Moul's
3 direct testimony?

4 A. Yes.

5 Q. Okay. Are there any other reasons why
6 you believe that Sammis is an exceptional asset from
7 an operations perspective?

8 A. No.

9 Q. Okay. So your opinion is based entirely
10 upon the direct testimony of Donald Moul; is that
11 correct?

12 A. Yes.

13 Q. Okay. Are you offering any independent
14 opinions in this case regarding the Sammis plant's
15 operational characteristics?

16 MR. KUTIK: Objection.

17 THE WITNESS: No.

18 BY MR. SOULES:

19 Q. And is it your opinion that the
20 Davis-Besse plant is an exceptional asset from an
21 operations perspective?

22 A. Yes.

23 Q. And do you believe that Davis-Besse is
24 an exceptional asset from an operations perspective?

1 A. Based on the testimony of Don Moul.

2 Q. Okay. Are there any other reasons why
3 you believe that Davis-Besse is an exceptional asset
4 from an operations perspective?

5 THE WITNESS: Would you repeat that
6 question?

7 (Record read back as requested.)

8 THE WITNESS: No.

9 BY MR. SOULES:

10 Q. Okay. So you are relying entirely on
11 the direct testimony of Donald Moul for that opinion,
12 correct?

13 A. Yes.

14 Q. Okay. If we could look again at
15 Page 12, starting at Line 13 it states, "The Economic
16 Stability Program is a reasonable effort to address
17 the missing money problem by compensating the Plants
18 for system benefits that are not explicitly
19 compensated for in the marketplace. One of those
20 benefits is supply diversity, including the system
21 reliability and price stability benefits provided by
22 coal and nuclear baseload plants with on-site fuel
23 supply."

24 That's your testimony, correct?

1 A. Yes.

2 Q. Are you offering an opinion in this
3 proceeding about the reliability of the Davis-Besse
4 plant?

5 THE WITNESS: Could you read that back,
6 please?

7 (Record read back as requested.)

8 THE WITNESS: Read it again, please.

9 (Record read back as requested.)

10 THE WITNESS: Yes.

11 BY MR. SOULES:

12 Q. And what opinion are you offering?

13 A. That Davis-Besse is part of the
14 cost-effective generation mix.

15 Q. Can you explain how that relates to the
16 reliability of the plant?

17 A. As I previously testified, that the cost
18 and performance of plants are a necessary condition
19 for them to be part of the cost-effective portfolio.

20 Q. Are you relying on any other witness's
21 testimony for that opinion?

22 A. I'm sorry, can you rephrase the
23 question?

24 Q. Sure. You testified that Davis-Besse is

1 part of a cost-effective generation mix, correct?

2 A. Yes.

3 Q. Are you relying on another witness's
4 testimony in support of that?

5 A. I've already said that I'm relying on
6 Don Moul's assessment.

7 Q. Did you review any specific data
8 relating to the reliability of the Davis-Besse plant?

9 A. No.

10 Q. Did you review any other documents
11 related to the reliability of the Davis-Besse plant?

12 A. No.

13 Q. And are you offering an opinion in this
14 proceeding about the reliability of the Sammis plant?

15 A. Yes.

16 Q. And what opinion are you offering?

17 A. That it's currently part of a
18 cost-effective generating portfolio.

19 Q. And are you relying in part on Donald
20 Moul's direct testimony for that opinion?

21 A. Yes.

22 Q. Is there anything else you're relying on
23 for that opinion?

24 A. No.

1 Q. And you haven't reviewed any specific
2 data about the Sammis plant's reliability, correct?

3 A. Yes.

4 Q. Yes, that's correct?

5 A. Yes.

6 Q. And you've not reviewed any other
7 documents specifically relating to the Sammis plant's
8 reliability, correct?

9 A. Yes.

10 Q. Do you have an opinion as to whether
11 some of the generating units of the Sammis plant are
12 more reliable than others?

13 A. No.

14 Q. Okay.

15 MR. SOULES: I'm sorry, did somebody
16 just join the deposition?

17 MR. KUTIK: Let's go off the record.

18 (Discussion held off the record.)

19 MR. KUTIK: Let's go back on the record.

20 MR. SOULES: Okay. Hopefully that won't
21 happen again.

22 BY MR. SOULES:

23 Q. Dr. Makovich, are you aware of problems
24 the railroad industry has recently experienced in

1 transporting Powder River Basin coal to midwest coal
2 plants?

3 MR. KUTIK: Objection, assumes facts.

4 THE WITNESS: Can you rephrase the
5 question, please?

6 BY MR. SOULES:

7 Q. Sure. Do you have any knowledge as to
8 whether the railroad industry has had difficulty
9 transporting Powder River Basin coal to midwest coal
10 plants?

11 MR. KUTIK: Objection.

12 THE WITNESS: If your question is has
13 that ever happened, the answer would be, yes, there
14 are constraints in most every infrastructure delivery
15 system at some point in time.

16 BY MR. SOULES:

17 Q. Do you have any knowledge about whether
18 there have been greater-than-normal problems in the
19 last year or two?

20 MR. KUTIK: Objection.

21 THE WITNESS: Can you rephrase that
22 question?

23 BY MR. SOULES:

24 Q. Yes. And so I believe you answered my

1 earlier question in terms of has that ever been --
2 have there ever been problems transporting Powder
3 River Basin coal to midwest coal plants.

4 My question is: Are you aware of any
5 problems within the last year or two in transporting
6 Powder River Basin coal to midwest coal plants?

7 MR. KUTIK: Well, I'll state -- I'll
8 state my objection again, and I'll have an additional
9 objection that it mischaracterizes his testimony.

10 Go ahead. You can answer.

11 THE WITNESS: I have not included in my
12 testimony anything about specific constraints that
13 did or did not exist in the delivery of Powder River
14 Basin coal.

15 BY MR. SOULES:

16 Q. Okay. You're not offering any opinions
17 in this case about the effect any transportation
18 constraints might have on the Sammis plant's
19 reliability, correct?

20 MR. KUTIK: Objection, assumes facts,
21 assumes there are constraints, assumes that the
22 Powder River Basin coal problems regarding the
23 midwest plants includes Sammis, which there's been no
24 evidence of. He can answer.

1 MR. SOULES: And I would please ask,
2 Mr. Kutik, if you could avoid --

3 MR. KUTIK: No, no. I'm making an
4 objection. When you ask an absurd and totally
5 improper question, I can make my objection on the
6 record. If you don't like it, it's too bad.

7 MR. SOULES: Can we please have the
8 question reread?

9 (Record read back as requested.)

10 THE WITNESS: No, it's not correct.

11 BY MR. SOULES:

12 Q. Why is that not correct?

13 A. In LM-2, on Page 11, I discuss the
14 general problem that delivered fuel prices for power
15 generation have inherent uncertainties.

16 Q. Have you offered any opinion beyond
17 what's referenced in Attachment LM-2?

18 MR. KUTIK: Objection.

19 THE WITNESS: Yes.

20 BY MR. SOULES:

21 Q. Okay. And what opinion?

22 A. On Page 13 of my supplemental testimony,
23 I discuss on Line 20 -- beginning on Line 20 that
24 power generation technologies have different

1 performance risks.

2 Q. Okay. Thank you.

3 Getting back, and without inquiring as
4 to what the content of this would be, have you
5 performed any analysis of coal transportation to the
6 Sammis plant specifically?

7 A. No.

8 Q. Okay. Thank you.

9 If we could go back to Page 12 of your
10 testimony. Starting on Line 22 it states, "The
11 Economic Stability Program addresses the missing
12 money problem and prevents uneconomic retirements of
13 cycling and baseload power plants that would move the
14 generation portfolio toward a more expensive fuel and
15 technology mix."

16 That's your testimony, correct?

17 A. Yes.

18 Q. Okay. Is it your understanding that
19 some of the generating units at issue in this case
20 are cycling units?

21 A. I'm not sure about the units that
22 they've got partial ownership in. My understanding
23 is Sammis and Davis-Besse would be best characterized
24 as baseload units.

1 Q. And would all seven generating units at
2 the Sammis plant be best characterized as baseload
3 units?

4 A. I've not done a specific analysis of the
5 units at Sammis.

6 Q. Okay. So why would it be a concern that
7 cycling units might retire?

8 A. As I've testified, the most
9 cost-effective way to give customers the electricity
10 they want when they want it is to have the
11 cost-effective mix of peaking, cycling, and baseload
12 units. If you don't have that mix, you're not going
13 to have as cost effective a power supply portfolio.

14 Q. Hypothetically speaking, if a cycling
15 unit retired and was replaced by another cycling
16 unit, would that pose a problem?

17 MR. KUTIK: Objection.

18 THE WITNESS: As I testified on Page 41
19 of LM-2 that, "There is no single fuel or technology
20 of choice for power generation, and all forms of
21 power production have economic, environmental, and
22 reliability impacts."

23 So what the most economic replacement
24 would be would depend on what the current generating

1 mix looks like.

2 BY MR. SOULES:

3 Q. Okay. Are there any particular
4 characteristics about the cycling unit currently in
5 existence today that make them a more optimal part of
6 a generation mix as opposed to a cycling unit that
7 might replace them?

8 MR. KUTIK: Objection.

9 THE WITNESS: I'm not sure I understand
10 your question. Can you rephrase it, please?

11 BY MR. SOULES:

12 Q. Sure. So our country's generation
13 portfolio currently includes a number of cycling
14 units, correct?

15 A. Yes.

16 Q. Is there anything particular about the
17 characteristics of those units that make them more
18 optimal than a cycling unit that would replace them?

19 MR. KUTIK: Objection.

20 THE WITNESS: Yeah. I don't understand
21 what you mean by "more optimal."

22 BY MR. SOULES:

23 Q. Let's scratch that, and we'll move on.

24 Could we take a look at Page 13 of your

1 written testimony?

2 A. Yes.

3 Q. Okay. Thank you.

4 So starting on Line 3 it states, "These
5 power plants have capacity costs in excess of
6 combustion turbine, but they have a lower overall
7 power supply cost because the expected value of the
8 fuel savings compared to a combustion turbine are
9 more than enough to pay for the higher upfront
10 capacity costs. Thus, some of the additional
11 capacity costs over and above combustion turbine
12 costs in a power supply portfolio are cost-effective
13 investments in production cost efficiency."

14 Is that your testimony?

15 A. Yes.

16 Q. Okay. When you're referring to these
17 power plants on Line 3, are you referring
18 specifically to Sammis and Davis-Besse?

19 A. No.

20 Q. And you're referring to cycling and
21 baseload power plants generally?

22 A. Yes.

23 Q. Okay. And combustion turbine references
24 in this portion of your testimony are referring to

1 natural gas simple-cycle combustion turbine; is that
2 correct?

3 A. It could also involve a liquid fuel
4 combustion turbine.

5 Q. Okay. But you're not referring to
6 combined-cycle plants, correct?

7 A. A combined-cycle plant involves a
8 combustion turbine plus a heat recovery steam
9 generator.

10 Q. So when you refer to combustion turbine
11 in this portion of your testimony, what are you
12 referring to?

13 A. I'm referring to the combustion turbine
14 technology.

15 Q. Including combined-cycle plant?

16 A. No. I referred to combined-cycle plants
17 as an example of a technology with a higher upfront
18 cost, but lower production cost compared to the
19 combustion turbine alone.

20 MR. SOULES: I'm sorry, could we have
21 that last answer read back?

22 (Record read back as requested.)

23 BY MR. SOULES:

24 Q. Okay. Thank you.

1 In this portion of your testimony,
2 though, you're comparing cycling and baseload power
3 plants to combustion turbine specifically.

4 MR. KUTIK: Did you get the question?
5 Michael, why don't we try to repeat that question,
6 please.

7 MR. SOULES: Sure. Can you guys hear me
8 any better now?

9 MR. KUTIK: Slightly, yes.

10 MR. SOULES: Okay. I'll try to speak
11 up.

12 BY MR. SOULES:

13 Q. In this portion of your testimony,
14 you're comparing cycling and baseload power plants to
15 combustion turbines specifically, correct?

16 A. I'm comparing all three technologies to
17 each other.

18 Q. Okay. Are you considering
19 combined-cycle plants in this comparison?

20 MR. KUTIK: Objection.

21 THE WITNESS: Natural gas-fired,
22 combined-cycle power plants are one of several
23 technologies that can be part of a cost-effective
24 generation mix.

1 BY MR. SOULES:

2 Q. Okay. Let's take a look at Page 15 of
3 your testimony.

4 A. Yes.

5 Q. Okay. Starting on Line 18 it states,
6 "Ohio must face the conundrum that the Plants are
7 both economic (because the cost of continued
8 operation is below the cost of closing the Plants and
9 replacing them with the lowest-cost source of
10 equivalent power supply) and at risk of retirement
11 (because market compensation is chronically below
12 their average total cost)."

13 Is that your testimony?

14 A. Yes.

15 Q. Okay. So it's your opinion that the
16 Sammis and Davis-Besse plants are economic because
17 the cost of continued operations is below the cost of
18 closing the plant and replacing them with the
19 lowest-cost source of equivalent power supply,
20 correct?

21 A. Yes.

22 Q. Okay. I'd like to spend a few minutes
23 talking about this opinion.

24 In developing this opinion, did you

1 analyze the expected cost of continuing to operate
2 the Sammis plant?

3 A. As I've previously testified, I relied
4 on Don Moul's testimony.

5 Q. I believe when we were talking about
6 Mr. Moul's testimony, we were discussing another
7 portion of your testimony, and I'm wondering about
8 this specific opinion.

9 Did you analyze -- did you specifically
10 analyze the expected cost of continuing to operate
11 the Sammis plant?

12 A. I've already answered that question. I
13 have relied on Don Moul's testimony in that regard.

14 Q. Okay. When you're referring to Don
15 Moul's testimony, you mean his direct testimony?

16 A. Yes.

17 Q. Okay. And not his supplemental
18 testimony?

19 A. I am relying on his direct testimony.

20 Q. Okay. Are you relying on any other
21 witness's testimony for your opinion that the Sammis
22 plant is economic?

23 A. No.

24 Q. Are you relying on any projections of

1 the Sammis plant's future costs and revenues for your
2 opinion that the Sammis plant is economic?

3 A. I believe I've already answered that
4 question. I've relied on Don Moul's testimony in
5 this regard.

6 Q. Okay. In preparing your testimony for
7 this proceeding, did you review any projections of
8 Sammis's future costs and revenue?

9 A. Would you repeat that question, please?

10 MR. SOULES: Could we have the question
11 reread?

12 (Record read back as requested.)

13 THE WITNESS: Yes.

14 BY MR. SOULES:

15 Q. In what years did those projections
16 cover?

17 A. I'm referring to Don Moul's testimony
18 with regard to the economics of these plants going
19 forward.

20 Q. Okay. Apart from any projection that
21 might be in Mr. Moul's testimony, you didn't review
22 any projections of Sammis's future costs and revenue;
23 is that correct?

24 A. I've testified that I've relied on the

1 assessments in Don Moul's testimony.

2 Q. And you're not relying on anything other
3 than Mr. Moul's testimony for your opinion that the
4 Sammis plant is economic; is that correct?

5 MR. KUTIK: Objection, asked and
6 answered.

7 THE WITNESS: I believe I've already
8 answered that question, that I'm relying on Don
9 Moul's testimony in that regard.

10 BY MR. SOULES:

11 Q. Okay. Looking again at Page 15, Lines
12 19 to 21, you refer to "...the cost of closing the
13 Plants and replacing them with the lowest-cost source
14 of equivalent power supply..." Do you see where it
15 states that?

16 A. Yes.

17 Q. It's a little unclear to me whether
18 you're referring here to one category of costs or two
19 categories. Is the cost of closing an existing power
20 plant a separate cost that you consider when
21 determining whether the plant is economic?

22 A. I'm sorry, I don't think I understand
23 your question. Can you rephrase it?

24 Q. Sure. So when you were -- in general

1 when you're trying to determine whether a power plant
2 is economic, you consider the cost of continued
3 operations as part of that assessment, correct?

4 A. Yes.

5 Q. And you also consider the cost of
6 replacing that plant with the lowest-cost source of
7 equivalent power supply, correct?

8 A. Yes.

9 Q. And I'm wondering if there's a third
10 category of cost that you consider, which is the cost
11 of closing the existing plant?

12 A. The costs that I'm discussing here are
13 the going-forward costs of the existing plant.

14 Q. So -- and I'm not -- I'm asking this in
15 general, not with respect to Sammis or Davis-Besse.
16 When you're determining whether a plant is economic,
17 do you assess what the costs would be of closing the
18 plant?

19 A. Would you repeat that question, please?

20 MR. SOULES: Could we have the question
21 reread?

22 (Record read back as requested.)

23 THE WITNESS: What I've talked about is
24 the economic test, which involves comparing the

1 going-forward costs of a plant with the cost to
2 replace it. That's the economic test that I have
3 discussed.

4 BY MR. SOULES:

5 Q. Okay. So the economic test essentially
6 involved comparing two categories of costs; is that
7 correct?

8 A. I'm not sure what you mean by
9 "categories."

10 Q. The economic tests involved comparing
11 two costs, the cost of going forward and the cost of
12 replacement; is that accurate?

13 A. Yes.

14 Q. Okay. Thank you.

15 Could we -- let's talk for a few minutes
16 about the costs of replacing -- I'm sorry. Scratch
17 that.

18 It's your opinion that the Davis-Besse
19 plant is economic, correct?

20 A. As I've already testified, I relied on
21 Don Moul's testimony in this regard.

22 Q. Okay. That applies with respect to your
23 opinion about both Davis Bessie and Sammis, correct?

24 A. Yes.

1 Q. Okay. With respect to the cost of
2 replacing Sammis and Davis-Besse with the lowest-cost
3 source of equivalent power supply, do you know what
4 type of resource is the lowest-cost source of
5 equivalent power supply for Sammis and Davis-Besse?

6 A. I have not done an assessment, as I
7 said, of the specifics of the Davis-Besse and Sammis
8 plants. I've testified to the value of fuel and
9 technology diversity and power supply.

10 Q. So you're not offering an opinion in
11 this case about what type of resource specifically
12 would be the lowest-cost source of equivalent power
13 supply for Sammis and Davis-Besse?

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

16 (Record read back as requested.)

17 THE WITNESS: My testimony is that the
18 missing money problem creates the probability that
19 cost-effective baseload plants will close down and be
20 replaced by more costly peaking and cycling plants.

21 BY MR. SOULES:

22 Q. Okay. So you've not performed any
23 client-specific analysis for the Sammis plant,
24 correct?

1 MR. KUTIK: Objection, asked and
2 answered.

3 THE WITNESS: My testimony is that I've
4 relied on Don Moul's testimony in that regard.

5 BY MR. SOULES:

6 Q. Okay. Have you considered whether a
7 subset of the Sammis unit could be retired without
8 requiring an equivalent power supply?

9 A. I've already testified that I've not
10 done a specific analysis of Sammis or Davis-Besse,
11 and I've relied on Don Moul's testimony in that
12 regard.

13 Q. Okay. Let's go back to Page 15 again,
14 Lines 18 to 22. It's your opinion that the Sammis
15 plant is at risk of retirement, correct?

16 A. Yes.

17 Q. And what information did you rely on in
18 developing that opinion?

19 A. My assessment of the consequences of the
20 missing money problem in the PJM power market.

21 Q. Is there any other information that you
22 are relying on for that opinion?

23 A. Yes.

24 Q. And what information is that?

1 A. On Page 29 of LM-2, I discuss some
2 similar examples to the Davis-Besse plant, including
3 the Kewaunee nuclear plant and the Vermont Yankee
4 nuclear plant.

5 Q. So I was inquiring about the Sammis
6 plant, not the Davis-Besse plant. Is there any other
7 information that you're relying on for your opinions
8 that the Sammis plant is at risk of retirement?

9 A. My previous answer is still applicable.
10 There are other examples of baseload plants that are
11 closing down before it's economic to do so because of
12 the missing money problem in the energy marketplace.

13 Q. Okay. Thank you.

14 Is there anything else that you're
15 relying on for your opinion that the Sammis plant is
16 at risk of retirement?

17 A. Yes.

18 Q. And what is that?

19 A. The direct testimony of Don Moul.

20 Q. Okay. Anything else?

21 A. No.

22 Q. Okay. Based on what you know today, how
23 great is the risk that Sammis will retire in the next
24 three to five years?

1 A. As I previously testified, I'm relying
2 on the assessment of Don Moul in that regard who says
3 on Line 17 of his direct testimony, on Page 2, Line
4 17, "The economic viability of the Plants is in
5 doubt." He goes on further on Line 21 to say,
6 "...the Plants may not survive to see these better
7 days."

8 Q. Okay. Do you think it's more likely
9 than not that Sammis will retire in the next three to
10 five years if the Economic Stability Program is not
11 approved?

12 A. I have not put a probability on the
13 retirement of these plants.

14 Q. Okay. Do you have an opinion as to
15 whether some of the Sammis units are at greater risk
16 of retirement than other units?

17 A. I've already testified that I've not
18 done a specific analysis of Sammis, and I've relied
19 on the testimony of Don Moul in that regard.

20 Q. Okay. Have you communicated with anyone
21 employed by FirstEnergy Solutions or the companies
22 about the Sammis plant's potential retirement?

23 A. Can you rephrase that question?

24 Q. Yeah. Can you tell me what confused you

1 about that question?

2 A. Well, it could be broadly interpreted.
3 If I've discussed the missing money problem, since it
4 has a direct bearing on the plant, without mentioning
5 the plant, you know, that could be considered a
6 discussion of the issue that affects the plant.

7 Q. Okay. Thank you.

8 Have you communicated with anyone
9 employed by FirstEnergy Solutions or the companies
10 that specifically referenced the Sammis plant's
11 potential retirement?

12 MR. KUTIK: Objection.

13 THE WITNESS: Yeah. I've already
14 testified that I've been engaged here to talk about
15 the value of fuel diversity as it applies to the
16 potential loss of Sammis and Davis-Besse.

17 BY MR. SOULES:

18 Q. Have you verbally communicated with
19 anyone employed by FirstEnergy Solutions or the
20 companies about whether the Sammis plant specifically
21 might retire?

22 MR. KUTIK: Objection.

23 THE WITNESS: My testimony, as I
24 understand it, has been read by people at

1 FirstEnergy, and my testimony does discuss the
2 potential for Sammis and Davis-Besse to retire.

3 BY MR. SOULES:

4 Q. Have you had an oral conversation?

5 A. I'm sorry?

6 MR. KUTIK: I'm sorry, what was the
7 question?

8 THE WITNESS: I didn't hear that.

9 BY MR. SOULES:

10 Q. Have you had a verbal conversation with
11 anyone employed by FirstEnergy Solutions or the
12 companies about the Sammis plant potential
13 retirement?

14 MR. KUTIK: Objection.

15 THE WITNESS: Yes.

16 BY MR. SOULES:

17 Q. And are you relying on that conversation
18 in any way for your opinion that the Sammis plant is
19 at risk of retirement?

20 A. I believe I've already testified, I'm
21 relying on the testimony of Don Moul in that regard.

22 Q. And Mr. Moul's testimony is written
23 testimony, right?

24 A. Yes.

1 Q. And I was inquiring about verbal
2 conversations.

3 MR. KUTIK: Well, he's answered your
4 questions, Counsel. Why don't you move on. In fact,
5 it's -- we've been going at this an hour-and-a-half.
6 Why don't we take a break. Let's go off --

7 MR. OLIKER: Dave, before we go on a
8 break, can I just follow up and see what the order is
9 right now, because I may have a conflict around
10 lunch, though I doubt it will be my turn by then.

11 MR. KUTIK: First let's be off the
12 record.

13 (Discussion held off the record.)

14 (Recess taken.)

15 (Record read back as requested.)

16 BY MR. SOULES:

17 Q. Dr. Makovich, do you know what factors
18 FirstEnergy Solutions Corp. would consider in
19 deciding whether to retire the Sammis plant?

20 A. I'm not sure what you mean by "what
21 factors."

22 Q. If the owner of a generating unit were
23 considering the retirement of that unit, they would
24 look at certain factors or criteria in deciding that,

1 right?

2 A. Yes.

3 Q. That's the way in which I'm referring to
4 factors. Does that clarify?

5 A. Not really. I'm not sure what you're
6 asking.

7 Q. Do you know what type of information
8 FirstEnergy Solutions would consider in deciding
9 whether to retire the Sammis plant?

10 A. I have not been privy to any of the
11 internal discussions by the companies with regard to
12 this retirement assessment.

13 Q. Okay. And you don't know what time
14 horizon FirstEnergy Solutions would consider in
15 deciding whether to retire the Sammis plant; is that
16 correct?

17 A. As I've just testified, I've not been
18 privy to any of their internal discussions in that
19 regard.

20 Q. Okay. Let's assume hypothetically the
21 Economic Stability Program were not approved by the
22 Commission. In that circumstance, do you think that
23 the Sammis plant's market compensation will remain
24 below its average total costs for the foreseeable

1 future?

2 MR. KUTIK: Objection.

3 THE WITNESS: As I testified, I'm
4 relying on the assessment of Don Moul in that regard.

5 BY MR. SOULES:

6 Q. And that includes your testimony that
7 market compensation for the Sammis plant is
8 chronically below its average total cost?

9 A. I'm sorry. Where are you referring to
10 that?

11 Q. I'm looking at Page 15, Lines 21 to 22.

12 A. And, I'm sorry, your question is what?

13 Q. My question was: If the Economic
14 Stability Program were not approved by the
15 Commission, do you think that the Sammis plant's
16 market compensation will remain below its average
17 total costs for the foreseeable future?

18 A. I believe there's a probability that
19 that will be the case.

20 Q. And that's based upon the testimony --
21 the direct testimony of Mr. Moul, correct?

22 A. Yes.

23 Q. Okay. If that were the case, would that
24 mean that FirstEnergy Solutions would earn a higher

1 profit by retiring the Sammis plant rather than
2 continuing to operate it?

3 MR. KUTIK: Objection.

4 THE WITNESS: I've done no assessment of
5 the financial pro formas of any of these options that
6 you're discussing here.

7 BY MR. SOULES:

8 Q. Okay. But speaking in general terms, if
9 you had a -- if you hypothetically had a generating
10 unit whose market compensation were chronically below
11 its average total costs, would the owner of the unit
12 earn a higher profit by closing the unit rather than
13 continuing to operate it?

14 MR. KUTIK: Objection, incomplete
15 hypothetical.

16 THE WITNESS: The hypothetical that
17 you've posed, you haven't told me anything about the
18 market itself; so it's very difficult to answer that
19 question.

20 BY MR. SOULES:

21 Q. And what would you need to know about
22 the market itself to determine whether the unit owner
23 would earn more money by closing the unit?

24 A. There's a whole host of things I would

1 need to know about the costs of the owner's options,
2 as well as the level and volatility of the prices
3 we're talking about in this electricity market that
4 you're referring to.

5 Q. If you had -- if you hypothetically had
6 a situation where for the entire foreseeable future
7 the unit's market compensation would remain below its
8 average total costs, would it make financial sense
9 for the owner to retire the unit?

10 MR. KUTIK: Objection.

11 THE WITNESS: The -- the -- I've
12 testified that the economic test here is a comparison
13 of the going-forward costs to the replacement cost.
14 I haven't testified with regard to the profitability
15 of -- of an owner's two options here of closure and
16 replacement.

17 BY MR. SOULES:

18 Q. Okay. Is it your opinion that there --
19 that the right -- from an economic perspective, a
20 retirement -- scratch that.

21 Is it possible to have an economic
22 generating unit that is economic, but is also
23 financially unprofitable?

24 MR. KUTIK: Objection.

1 THE WITNESS: Yes.

2 BY MR. SOULES:

3 Q. Okay. So the interest of the unit owner
4 can average from what would be economically
5 efficient; is that correct?

6 A. I'm not sure what you mean by the
7 interest of the owner.

8 Q. The generating unit profit margin does
9 not necessarily sync up perfectly with what is
10 economically efficient; is that correct?

11 MR. KUTIK: Objection.

12 THE WITNESS: Again, the term "sync up
13 perfectly" is not clear what you mean.

14 BY MR. SOULES:

15 Q. Okay. Why don't we move on.

16 Dr. Makovich, have you reviewed the
17 direct testimony of the companies' witness, Jay
18 Ruberto?

19 A. No, I have not.

20 Q. Okay. Have you reviewed the direct
21 testimony of companies' witness, Jason Lisowski?

22 A. No, I have not.

23 Q. Have you reviewed the direct testimony
24 of companies' witness, Judah Rose?

1 A. No.

2 Q. If we could look at the bottom of
3 Page 15 of your written testimony. Starting on
4 Line 23 it states, "Indeed, with PJM capacity and
5 energy cash flows increase in future years to cover
6 the costs of a diverse power supply portfolio, then
7 customers will be further benefited from the Economic
8 Stability Program in place."

9 That's your testimony, correct?

10 A. Yes.

11 Q. What is the basis for your belief that
12 PJM energy cash flows will increase in future years?

13 A. I didn't testify that that was my
14 belief. What I'm saying is if that were to happen,
15 then the customers would benefit further.

16 Q. Okay. So when you say "when PJM
17 capacity and energy cash flows," you really mean if
18 PJM capacity and energy cash flows increase in future
19 years, then customers would benefit further?

20 A. That's what I mean, that if the
21 energy -- the capacity and energy cash flows increase
22 in future years, then customers would benefit
23 further.

24 Q. Okay. But you're not offering any

1 specific opinion that energy or capacity cash flows
2 will increase in future years?

3 A. That's right.

4 Q. Dr. Makovich, do you recall earlier when
5 we were discussing the Clifty Creek and Kyger Creek
6 plants?

7 A. I believe we mentioned that they were
8 part of this Economic Stability Program.

9 Q. Right, right. Okay. Thank you.

10 These two plants are often referred to
11 as the Ohio Valley Electric Corporation, or OVEC,
12 plants. If I refer to the plants collectively as the
13 OVEC plants, would you understand what I mean?

14 A. I'm sorry, I didn't hear that. If you
15 refer to them as what?

16 Q. If I refer to these plants collectively
17 as the OVEC plants, will you understand what I mean?

18 A. Yes.

19 Q. Okay. Are you offering any opinions in
20 this case regarding the operational characteristics
21 of the OVEC plants?

22 A. No.

23 MR. KUTIK: Objection.

24 BY MR. SOULES:

1 Q. Are you offering any opinions in this
2 proceeding as to whether the OVEC plants are
3 economic?

4 MR. KUTIK: Objection.

5 THE WITNESS: As I've said, I've relied
6 on Don Moul's testimony in that regard.

7 BY MR. SOULES:

8 Q. Okay. And any opinion -- do you have
9 any opinion -- scratch that.

10 Are you offering any opinion about the
11 OVEC plants' cost of continued operation?

12 A. As I said, I am relying on Don Moul's
13 testimony in that regard.

14 Q. Okay. And is it the same case as to
15 whether the OVEC plants might be at risk of
16 retirement, any opinion you have would be described
17 in the direct testimony of Mr. Moul?

18 A. I've relied on Mr. Moul's testimony in
19 that regard.

20 Q. Okay. And nothing beyond Mr. Moul's
21 testimony?

22 A. I think I've already answered that I've
23 relied on his testimony.

24 Q. Okay. Let's talk a bit about the

1 broader issue of supply diversity, plant retirement.

2 If we could take a look at Page 4 of your written
3 testimony.

4 A. Yes.

5 Q. Okay. Starting on Line 13 it reads,
6 "Without a surplus of generating capacity, it is
7 economic to retire a power plant when the cost of
8 continued operation exceeds the cost of closing the
9 plant and replacing it with the lowest cost source of
10 equivalent power supply."

11 That's your testimony, correct?

12 A. Yes.

13 Q. And this subject is essentially
14 providing a formula for determining whether it's
15 economic to retire a power plant, is that a fair
16 characterization?

17 A. I've described when it is economic to
18 retire a power plant under a given set of conditions.

19 Q. And what -- what are those given set of
20 conditions?

21 A. As I mentioned here on Line 13 of
22 Page 4, that one of the conditions is we don't have a
23 surplus of generating capacity.

24 Q. So if you had an electrical grid with a

1 surplus of generating capacity, it might be economic
2 to retire the power plant even if these conditions
3 are not met?

4 A. Yes.

5 Q. Okay. Looking down a little further,
6 Line 18, there is a reference to environmental impact
7 management. Do you see where it says that?

8 A. Yes.

9 Q. Could you define what you mean by
10 "environmental impact management"?

11 A. All forms of electric generation have an
12 environmental impact, and this is something that
13 power suppliers have to manage.

14 Q. Did you describe environmental impact as
15 a system benefit; is that accurate?

16 MR. KUTIK: Objection.

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

19 (Record read back as requested.)

20 THE WITNESS: No.

21 BY MR. SOULES:

22 Q. Why is that not accurate?

23 A. I described environmental impact
24 management as a system benefit.

1 Q. Right, okay. I think I misspoke. Thank
2 you.

3 If we could look at the bottom of
4 Page 14 and top of Page 15 of your written testimony.

5 A. Yes.

6 Q. Okay. Starting on Line 22 on Page 14 it
7 reads, "The Plants involve fixed costs to fund
8 greater power production efficiency, and provide
9 production cost risk management and technology,
10 performance risk management, as well as provide
11 environmental impact management."

12 Is that your testimony?

13 A. Yes.

14 Q. So is it your opinion that the Sammis
15 and Davis-Besse plants provide environmental impact
16 management?

17 A. It is my testimony that some of the
18 investments in these plants do provide environmental
19 impact management.

20 Q. And which investments are you referring
21 to?

22 A. Environmental control investments.

23 Q. Are there any other ways in which the
24 Sammis plant provides environmental impact

1 management?

2 A. Yes.

3 Q. In what way?

4 A. That an environmental profile is a
5 function of the cost-effective generation portfolio
6 of which it's a part.

7 MR. SOULES: I'm sorry, could we have
8 that last answer read back?

9 (Record read back as requested.)

10 BY MR. SOULES:

11 Q. What do you mean by "environmental
12 profile"?

13 A. I'm talking about the environmental
14 impacts.

15 Q. Both positive and negative impacts?

16 MR. KUTIK: Objection.

17 THE WITNESS: I -- I haven't divided
18 impacts into positives and negatives. As I've
19 testified, all sources of power supply have an
20 environmental impact.

21 BY MR. SOULES:

22 Q. And environmental impact management is a
23 type of system benefit, correct?

24 A. Yes.

1 Q. What are you relying on in support of
2 your opinion regarding the Sammis plant's
3 environmental impact management?

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

5 Q. Did you -- did you review any
6 documents -- well, scratch that.

7 I believe you stated that the Sammis
8 plant provides environmental impact management,
9 correct?

10 A. Yes.

11 Q. And what information are you relying on
12 for that conclusion?

13 A. Well, as I told you, it's part of the
14 cost-effective generation mix, and all of the
15 technologies in that mix have an environmental impact
16 that needs to be managed.

17 Q. Did you review any specific information
18 about the Sammis plant's environmental controls?

19 A. I have not.

20 Q. Have you reviewed any specific
21 information about the pollutant emissions from the
22 Sammis plant?

23 A. I'm sorry. I didn't hear that question.

24 Q. Have you reviewed any specific

1 information about the pollutant emissions from the
2 Sammis plant?

3 A. As I've testified, I've not done
4 specific analysis of the Sammis plant.

5 Q. Okay. Thank you.

6 Let's turn back to Page 4 of your
7 written testimony.

8 A. Yes.

9 Q. Starting on Line 19 it states, "Wind and
10 solar resources are not realistic substitutes because
11 they are not equivalent power supply sources in
12 meeting power customer demands."

13 Is that your testimony?

14 A. Yes.

15 Q. Why don't wind resources qualify as an
16 equivalent power supply source?

17 A. These technologies are not direct
18 substitutes for the conventional generating resources
19 that provide baseload electric supply.

20 Q. And when you refer to conventional
21 generation resources, are you referring specifically
22 to coal and nuclear resources?

23 A. Those would be included, but it's not
24 exclusively those.

1 Q. Okay. Would you include natural gas as
2 a conventional generation resource?

3 A. That's a fuel.

4 Q. How would you consider a natural gas
5 combined-cycle plant?

6 MR. KUTIK: So the question again is?

7 BY MR. SOULES:

8 Q. Would you consider a natural gas
9 combined-cycle plant to be a conventional generation
10 resource?

11 A. Yes.

12 Q. Are there any circumstances in which a
13 wind resource could qualify as an equivalent power
14 supply source?

15 A. Equivalent to what?

16 Q. Equivalent to a conventional generation
17 resource.

18 A. Yeah. Can you rephrase your question?
19 I'm not sure what you're trying to ask here.

20 Q. Sure. So I believe you've testified
21 that wind resources do not qualify as an equivalent
22 power supply source comparable to conventional
23 generation resource, correct?

24 A. What I've testified is that to give

1 people the electricity they want when they want it
2 with a cost-effective portfolio of fuels and
3 technologies, that may or may not include wind and
4 solar resources.

5 Q. Okay. Wind and solar resources are not
6 realistic substitutes for conventional generation
7 resources, right?

8 A. Well, what I've testified to is in a
9 cost-effective generation mix, you need the peaking,
10 cycling, and baseload units. In that cost-effective
11 mix, wind and solar resources are not a substitute
12 for the conventional technologies in those roles.

13 Q. Okay. Can demand reduction initiatives
14 such as demand response or energy efficiency program
15 serve as a realistic substitute?

16 A. Those are resources that are on the
17 demand side of the marketplace as opposed to what I'm
18 talking about here with the supply side.

19 Q. Okay. Thank you.

20 Are you offering any opinions in this
21 case as to whether the OVEC plant provides
22 environmental impact management?

23 A. I -- I've already answered the question
24 that all types of power supply have an environmental

1 impact, which would include those plants.

2 Q. Okay. Are you providing any specific
3 opinions about the environmental impact management
4 that those plants would provide?

5 A. As I've testified, I've not done a
6 specific analysis of those particular plants.

7 Q. Okay. And you've not specifically
8 analyzed any cost risk management benefits that the
9 OVEC plants might provide?

10 A. As I've testified, I've relied on Don
11 Moul's testimony in that regard.

12 Q. Okay. And have you relied on Mr. Moul's
13 testimony for any opinions about the OVEC plants'
14 potential technology performance risk management
15 services?

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

18 (Record read back as requested.)

19 MR. KUTIK: Objection.

20 THE WITNESS: Can you read it back to
21 me, please?

22 (Record read back as requested.)

23 THE WITNESS: Yes.

24 BY MR. SOULES:

1 Q. And nothing besides Mr. Moul's
2 testimony?

3 MR. KUTIK: Objection.

4 THE WITNESS: As I've said, I've relied
5 on Don Moul's testimony in this regard.

6 BY MR. SOULES:

7 Q. Have you relied on Mr. Moul's testimony
8 for any opinions about whether the OVEC plants
9 provide production efficiency benefits?

10 A. Yes.

11 Q. And have you relied on Mr. Moul's
12 testimony for any opinion about whether the OVEC
13 plants provide grid location benefits?

14 A. Yes.

15 Q. Okay. Are you offering any opinions in
16 this case as to whether the Davis-Besse plant
17 provides grid location benefits?

18 A. As I've said, I relied on Don Moul's
19 testimony in that regard.

20 Q. And you haven't specifically analyzed
21 whatever grid implications retirement of the
22 Davis-Besse plant might have?

23 A. As I've testified, I've not done
24 specific analyses of these plants.

1 Q. Okay. Dr. Makovich, you recently
2 performed a study that looked at the value of
3 diversity in our country's power supply portfolio,
4 correct?

5 A. Yes.

6 Q. And that's the study that's attached as
7 LM-2 to your testimony?

8 A. Yes.

9 Q. Okay. And in that study, you compared
10 the country's current power supply portfolio to a
11 hypothetical less diverse portfolio, correct?

12 A. Yes.

13 Q. And based on that comparison, you found
14 that the current national portfolio lowers the cost
15 of electricity by more than \$93 million a year; is
16 that correct?

17 A. That was for a timeframe of analysis
18 from 2010 through 2012.

19 Q. Okay. The national portfolio that you
20 considered had a generation mix that was
21 approximately 40 percent coal, 20 percent nuclear, 27
22 percent gas, and less than 5 percent wind and solar;
23 is that correct?

24 A. Can you -- are you talking about a

1 capacity mix or a generation mix?

2 Q. I was talking about generation mix.

3 A. Can you repeat the question there?

4 Q. Sure. The national portfolio that you
5 considered in this analysis had a generation mix that
6 was approximately 40 percent coal, 20 percent
7 nuclear, 27 percent gas, and less than 5 percent wind
8 and solar; is that accurate?

9 A. Yes.

10 Q. And the hypothetical less diverse
11 portfolio had a generation mix that was approximately
12 74 percent natural gas and 22.5 percent wind and
13 solar; is that correct?

14 A. On Page 5 of LM-2, I've described the
15 reduced diversity case where wind and solar make up
16 about one-third of installed capacity and 22.5
17 percent of generation; hydro decreases from 6.6 to
18 5.3 in the capacity mix and represents 3.8 percent of
19 generation; natural gas-fired power plants account
20 for the remaining 61.7 percent of installed capacity
21 and 73.7 percent of generation.

22 Q. Okay. And the reduced diversity case
23 includes no generation of coal or nuclear resources,
24 correct?

1 A. Yes.

2 Q. Do you have any knowledge about the
3 current generation mix within PJM?

4 A. Yes. I have a general knowledge.

5 Q. Do you know if PJM's current generation
6 mix has a higher percentage of coal and nuclear than
7 the national generation mix?

8 A. Before I would testify to that, I'd want
9 to check the numbers.

10 Q. Okay. Do you have a general sense of
11 whether PJM's generation mix is representative of the
12 national generation?

13 A. As I said, without the data in front of
14 me, I can't compare and contrast the PJM mix to the
15 national average.

16 Q. Okay. Do you have any knowledge about
17 the current generation mix in Ohio?

18 A. Yes. I have a general knowledge.

19 Q. Okay. What knowledge do you have about
20 Ohio's generation mix?

21 A. Well, we're talking about some of the
22 plants in that mix right now. So it is a portfolio
23 that does include nuclear and coal assets, as well as
24 some natural gas assets, as well as some renewable

1 power supply assets.

2 Q. Okay. And am I assuming correctly that
3 you don't have the numbers of Ohio's current
4 generation mix at your fingertips?

5 A. Yes.

6 Q. Okay. Do you think it's likely that
7 coal-fired power will be eliminated from PJM's
8 generation mix within the next five years?

9 A. Within the next how many years?

10 Q. Five years.

11 A. No.

12 Q. How about within the next 10 years?

13 A. I'm sorry, what's the -- the question
14 is?

15 Q. Do you think it's likely that coal-fired
16 power will be eliminated from PJM's generation mix
17 within the next 10 years?

18 A. If you mean completely eliminated, I'd
19 say the probability is low that that would happen.

20 Q. Okay. Do you think it's likely that
21 coal-fired power will be completely eliminated from
22 PJM's generation mix within the next 20 years?

23 A. It's difficult to assess the probability
24 of the generation mix that far out with regard to

1 coal, particularly because of pending environmental
2 regulations.

3 Q. Okay. Do you think it's likely that
4 nuclear power will be eliminated from PJM's
5 generation mix within the next five years?

6 A. Similarly, I think that's a low
7 probability.

8 Q. And how about within the next 10 years?

9 A. Again, as we get out into these longer
10 terms, it's difficult to assess, you know, the
11 probabilities of this -- of this generation mix.

12 Q. Okay. Do you think that the reduced
13 diversity case presented in LM-2 is a likely outcome
14 within the next 10 years?

15 A. Yes, for some regional power systems.

16 Q. But not nationally?

17 A. As I've talked about it in this, power
18 systems tend to be regional, and that
19 directionally -- I think we're seeing a move
20 directionally towards the reduced diversity case. In
21 some regions, we are already close.

22 Q. Okay. But not within PJM, correct?

23 A. No.

24 MR. KUTIK: Objection.

1 BY MR. SOULES:

2 Q. I'm sorry, did you say no?

3 A. I said no.

4 Q. Okay. Thank you.

5 Dr. Makovich, have you evaluated what
6 the optimal mix of generation sources for PJM would
7 be from a supply diversity perspective?

8 A. No.

9 Q. In your opinion, can an electrical grid
10 have power supply diversity without coal resources?

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

13 (Record read back as requested.)

14 THE WITNESS: Yes.

15 BY MR. SOULES:

16 Q. And in your opinion, can a grid have
17 power supply diversity without nuclear resources?

18 A. Yes.

19 Q. And can a grid have power supply
20 diversity without either coal or nuclear resources?

21 A. Well, by "power supply diversity" in my
22 answers, I'm simply saying that you can have more
23 than one type of power supply. What my study was
24 about was cost-effective diversity, which is a

1 different issue.

2 Q. Okay. Can an electrical grid have
3 cost-effective diversity without coal resources?

4 A. I'd have to analyze the specific grid.
5 My study started off with the mix that we have in
6 place, which includes a significant slice for coal.

7 Q. Okay. Let's talk a little bit more
8 about the missing money problem. If we could turn to
9 Page 6 of your written testimony.

10 A. Yes.

11 Q. Okay. Starting on Line 10 it states,
12 "There are two root causes of the missing money
13 problem. First, power generation technologies have
14 inherent characteristics that prevent electric energy
15 markets from delivering prices high enough to balance
16 demand and supply in the long run."

17 That's your testimony, correct?

18 A. Yes.

19 Q. Okay. And let's consider this first
20 group for a minute here. In looking on Page 7 --

21 A. Yes.

22 Q. -- starting on Line 12 it states, "Some
23 power production technologies have cost
24 characteristics similar to Dupuit's bridges with

1 relatively large upfront costs and relatively low (or
2 virtually no) marginal costs."

3 That's your testimony, correct?

4 A. Yes.

5 Q. And I apologize if I mispronounced the
6 Dupuit's thing.

7 MR. KUTIK: That's the way we pronounce
8 it.

9 MR. SOULES: Good.

10 BY MR. SOULES:

11 Q. Now, your testimony specifically cites
12 to wind and solar technology. Are there other power
13 generation technologies that contribute to the
14 missing money problem?

15 A. Yes.

16 MR. KUTIK: Object.

17 BY MR. SOULES:

18 Q. Which technologies are those?

19 A. As I've testified on Line 15 of Page 7,
20 "More generally, the technologies employed to
21 cost-effectively generate electricity do not have the
22 incremental cost characteristics needed to produce a
23 textbook market outcome in which prices keep demand
24 and supply in long-run balance."

1 Q. And the technologies employed to
2 cost-effectively generate electricity are from which
3 technologies specifically?

4 A. Here I'm referring to the technologies
5 that make up a cost-effective generating portfolio,
6 which are the peaking, cycling, and baseload
7 technologies we've been discussing.

8 Q. So does that mean that baseload
9 technology contributes to the first root cause of the
10 missing money problem?

11 MR. KUTIK: Objection.

12 THE WITNESS: Yes.

13 BY MR. SOULES:

14 Q. And cycling technologies, likewise,
15 contribute to the first root cause of the missing
16 money problem?

17 A. As I've testified, it's the cost
18 characteristics of these technologies that are the
19 root cause of the first dimension of this problem.

20 Q. Okay. Thank you.

21 If we could turn to the bottom of
22 Page 10 of your written testimony. I'm specifically
23 looking at Page 10, Line 10, through Page 11, Line 2.
24 So if you want a minute to skim that, please do so.

1 A. I've got Page 10 in front of me.

2 Q. Okay. Is it your opinion that PJM's
3 existing capacity market eliminates the first root
4 cause of the missing money problem?

5 A. I'm sorry. I didn't hear the question.

6 Q. Is it your opinion that PJM's existing
7 capacity market eliminates the first root cause of
8 the missing money problem?

9 A. I testified that it addresses the
10 inherent dimension of the missing money problem; I
11 did not testify that it eliminates it.

12 Q. And do you think that the current
13 capacity market does not fully eliminate the first
14 root cause of the missing money problem?

15 A. It is not clear to me that it has fully
16 addressed the first dimension of the missing money
17 problem.

18 Q. Okay. If PJM modified the capacity
19 market so that generating units received higher cash
20 flows by providing capacity, would -- could that
21 eliminate the first root cause of the missing money
22 problem?

23 THE WITNESS: Can you read that question
24 back, please?

1 (Record read back as requested.)

2 MR. KUTIK: Objection.

3 THE WITNESS: Yeah. I've not testified
4 here as to what kinds of evolutionary reforms in PJM
5 might provide improvements.

6 BY MR. SOULES:

7 Q. Okay. And you're not offering any
8 opinions in this case about PJM's proposed capacity
9 performance proposal that is filed with FERC?

10 A. I have not included a discussion of the
11 proposed changes to the PJM capacity market.

12 Q. Okay. And it's your opinion that PJM's
13 existing capacity market does not address the second
14 root cause of the missing money problem; is that
15 correct?

16 A. It -- my testimony is it largely does
17 not address the second dimension of the missing money
18 problem.

19 Q. Okay. While we're looking at Pages 10
20 and 11, if we could look at Page 11, starting on
21 Line 9.

22 A. Okay.

23 Q. It reads, "Current market conditions
24 illustrate this cost recovery shortfall, with the

1 current market providing approximately \$48 per
2 megawatt hour to a replacement power plant requiring
3 approximately \$55 per megawatt hour to cover its
4 annual levelized costs."

5 That's your testimony, correct?

6 A. Yes.

7 Q. And the \$55-per-megawatt-hour figure is
8 based in part on your estimate that upfront capital
9 costs would run at around \$1,400 per kilowatt; is
10 that correct?

11 A. Yes.

12 Q. Is that \$1,400 figure expressed in 2015
13 dollars?

14 A. These would be current dollars.

15 Q. Okay. And is that a capital cost
16 estimate for a combined-cycle power plant
17 specifically?

18 MR. KUTIK: I'm sorry. Can you read the
19 question?

20 (Record read back as requested.)

21 THE WITNESS: Yes.

22 BY MR. SOULES:

23 Q. Okay. And how did IHS calculate that
24 \$1,400 figure?

1 A. As I said on Line 13 of Page 11, this
2 reflects some internal metrics that we use in our
3 research.

4 Q. And can you describe what the source of
5 those internal metrics are? If we need to process to
6 a confidential portion later, that's fine.

7 MR. KUTIK: Well, if Dr. Makovich is
8 going to be talking about things that are proprietary
9 to IHS, I'm not sure that having a confidential
10 session solves that problem, but let's cross that
11 bridge when we come to it. Go ahead.

12 THE WITNESS: Yes. This upfront cost
13 reflects the information we gain from our interaction
14 with our clients.

15 BY MR. SOULES:

16 Q. Can you describe in general terms what
17 information sources IHS relies on to develop that
18 figure?

19 MR. KUTIK: Objection, asked and
20 answered. Go ahead.

21 THE WITNESS: As I've said, we have a
22 large number of clients interested in our assessments
23 of the power marketplace. Through our interactions,
24 we gain information with regard to costs.

1 BY MR. SOULES:

2 Q. And those interactions provide the sole
3 basis for the \$1,400 figure?

4 A. No.

5 Q. Okay. What else formed the \$1,400
6 figure?

7 A. Well, there are other available
8 information with regard to upfront capital costs.

9 Q. And what available information would
10 that be?

11 A. Well, for example, you know, the Energy
12 Information Association provides information about
13 the costs of a combined-cycle plant.

14 Q. Did you review that information in
15 performing the calculation shown on Page 11 of your
16 testimony?

17 A. I'm aware of it.

18 Q. Okay. Did you personally take any
19 steps to verify the reasonableness of the
20 \$1,400-per-kilowatt figure?

21 A. Yes.

22 Q. What steps did you take?

23 A. The example I've provided here is an
24 estimate that errs on the low side. It is lower than

1 what we typically tell clients we expect the
2 annualized levelized cost to be, and it's lower, for
3 example, than the Energy Information Association's
4 annual energy outlook in 2014 that put this not at
5 \$55 a megawatt hour, but instead at \$77.9.

6 Q. So correct me if I'm wrong, but those
7 sound like steps you may have taken to verify the
8 reasonableness for the \$55-per-megawatt figure; is
9 that accurate?

10 A. That's what I've just said.

11 Q. Okay. So talking about the
12 \$1,400-per-kilowatt figure specifically, did you take
13 any steps to verify the reasonableness of that
14 number?

15 A. As I've said, it is a function of
16 interactions we have with people in the marketplace
17 that are developing power lines.

18 Q. And is it your opinion that that figure
19 is accurate?

20 A. As I just testified, it's my opinion
21 that it would be on the low side.

22 Q. Okay. Take a look at Page 12 of your
23 written testimony. Just let me know when you're
24 there.

1 A. Page 12, yes.

2 Q. Starting on Line 2 it states, "...market
3 payments of approximately \$48 per megawatt hour are
4 coming up about 12 percent short of covering the
5 replacement costs of a baseload power plant."

6 That's your testimony, correct?

7 A. Yes.

8 Q. Given this cost recovery shortfall, it
9 would not make financial sense for a new
10 combined-cycle power plant to be built within PJM,
11 correct?

12 A. I did not testify to that.

13 Q. Do you think it -- do you think it makes
14 financial sense for a new combined-cycle power plant
15 to be built within PJM?

16 A. It may in a cycling mode, but not a
17 baseload mode.

18 Q. And why that qualification?

19 A. The decision to develop a power plant is
20 a function of the expected utilization rate. It may
21 be the case that it would make sense to build a
22 natural gas combined-cycle plant in a cycling mode,
23 but not in a baseload mode.

24 Q. Are you aware of whether there are new

1 combined-cycle plants currently being developed
2 within PJM?

3 A. Yes, there are.

4 Q. Are those combined-cycle plants designed
5 to operate in a cycling mode?

6 A. I do not have information on the
7 specific expectations of the development plans of
8 these plants.

9 Q. Okay. But it would be your opinion that
10 if there was a combined-cycle plant currently being
11 developed, it would not make financial sense if it
12 was designed to operate in a baseload mode, correct?

13 A. I -- I did not say that.

14 Q. Okay. Why am I wrong? What's wrong
15 about that statement?

16 A. What I've provided here is an example of
17 some generic costs that were on the low side. As you
18 look at specific power plant projects, they differ
19 quite a bit with regard to their costs compared to
20 what might be typical or generic. So I cannot,
21 without looking at a specific power plant, opine on
22 what the economics involve.

23 Q. When you say what the economics involve,
24 you mean whether or not it would make financial sense

1 to build it --

2 A. Yes.

3 Q. -- correct?

4 Okay. Let's turn back to Page 6.

5 Please let me know when you're there.

6 A. Yes. I'm on Page 6.

7 Q. Okay. Starting on Line 12 it states,
8 "Second, environmental regulations imposed on power
9 supply created the unintended consequence of further
10 suppressing electric energy market prices."

11 Is that your testimony?

12 A. Yes.

13 Q. Okay. And then on Pages 8 and 9 of your
14 written testimony, you elaborate on this point by
15 discussing how environmental policies contribute to
16 the missing money problem; is that correct?

17 A. On Page 8 and 9, yes.

18 Q. Okay. And --

19 A. With the -- what I'm talking about on
20 Page 8 and 9 are cash flows as opposed to just the
21 revenue stream.

22 Q. I'm sorry, can you explain the
23 difference between cash flows and the revenue stream
24 that you're referring to?

1 A. Yes.

2 Q. Okay. Please -- please do.

3 A. When I talk about prices being
4 suppressed, your revenue stream is lower because the
5 revenue stream is price times quantity. If the -- as
6 I've testified here, the imposition of renewables
7 also effects the cost side and the cash flow being
8 revenues less costs.

9 Q. Okay. Got it. Thank you.

10 And on Page 8 -- we've been discussing
11 the environmental policies. On Page 8, Line 11 to
12 12, you reference subsidies and the imposition of
13 mandates for renewable power generation shares,
14 correct?

15 A. Yes.

16 Q. And these types of environmental
17 policies contribute to the missing money problem,
18 correct?

19 A. Yes.

20 Q. Are there other types of environmental
21 policies that contribute to the missing money
22 problem?

23 MR. KUTIK: Objection.

24 THE WITNESS: There may be.

1 BY MR. SOULES:

2 Q. Can you identify any other environmental
3 policies?

4 A. Yes.

5 Q. Okay. Please identify the policies.

6 A. Well, for example, there are some market
7 rules that require taking the renewable output even
8 if it would be less expensive to curtail it.

9 Q. Okay. Can you identify any other
10 environmental policies that contribute to the missing
11 money problem?

12 A. There are others. My testimony doesn't
13 provide an exhaustive list.

14 Q. Okay. Does federal regulation of carbon
15 dioxide contribute to the missing money problem?

16 A. I'm sorry, can you repeat that question?

17 Q. Sure. Does federal regulation of carbon
18 dioxide contribute to the missing money problem?

19 A. Can you rephrase the question? What
20 federal policies are you referring to?

21 Q. Sure. Why don't I -- let's scratch
22 that.

23 Does any state or federal regulation of
24 carbon dioxide contribute to the missing money

1 problem?

2 A. Again, I'd need to know what specific
3 policy you're referring to.

4 Q. Okay. Move on.

5 Does EPA's regulation of other air
6 pollutants such as mercury or sulfur dioxide
7 contribute to the missing money problem?

8 A. I have not had any reason to expect that
9 they do.

10 Q. Okay. How about environmental policies
11 that apply to the handling and disposal of
12 radioactive material, would those policies contribute
13 to the missing money problem?

14 A. It's not something that I've assessed.
15 I don't have any reason to expect they would, but
16 it's not something that I can think of a connection.

17 Q. Okay. Thank you.

18 If we could look at Page 9 of your
19 written testimony.

20 A. Yes.

21 Q. Thank you. Starting on Line 5 it reads,
22 "It is important to note, however, that renewable
23 mandates and renewable supply are only part of the
24 missing money problem. There are other

1 contributors."

2 Is that your testimony?

3 A. Yes.

4 Q. And when you refer to "other
5 contributors," what are you referring to?

6 A. I've been involved in discussions with
7 people regarding other factors that are suppressing
8 energy prices.

9 Q. What factors are those?

10 A. Well, for example, there is a concern
11 that some of the processes that are followed to
12 create a security-constrained economic dispatch and
13 calculate uplift payments are a contributing factor
14 to missing money.

15 Q. Okay. Are there other factors --

16 A. Yes.

17 Q. -- that you're aware of?

18 Okay. I'm sorry. Could you please
19 describe those factors?

20 A. Well, what I -- I haven't provided
21 testimony here regarding a comprehensive list of all
22 factors that can suppress energy prices.

23 Q. Okay. Just to clarify, when you're
24 referring to other contributors on Line 6 and 7, are

1 you referring to other contributors to the second
2 root cause of the missing money problem?

3 A. Yes.

4 Q. Okay. But not other contributors to the
5 first root cause of the missing money problem?

6 A. I did not provide a comprehensive list
7 of all of the factors that could contribute to the
8 first dimension, either.

9 Q. Can you describe any of the other
10 factors that contribute to the first dimension?

11 A. Yes.

12 Q. Okay. Please do.

13 A. For example, a subsidized program for
14 demand-side management has the potential to suppress
15 capacity prices.

16 Q. And that would fall under the first root
17 cause of the missing money problem?

18 A. It could be a contributor to that first
19 dimension of the missing money problem.

20 Q. Okay. While we're looking at Page 9,
21 let's take a look at Figure 1 of your direct
22 testimony. This is the figure that's entitled "Key
23 Results from Selected Wind Energy Integration Cost
24 Studies."

1 A. Yes.

2 Q. Did you prepare this figure?

3 A. This figure came from a research paper
4 done by Brooks and others in 2003.

5 Q. Do you know what the title -- I'm sorry.
6 What's the -- Brooks's full name?

7 A. I don't have that in front of me.

8 Q. Are you referring to the first source
9 listed at the bottom of the figure?

10 A. The source there, Brooks et al., in
11 2003.

12 Q. Okay. But this figure also includes
13 other data points as well, correct?

14 A. No. This figure came from the book --
15 the Brooks research.

16 Q. And that was in 2003?

17 A. Yes.

18 Q. Can you explain to me why the list of
19 sources include references to items that post date
20 2003?

21 A. As I said, I have to -- I don't have the
22 direct cite for Brooks as far as the year of the
23 report. I can get that for you, but I don't have it
24 here in front of me.

1 Q. No. I appreciate that. My confusion is
2 this figure appears to cite to reports -- a number of
3 reports, the most recent of which appears to be from
4 2010 if I'm reading the source correctly.

5 A. Yes, yeah. So Brooks -- yeah, I'm
6 sorry, the --

7 MR. KUTIK: Let him ask a question. Let
8 him ask a question. Go ahead.

9 THE WITNESS: Okay.

10 BY MR. SOULES:

11 Q. I wondered if you could please explain
12 that apparent discrepancy.

13 A. I believe that, for example, the 2003
14 refers to that Xcel study. The Brooks study -- I'll
15 have to get the exact cite for you and the date.
16 Brooks was the one that collected all these studies
17 and put them together in this kind of a graphic.

18 Q. Okay. And then you reproduced that
19 graphic in your testimony here?

20 A. Yes.

21 Q. Okay. Did you review the underlying
22 studies that are represented in the data points in
23 this graphic?

24 A. I have looked at some of these

1 integration studies in the past.

2 Q. Okay. And is Brooks an employee of IHS?

3 A. No.

4 Q. Okay. Was this figure reproduced in an
5 IHS report at a later date?

6 A. Yes.

7 Q. Before -- and when was it reproduced?

8 A. I'd have to check the date and exact
9 publication.

10 MR. SOULES: David, would it be possible
11 to get that data publication after this deposition?

12 MR. KUTIK: We will take your request
13 under advisement.

14 MR. SOULES: Okay. Thank you.

15 Could we take maybe a five-minute break?
16 I think I'm pretty close to being done, but just
17 wanted to review, you know.

18 MR. KUTIK: Okay. Very good.

19 (Recess taken.)

20 BY MR. SOULES:

21 Q. I have just a couple more questions.
22 Should be just a few minutes here.

23 Dr. Makovich, could we take a look at
24 Page 11 of your written testimony?

1 A. Yes.

2 Q. For the calculations that you provided
3 in this portion of your testimony, did you create any
4 workpapers?

5 A. Yes.

6 Q. And those workpapers reflect the
7 calculation, et cetera, that fed into this estimate?

8 A. Yes.

9 Q. Okay. Are you aware of whether those
10 workpapers have been provided to other parties in
11 this case?

12 A. I don't believe they have.

13 Q. Okay. Did you create workpapers for any
14 of the other analyses that you performed for this
15 testimony?

16 A. This is the -- I think this is the only
17 calculation I've got in the testimony. I did provide
18 Figure 2, which is a graphic of data.

19 Q. And that -- that figure and the data
20 underlying it are also part of your workpapers
21 associated with this testimony?

22 MR. KUTIK: Objection. Go ahead.

23 THE WITNESS: I didn't hear the
24 question.

1 BY MR. SOULES:

2 Q. I -- I asked if the data underlying
3 Figure 2 is also part of the workpaper associated
4 with your testimony for this case?

5 A. Oh, I'm not sure what you mean by
6 "workpaper," but there's data behind Figure 2.

7 Q. Okay. That data is graphically
8 represented in Figure 2?

9 A. Yes.

10 Q. Okay. Did you create any other
11 workpapers -- scratch that.

12 Did you -- apart from what we've just
13 discussed, have you created any workpapers associated
14 with your testimony in this case?

15 A. I believe what we've talked about is the
16 extent of my workpapers that I prepared in -- for
17 this testimony.

18 Q. Okay. And you've -- apart from whatever
19 modeling you performed for Attachment LM-2, you
20 performed no economic modeling in preparing your
21 testimony for this case; is that correct?

22 THE WITNESS: Can you repeat the
23 question?

24 (Record read back as requested.)

1 THE WITNESS: All of the analysis for
2 LM-2 was prepared before I was engaged to provide
3 testimony.

4 BY MR. SOULES:

5 Q. And did you perform any economic
6 modeling apart from that modeling in LM-2?

7 A. Yes.

8 Q. And what modeling did you perform?

9 A. What we just discussed on Page 11.

10 Q. Did you perform any other modeling for
11 this case apart from what we described on page --
12 what we discussed on Page 11?

13 A. No.

14 Q. Okay. Those are my questions,
15 Dr. Makovich. Thank you for your time, and I'm
16 finished.

17 MR. KUTIK: Okay. Thank you.

18 Let me go through the parties that I
19 have listed here, the counsel. Ryan O'Rourke, do you
20 have any -- do you have any questions?

21 MR. O'ROURKE: No questions.

22 MR. KUTIK: All right. Rebecca Hussey,
23 do you have questions at this time?

24 MS. HUSSEY: Just a few questions. I do

1 have another brief call, though. I thought we were
2 waiting until after lunch to do the remaining
3 questions.

4 MR. KUTIK: Well, I was trying to get
5 through at least a couple of the ones with shorter
6 time lines.

7 Dylan, are you prepared to go at this
8 time?

9 MR. BORCHERS: I actually no longer have
10 any questions.

11 MR. KUTIK: Okay. Thank you.

12 Larry Sauer.

13 MR. SAUER: David.

14 MR. KUTIK: Are you prepared to go at
15 this time?

16 MR. SAUER: Yeah, I can. I've got a few
17 questions.

18 MR. KUTIK: Okay. Thank you. Why don't
19 you go ahead then.

20 MR. SAUER: Thank you.

21 - - -

22 CROSS-EXAMINATION

23 BY MR. SAUER:

24 Q. Dr. Makovich, my name's Larry Sauer.

1 I'm representing the office of the Ohio Consumers'
2 Counsel.

3 If you could turn to Page 4 of your
4 testimony, Lines 13 to 15.

5 A. Yes.

6 Q. When you're discussing that, sir, are
7 you talking about over what period of time? Is it a
8 long-run analysis?

9 A. What do you mean by "long-run analysis"?

10 Q. Well, your statement is, "Without a
11 surplus of generating capacity, it is economic to
12 retire a power plant when the cost of continued
13 operation exceeds the cost of closing the plant and
14 replacing it with the lowest cost source of
15 equivalent power supply."

16 Trying to understand if that analysis
17 takes place over a short run or a long run, or could
18 it be both?

19 A. Well, the timeframe here involves the
20 life of the assets being considered.

21 Q. So that would be long run then?

22 A. Yes. To the extent that long run means
23 that all of the ver- -- all of the inputs here on the
24 replacement costs are avoidable, then I'd say it's

1 best to characterize this as a long-run assessment.

2 Q. Okay. I'm sorry if this is a repeat of
3 what Mr. Soules had asked you. On Lines 19 and 20
4 you're talking about, "Wind and solar resources are
5 not realistic substitutes..."

6 Did I hear you say that the natural gas
7 combined-cycle unit would be a realistic substitute
8 as an equivalent power supply source?

9 A. Yes.

10 Q. Thank you. There were some questions on
11 Page 5 regarding your analysis pertaining to the
12 current diversified portfolio of US power supplies.
13 I think the questions were something along the lines
14 of is it realistic that there would be no meaningful
15 coal generation in Ohio in the next 10 years. Did
16 you say you didn't have an answer for that?

17 A. My testimony was that I have not put a
18 probability on that.

19 Q. Okay. And that was the same with
20 nuclear as well?

21 A. Yes.

22 Q. And the -- the purchase power
23 arrangement in this case is a 15-year term. Do you
24 understand that?

1 A. Yes.

2 Q. What would be your understanding of the
3 purchase power arrangement if there was -- if the
4 Sammis plant was no longer generating power due to a
5 retirement?

6 MR. KUTIK: May I have the question
7 read, please?

8 (Record read back as requested.)

9 THE WITNESS: As I've testified, I don't
10 have any knowledge of the specific terms and
11 conditions of the contract.

12 BY MR. SAUER:

13 Q. Okay. If the Sammis plant were to be
14 retired during the 15-year term of the purchase power
15 arrangement and replaced with a natural gas
16 combined -- a combined-cycle natural gas facility,
17 would -- I'm sorry. Strike that question.

18 In your analysis of the US diversified
19 power supply, did you -- did you look at the
20 diversification of Ohio's power supply?

21 A. As I testified, the analysis was done
22 for the existing supply at an interconnection level.

23 Q. What factors were you considering, or
24 how did you arrive at the \$93 billion number that

1 appears on Line 8 on Page 5 of your testimony?

2 MR. KUTIK: Objection.

3 THE WITNESS: Can you rephrase the
4 question as to what you mean by "factors"?

5 BY MR. SAUER:

6 Q. You state that "...the current
7 diversified portfolio of US power supply lowers the
8 cost of generating electricity by more than \$93
9 billion per year compared to a less diverse
10 portfolio..."

11 How do you arrive at the \$93 billion
12 number?

13 A. By quantifying the counterfactual and
14 looking at the difference.

15 Q. And what are the counterfactuals that
16 you're looking at?

17 A. What the United States would have looked
18 like in 2010, '11 and '12 with the less diverse power
19 generation portfolio.

20 Q. Would you consider the US power supply
21 to be less diverse if the Sammis plant would be
22 retired and be replaced by a natural gas
23 combined-cycle unit?

24 A. My testimony is that the objective of

1 the study was not to maximize diversity, but it was
2 to assess the cost effectiveness of the existing
3 generation mix.

4 Q. Could you do that analysis on an
5 individual plant-by-plant basis?

6 A. Yes.

7 Q. And did you do any such analysis in
8 preparation of this case?

9 A. No.

10 Q. When -- if you could turn to Page 10 of
11 your testimony.

12 A. Yes.

13 Q. I'm looking at the statement on
14 Page 5 -- Lines 5 and 6, it says, "...the price
15 suppression from renewable power mandates causes the
16 price to clear at a negative level within the PJM
17 system, as shown in Figure 2."

18 I guess what I'm asking is you show a
19 negative 55 megawatt hour minimum. Was that over the
20 11 hours you're talking about, the negative hours?

21 A. No.

22 Q. Does the figure show that during this
23 period of time, is this a -- is this a full 13 months
24 or is it a 12-month chart on Figure 2?

1 A. It's a 12-month chart.

2 Q. Okay. And for that 12-month period, are
3 you saying that there were 11 hours that were
4 negative?

5 A. Yes.

6 Q. And the lowest negative figure was at
7 negative 55?

8 A. Dollars per megawatt hour, yes.

9 Q. Uh-huh. And that that is caused by
10 renewable power mandates?

11 A. Yes.

12 Q. And that's the only factor that's
13 driving that?

14 MR. KUTIK: Objection.

15 THE WITNESS: The renewable -- my
16 testimony is the renewable power mandates are the
17 primary cause of these negative prices.

18 BY MR. SAUER:

19 Q. What could the other causes of the
20 negative pricing --

21 A. In a -- in a power system with lots of
22 hydro in a very wet year, we might be able to create
23 a situation like this. That's an example.

24 Q. Any other examples that you can think

1 of?

2 A. Not offhand.

3 Q. Okay. Thank you, Dr. Makovich. That's
4 all the questions I have for you today.

5 MR. KUTIK: Okay. Let's go off the
6 record.

7 (Discussion held off the record.)

8 (Luncheon recess.)

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1 Wednesday Afternoon Session,
2 May 27, 2015.

3 - - -

4 MR. KUTIK: Rebecca, are you ready to
5 go?

6 MS. HUSSEY: I am.

7 MR. KUTIK: Let's go back on the record.

8 MS. HUSSEY: Thank you.

9 - - -

10 CROSS-EXAMINATION

11 BY MS. HUSSEY:

12 Q. Dr. Makovich, could you please turn to
13 Page 3, Line 4 to 5 of your testimony?

14 A. Yes.

15 Q. And I'm summarizing, but there you
16 testified of the Economic Stability Program, among
17 other things, will prevent the plant from retiring
18 before it's economic to do so; is that correct?

19 A. Yes.

20 Q. Okay. To your understanding, who will
21 make the choice about whether the plants that are
22 implicated by the Economic Stability Plan will be
23 retired?

24 THE WITNESS: Would you read that

1 question back, please?

2 (Record read back as requested.)

3 THE WITNESS: That would be the plant
4 owners.

5 BY MS. HUSSEY:

6 Q. Okay. And different places throughout
7 your testimony -- I guess, please refer to Page 3,
8 Line 17. We're talking about effective -- or excuse
9 me, efficient power supply. So on Page 3, Line 17,
10 could you tell me what you mean by "efficient power
11 supply"?

12 A. Yes.

13 Q. Could you please do so?

14 A. As I've testified, the objective is to
15 provide electricity customers with the power that
16 they want when they want it with a cost-effective mix
17 of peaking, cycling, and baseload technologies.

18 Q. Okay. And two lines further down on
19 Line 19, you refer to cost-effective power supply
20 portfolio.

21 A. Yes.

22 Q. Please tell me what you mean by "cost
23 effective."

24 A. It's a power supply portfolio where the

1 economic tradeoffs between peaking, cycling, and
2 baseload plants have been made appropriately.

3 Q. Okay. In different places throughout
4 your testimony, and would that be attached to your
5 testimony as LM-2, you refer to fuel diversity or
6 fuel supply diversity. Could you share with me what
7 your definition of diversity is?

8 MR. KUTIK: Objection.

9 THE WITNESS: Well, the simple
10 explanation is not to have all your eggs in one
11 basket.

12 BY MS. HUSSEY:

13 Q. Okay. And could you maybe elaborate a
14 little bit about exactly what you mean by that?

15 A. The study we performed showed that it
16 was valuable to have the existing mix of generating
17 technologies and fuels in US power supply compared to
18 a less diverse mix.

19 Q. And a less diverse mix that you're
20 referring to was presented in your reduced diversity
21 case; is that correct?

22 A. Yes.

23 Q. Okay. And I have a clarification with
24 regard to a response that you gave to Mr. Soules

1 earlier about fuel supply diversity. So in LM-2, as
2 we just discussed, you and your team advanced a
3 reduced diversity case in which no coal or nuclear
4 generation was included; is that correct?

5 THE WITNESS: Could you read that back
6 for me?

7 THE COURT REPORTER: I was going to ask
8 her to repeat that question. I think she broke up.

9 MR. KUTIK: Could you repeat the
10 question, please?

11 BY MS. HUSSEY:

12 Q. Sure. In LM-2 you and your team
13 advanced a reduced diversity case in which no coal or
14 nuclear generation was included; is that accurate?

15 MR. KUTIK: I'm sorry, what were the
16 first couple words of that? I really didn't hear
17 that.

18 (Record read back as requested.)

19 MR. KUTIK: Is that what you said?

20 BY MS. HUSSEY:

21 Q. Advanced a reduced diversity case.

22 A. I believe I previously testified about
23 the nature of the reduced diversity case by reading
24 its description from Page 5 of LM-2.

1 Q. Okay. And summarizing, in the reduced
2 diversity case, no coal or nuclear generation was
3 included, correct?

4 A. Yes.

5 Q. Okay. And I believe you also testified
6 earlier that you do not believe that coal or nuclear
7 generation will be entirely eliminated as fuel supply
8 sources for at least the next 10 years; is that
9 accurate?

10 A. No. I said that I hadn't put a
11 probability on the next 10 years.

12 Q. Okay. And was that specifically with
13 regard to the PJM zone?

14 A. I don't remember the exact nature of the
15 question, whether it was PJM or whether it was the
16 entire United States.

17 Q. Okay. I thought, and please correct me,
18 I thought that you had said that you didn't put a
19 probability on the next 20 years, but that at 10
20 years you believe that there would still be coal or
21 nuclear generation as a fuel supply source in the PJM
22 zone.

23 MR. KUTIK: Well, his testimony is what
24 it is. So what is your question?

1 MS. HUSSEY: I'm trying to clarify.

2 MR. KUTIK: Well, that's not a question;
3 you just made a statement.

4 MS. HUSSEY: I asked him if it was
5 accurate.

6 MR. KUTIK: Well, I'll object,
7 mischaracterizes his testimony. Go ahead.

8 THE WITNESS: Could you repeat your
9 question, please?

10 BY MS. HUSSEY:

11 Q. Sure. Okay. From what I understood
12 from your testimony earlier, I believe that you did
13 not -- you said that you don't believe coal or
14 nuclear generation will be entirely eliminated as
15 fuel supply sources in PJM for at least the next 10
16 years; is that correct, or no?

17 A. I did not assign a probability to it,
18 but I think there's a low probability that we -- of
19 no nuc and coal in 10 years.

20 Q. Okay. Thank you.

21 And so I believe you also testified that
22 the reduced diversity case has a lower level of
23 probability in the PJM zone; is that correct?

24 MR. KUTIK: Objection.

1 THE WITNESS: Yeah. I -- I'm not sure
2 what you're referring to there.

3 BY MS. HUSSEY:

4 Q. Okay. It's my understanding that the
5 PJM zone, excuse me, as a reduced diversity case, it
6 consists of a fuel supply diversity where no nuclear
7 or coal-fired generation appears; is that correct?

8 A. That's part of the reduced diversity
9 case, yes.

10 Q. Okay. And I believe you just told me
11 that you did not -- that there was a low probability
12 that in the next 10 years coal and nuclear generation
13 would be entirely eliminated in fuel supply sources
14 in PJM, correct?

15 A. Yes.

16 Q. Okay. So then the 25 percent increase
17 in retail power prices that your team calculated
18 under the reduced diversity case would not apply in
19 PJM?

20 A. I did not testify to that, no.

21 Q. I'm asking you that now.

22 MR. KUTIK: Well, he's given you the
23 answer, it's no.

24 BY MS. HUSSEY:

1 Q. Okay. And if there is going to be coal
2 and nuclear power supply in PJM in the next 10 years,
3 would a 25 percent increase in retail power prices
4 still stand for the PJM zone?

5 A. On Page 36 of LM-2, I've included
6 graphics that show the progression one might expect
7 as you move from the current mix to the reduced
8 diversity case.

9 Q. Okay. And given those graphics and
10 given what you know about PJM, what would be
11 representative then of PJM?

12 A. As I've testified, the assessments were
13 done on an interconnection level; so I did not
14 specifically analyze PJM on its own.

15 Q. Okay. So in correlation then, the 25
16 percent increase that you've predicted in resale
17 power prices doesn't necessarily represent PJM on its
18 own?

19 A. That is an aggregate number for the
20 United States.

21 Q. Okay. Thank you.

22 You also referred to the missing money
23 problem throughout your testimony in LM-2. I
24 wondered, in your estimation, how long has the

1 missing money problem been ongoing in the context of
2 competitive power markets?

3 A. In my estimation, it's been there from
4 the very start.

5 Q. If you could turn to Page 15, Line 22.

6 A. Yes.

7 Q. You refer to an efficient market test.
8 Could you please explain what you mean by "efficient
9 market test"?

10 A. Yes.

11 Q. Okay. Would you please go ahead and do
12 so.

13 A. The comparison that we've provided with
14 regard to the going-forward costs of an existing
15 plant and the cost to replace that plant with the
16 lowest-cost source of equivalent power supply.

17 Q. You referred to wind and solar
18 technology on Page 7 of your testimony. In your
19 estimation, do wind and solar generation technologies
20 add value to the power system?

21 MR. KUTIK: Objection.

22 THE WITNESS: Where in particular on
23 Page 7 are you referring?

24 BY MS. HUSSEY:

1 Q. You generally refer to wind and solar
2 technologies on Lines 13 and 14 and in other places
3 throughout your testimony. I wondered broadly if
4 wind and solar generation technologies, in your
5 opinion, add value to the power system?

6 MR. KUTIK: Objection.

7 THE WITNESS: On Line 13 and 14, I was
8 not providing an assessment of the value of wind and
9 solar technologies. I was providing an example of
10 technologies with low or virtually zero marginal
11 costs in a competitive situation.

12 BY MS. HUSSEY:

13 Q. Okay. Perhaps I was confused. If you
14 could just set the reference to 13 -- Line 14 -- 13
15 and 14 or 14 and 15, and just generally answer for me
16 whether you believe wind and solar technologies add
17 value to the power system?

18 MR. KUTIK: Objection.

19 THE WITNESS: It would depend on the
20 characteristics of the power system.

21 BY MS. HUSSEY:

22 Q. Okay. In the PJM zone as it currently
23 stands, do you believe that wind and solar generation
24 technologies add value?

1 MR. KUTIK: Objection.

2 THE WITNESS: I've not performed this
3 assessment to be able to tell you whether they add
4 value or not.

5 BY MS. HUSSEY:

6 Q. Okay. On Page 12, Line 9, you make
7 reference to exceptional assets.

8 A. Yes.

9 Q. And I wondered in your estimation if any
10 generation assets other than coal or nuclear
11 generating units would qualify as exceptional assets.

12 A. Yes.

13 Q. Okay. And what type of assets would
14 those be?

15 A. As I said, the objective of giving
16 customers the electricity they want when they want it
17 requires a mix of peaking, cycling, and baseload
18 units, and these units need to be running at -- and
19 meeting the cost and performance characteristics.

20 Q. Okay. So if those qualifications are
21 met, is it your opinion that any type of generating
22 asset might qualify as an exceptional asset?

23 A. No.

24 Q. Okay. Could you explain why not?

1 A. Some generating assets, regardless of
2 how well they run, would not be part of a
3 cost-effective power supply portfolio.

4 Q. And that's based upon what?

5 A. It would be based upon the cost and
6 performance characteristics of the technology.

7 Q. Okay. Thank you very much.

8 MR. KUTIK: Okay. Joe Oliker, are you
9 on the phone?

10 MR. OLIKER: Dave, I'm on the phone, but
11 if there's somebody else that is ready to go, I would
12 prefer to go that way.

13 MR. KUTIK: All right. Madeline
14 Fleisher.

15 MS. FLEISHER: Yes, I can go.

16 - - -

17 CROSS-EXAMINATION

18 BY MS. FLEISHER:

19 Q. Mr. Makovich, my name is Madeline
20 Fleisher. I represent the Environmental Law & Policy
21 Center. I hope you can hear me okay.

22 A. Yes.

23 Q. Great. So is it your opinion that all
24 plant closures in PJM are due to the missing money

1 problem?

2 A. No.

3 Q. And what other causes could there be for
4 plant closures within PJM?

5 A. As I've testified, there are cases where
6 the going-forward costs exceed the replacement costs,
7 in which case it would be an economic retirement.

8 Q. And can you determine for the Sammis and
9 Davis-Besse and OVEC plants which category this would
10 fall into?

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

13 THE WITNESS: Based on the testimony of
14 Don Moul, these plants are economic to continue to
15 operate.

16 BY MS. FLEISHER:

17 Q. And what's your understanding of what
18 Mr. Moul identified as the least cost alternative
19 supply?

20 A. My understanding is the future market
21 price projection was at a level to cover the cost of
22 new entry.

23 Q. Are you -- which market price projection
24 are you referring to there?

1 A. Don Moul's direct testimony, Page 2,
2 Line 20. It begins on Line 20 where he refers to
3 Witness Rose's forecast that market prices for energy
4 and capacity will increase over time.

5 Q. Pardon. I just want to pull that up to
6 make sure we're in the same place.

7 And so you're just basing it on that
8 portion of Mr. Moul's testimony?

9 A. No.

10 Q. What other portions are you basing your
11 conclusion on?

12 A. Page 5 of Don Moul's direct testimony,
13 beginning on Line 4, he says: Specifically, these
14 units satisfy important policy goals of fuel
15 diversity and promoting baseload units with
16 significant on-site fuel capacity.

17 Q. And how does that relate to the question
18 of the going-forward costs of these plants versus the
19 cost of alternative supply?

20 MR. KUTIK: Objection.

21 THE WITNESS: The alternative supply
22 will affect fuel diversity and on-site fuel supply.

23 BY MS. FLEISHER:

24 Q. I guess I'm a little confused here. I

1 was asking you about which portions of Mr. Moul's
2 testimony you relied upon to conclude that the
3 going-forward costs of the -- that the Sammis,
4 Davis-Besse, and OVEC plants are greater than the
5 cost of alternative supply. I guess can you explain
6 to me how this portion on Page 5 relates to that?

7 A. Further down on Page 5, Line 12, Don
8 Moul testifies, "Retirement of the Plants could also
9 mean that customers are forced to pay significantly
10 more for energy, for transmission upgrades...and
11 eventually for the construction of new baseload
12 plants through higher capacity costs."

13 Q. Okay. So just to make sure I'm
14 understanding you correctly, you're saying that you
15 relied on Mr. Moul's references to potential
16 transmission costs and costs for construction of new
17 baseload plants?

18 A. I've testified I relied on that section
19 that I read to you on Page 5 of Don Moul's direct
20 testimony.

21 Q. Okay. Do you know if Mr. Moul
22 considered in his analysis the potential for
23 demand-side resources to decrease the cost required
24 for either -- well, let's start with transmission

1 upgrades?

2 A. I cannot speak for Don Moul and what he
3 did or did not include.

4 Q. Okay. And in firm, do you know if
5 Mr. Moul considered the potential for demand-side
6 resources to address the cost for the construction of
7 new baseload plants referenced in his testimony here?

8 A. Again, that's a question that's
9 appropriate for -- for Don Moul.

10 Q. Okay. Let's turn -- can we turn to
11 Page 9 of your direct testimony, Figure 1.

12 A. Yes.

13 Q. And I guess just an aside for a moment.
14 Are you aware that PJM conducted a study issued in
15 2014 looking at renewable integration costs?

16 A. I'm aware that PJM has done integration
17 studies for renewables. I can't testify specifically
18 to the dates.

19 Q. Okay. Just without referencing any
20 specific date, is there a reason you didn't include
21 the PJM studies that exist in your analysis here?

22 A. As I've testified, this analysis was
23 conducted by Brooks, and it's compilations of studies
24 that Brooks had collected.

1 Q. Okay. And you didn't independently look
2 at any other study?

3 A. I've testified that I have looked at
4 integration studies in the past.

5 Q. Okay. And is there a reason you
6 didn't -- you relied solely on the Brooks study here?

7 A. Yes.

8 MR. KUTIK: Objection. Go ahead.

9 BY MS. FLEISHER:

10 Q. Please answer.

11 A. It's an example of a collection of
12 studies showing positive integration costs for wind.

13 Q. And do you believe that this figure, I
14 guess I'll call it, necessarily reflects integration
15 costs for renewables in PJM?

16 A. I have no reason to expect that PJM is
17 much different.

18 Q. Okay. But you didn't look at that
19 PJM -- PJM studies to compare?

20 MR. KUTIK: Objection, mischaracterizes
21 his testimony. Go ahead.

22 THE WITNESS: As I've testified, in the
23 past, I have looked at integration studies from
24 different power systems.

1 BY MS. FLEISHER:

2 Q. For purposes of this testimony in this
3 case, did you compare the existing PJM renewable
4 integration study to the studies referenced in this
5 figure?

6 A. No.

7 Q. Okay. And can we turn back to Page 4 of
8 your testimony, Line 13 through 15. It's been read
9 before, but, "Without a surplus of generating
10 capacity, it is economic to retire a power plant when
11 the cost of continued operation exceeds the cost of
12 closing the plant and replacing it with the lowest
13 cost source of equivalent power supply."

14 Do you know whether there's a surplus of
15 generating capacity in PJM currently?

16 A. I -- I don't have the PJM reserve
17 margins in front of me to tell you the degree of
18 reserve margin in PJM right now.

19 Q. Okay. Did you -- I guess just to -- did
20 you look at the question in preparing this testimony
21 of whether PJM has a surplus of generating capacity?

22 A. My understanding of PJM is that we do
23 not have a serious problem of surplus-generating
24 capacity.

1 Q. What does serious problem mean?

2 A. Meaning that it would alter this
3 statement as being applicable.

4 Q. Okay. And the -- I'm trying not to
5 repeat what others have done. Can we go to Page 36
6 in exhibit -- Attachment LM-2 to your testimony?

7 A. Yes.

8 Q. I'm looking at Figure 25, and to
9 paraphrase, I believe you described this to
10 Ms. Hussey as showing the progression from a base
11 case to your load diversity case of the average
12 wholesale power price; is that correct?

13 A. Yes.

14 Q. And do you have any basis for assuming
15 that it's a linear progression?

16 MR. KUTIK: Objection.

17 THE WITNESS: Yeah, I have no basis to
18 assume it's not.

19 BY MS. FLEISHER:

20 Q. Okay. Do you have any basis for
21 assuming it is?

22 A. It's not an assumption. What I'm trying
23 to show is moving away from a cost-effective
24 generation mix is a matter of degree.

1 Q. Okay. I guess I'm trying to flesh that
2 out a little bit. Does that mean, you know, if
3 you're -- sorry. Let me pick out a couple points
4 here.

5 So you're not saying that, you know, any
6 particular point on this -- one of these lines, that
7 that is, in fact, the quantitative degree of the
8 effect on wholesale prices?

9 A. I'm not sure. Can you rephrase your
10 question?

11 Q. Sure, I guess. So if you look at, you
12 know, let's say on the X axis, there's the 10
13 standard deviation hash mark. You follow that out to
14 the -- on the East line, then that -- the East line,
15 that would be, I'm estimating here, about an average
16 wholesale price of \$45 per megawatt hour.

17 Does your analysis in this report
18 indicate that that would, in fact, be the wholesale
19 price at that mix of diversity?

20 A. What the graphic shows is that the value
21 of the current diversity in power supply will change
22 as you move towards the less diverse case, and it
23 will change more for some regions than others, and
24 that the loss of the value is a matter of degree

1 given the direction we're moving in.

2 Q. Okay. But your analysis doesn't address
3 the magnitude of that case?

4 MR. KUTIK: Objection, asked and
5 answered.

6 THE WITNESS: I did not say that.

7 BY MS. FLEISHER:

8 Q. Now, have you -- getting back to the
9 missing money problem, have you done any analysis of
10 preferred policy solutions for addressing the missing
11 money problem?

12 MR. KUTIK: Objection.

13 THE WITNESS: Can you read back that
14 question?

15 (Record read back as requested.)

16 THE WITNESS: I'm not sure what you mean
17 by "preferred."

18 BY MS. FLEISHER:

19 Q. Or have you offered any recommended
20 policy solutions as part of your work with IHS to
21 address the missing money problem?

22 A. Yes.

23 Q. Can you describe what that solution or
24 those solutions are?

1 A. In Attachment LM-1, under my Selected
2 Publications, in October of 2014 what's listed as
3 No. 2 was a report on "Bridging the Missing Money
4 Gap: Assessing alternative approaches," which we
5 looked at the different approaches to addressing this
6 problem.

7 Q. And since I don't have that report in
8 front of me, can you offer a brief description of
9 what alternative approaches you endorsed in that
10 report?

11 A. The report evaluated 13 different
12 approaches and broke the approaches into the group of
13 eight that could work under the right circumstances,
14 and the remaining five were not likely to work well
15 under any circumstances.

16 Q. And of the eight that you believed would
17 work under the right circumstances, do you believe
18 any of those would be applicable to PJM?

19 A. Yes.

20 Q. Can you describe what those are?

21 A. PJM employs a formal-forward capacity
22 market, which was one of the eight, and this proposal
23 for a long-term contract is also one of the eight
24 that can work.

1 Q. Are there any others?

2 A. Yes.

3 Q. Can you describe them, please?

4 A. Well, the report goes through in
5 exhaustive detail all 13 ranging from, as I
6 mentioned, the capacity markets to the contracts, as
7 well as others.

8 Q. Apologies, I don't mean to cut you off.
9 I was looking for whether, besides the formal
10 capacity market and the proposal for a long-term
11 contract, there were any approaches that you -- that
12 the report recommended that would be appropriate for
13 PJM.

14 A. I did not make specific recommendations
15 in the report for PJM.

16 Q. Okay. Were there any that -- other
17 approaches besides a forward capacity market and a
18 long-term contract that were recommended in general?

19 A. As I said, there were eight that we
20 deemed had a high probability of being able to
21 address the missing money problem under the right
22 conditions.

23 Q. Okay. So that's two. What were the
24 other six?

1 A. I don't have the report in front of me
2 here, but it included things like administratively
3 set capacity payments, administratively set energy
4 price adders, economic withholding. Again, without
5 this in front of me here, I don't want to presume I
6 can give you all 13 accurately.

7 Q. I can only ask you to do your best.
8 Okay. So I have now five; capacity market, long-term
9 contract, administratively set capacity payments,
10 administratively set energy price adders, economic
11 withholding. Can you remember any of the other three
12 from the list of eight recommended approaches?

13 A. I just -- at this time I cannot
14 remember.

15 Q. Okay. And do you know, has that report
16 been produced to any of the parties in discovery?

17 A. I do not know.

18 Q. Okay. Do you happen to know if it's
19 publicly available?

20 A. It's not publicly available.

21 Q. Okay. Of the recommended approaches you
22 recall, do you know if any of them are being
23 considered for implementation in PJM?

24 A. Well, as I have testified, PJM has a

1 formal-forward capacity market, which is one of the
2 approaches to address one dimension of the missing
3 money problem.

4 Q. And do you know whether PJM is
5 considering any other approaches?

6 A. I cannot speak for PJM.

7 Q. Give me one second. I'm just trying to
8 find a particular reference in your testimony. Okay.
9 Here we are. On Page 12 of your testimony when
10 you -- Lines 7 to 8 you say, "The missing money
11 problem is a problem left for PJM and other markets
12 to sort through and attempt to correct."

13 When you say that, what do you believe
14 is the right approach for PJM to take to this issue
15 that you've identified?

16 A. The purpose of our study in the missing
17 money was to find the problem in its two dimensions
18 and discuss the approaches that people take.

19 Q. Okay. And are you aware that the
20 utility, American Electric Power, has proposed a
21 power purchase agreement similar to FirstEnergy for
22 approval by the Public Utilities Commission of Ohio?

23 MR. KUTIK: Objection.

24 THE WITNESS: Yes.

1 BY MS. FLEISHER:

2 Q. Do you believe both PPAs would be
3 necessary to address the missing money problem?
4 Let's leave it there.

5 MR. KUTIK: Objection.

6 THE WITNESS: I would need more
7 information to answer your question.

8 BY MS. FLEISHER:

9 Q. Okay. What other information would you
10 need?

11 A. I'd need to know what power plants we're
12 talking about, for example.

13 Q. Okay. And you would need information on
14 the costs and cost effectiveness of power plants, for
15 example?

16 A. No. What I said is I need to know what
17 the plants are and what type they are.

18 Q. Okay. And is that, in effect, the
19 relevance to the supply diversity issue you
20 discussed?

21 A. Supply diversity would be one thing to
22 consider, as well as the role; peaking, baseload, or
23 cycling.

24 Q. Is there a limit to the number of

1 megawatts or amount of coal and nuclear generation
2 that would be needed through a PPA to provide the
3 supply diversity benefit you've described?

4 A. I don't believe there's an absolute
5 limit.

6 Q. Is there a minimum amount?

7 A. A minimum amount of what?

8 Q. Of -- of -- amount of -- let's talk
9 about coal for a minute. Is there a minimum amount
10 of coal generation that would be needed to provide
11 the supply diversity benefit you've discussed?

12 A. I have not provided testimony regarding
13 any minimum shares.

14 Q. So given a particular proposal such as
15 this one, how would you determine whether that
16 proposal is needed to support supply diversity?

17 THE WITNESS: Can you read that question
18 back, please?

19 (Record read back as requested.)

20 MR. KUTIK: Objection, asked and
21 answered.

22 THE WITNESS: The study we conducted
23 established that there's considerable value to the
24 existing portfolio -- diverse portfolio of power

1 supply, and that current trends are moving us to lose
2 that.

3 BY MS. FLEISHER:

4 Q. And when you say "the existing
5 portfolio," you mean the national generation mix that
6 you exhibit in your study?

7 A. No.

8 Q. What do you mean?

9 A. That -- I'm talking about the existing
10 diversity in power supply portfolios in the regional
11 US power markets.

12 Q. Okay. How does your study show the
13 region for -- let's back up a second. When you say
14 "regional," you mean region such as PJM?

15 A. Yes.

16 Q. Okay. And where does your study
17 describe the benefits of the PJM generation mix?

18 A. The study I conducted was done at an
19 interconnection level, and demonstrated an approach
20 to quantify the current value of diversity.

21 Q. Did you apply that approach to PJM?

22 A. As I previously testified, I have not
23 done a specific analysis of PJM.

24 Q. And to get back to the question I was

1 asking you before: Given your study, how would you
2 apply that approach to determine how much diversity
3 you need to retain to get the benefits that you
4 discussed?

5 MR. KUTIK: Objection, asked and
6 answered.

7 THE WITNESS: As I said, I have not
8 conducted a specific study to recommend a particular
9 generation mix.

10 BY MS. FLEISHER:

11 Q. I guess I'm saying how would you conduct
12 that study -- how would you apply your study to
13 determine an appropriate generation mix for a region?

14 MR. KUTIK: Objection, asked and
15 answered.

16 THE WITNESS: The study demonstrated an
17 approach to quantifying the current value of power
18 supply diversity by analyzing the counterfactual over
19 a historic timeframe.

20 BY MS. FLEISHER:

21 Q. And does your approach enable analyzing
22 the counterfactual other than your reduced diversity
23 case?

24 MR. KUTIK: Objection.

1 THE WITNESS: Someone could devise a
2 different counterfactual and analyze it in a similar
3 way.

4 BY MS. FLEISHER:

5 Q. Okay. Wait a second. I think I'm
6 almost done here, but I just want to see if I have a
7 couple more questions.

8 (Pause.)

9 If we can just turn -- just another
10 question or two here -- Page 19 of Attachment LM-2
11 directly under the heading "Diversity: The
12 substitution effect," it reads, "A varied portfolio
13 mitigates power production cost risk because fuel
14 diversity provides the flexibility to substitute one
15 source of power for another in response to relative
16 fuel price changes."

17 Do I understand correctly that there is
18 value in flexibility available to switch between
19 different types of power supply?

20 A. Yes.

21 Q. And might that -- do I understand
22 correctly that flexibility would be useful if, for
23 instance, the cost of a particular type of generation
24 rose?

1 A. I'd have to have more information to
2 answer that question.

3 Q. If the price of coal generation were to
4 rise in response to EPA regulation of carbon dioxide,
5 would there be value in being able to switch to other
6 types of generation?

7 A. That's a hypothetical that -- I don't
8 know what other conditions exist.

9 Q. Okay. All else being equal, if that
10 were the hypothetical condition?

11 A. All else being equal to what base?

12 Q. To current-day generation in PJM.

13 A. So what's the question?

14 Q. Is there value to preserving the
15 flexibility between different types of generation --
16 to switch between different types of generation in
17 PJM?

18 A. I believe my testimony is clear that a
19 varied portfolio of fuels and technologies provides
20 the opportunity to take advantage of relative fuel
21 cost changes.

22 Q. Okay. But just to go back to the actual
23 statement, to substitute one source of power for
24 another or provide the flexibility to substitute one

1 source of power for another; is that correct?

2 MR. KUTIK: May I have the question
3 read?

4 THE WITNESS: Yeah. Can we read the
5 question back?

6 (Record read back as requested.)

7 MR. KUTIK: I object.

8 THE WITNESS: Can you restate that
9 question, please?

10 BY MS. FLEISHER:

11 Q. Sure. So you have referred the first
12 part saying that -- of that saying a varied portfolio
13 mitigates power production off grid -- actually,
14 scratch that.

15 I guess I was just looking for your
16 confirmation that the -- the value you're identifying
17 here in terms of the substitution effect is the
18 ability to actually substitute and the flexibility to
19 substitute between alternative generation resources;
20 is that correct?

21 A. What I've talked about here was the
22 ability to substitute one source of power for another
23 in response to relative fuel price changes.

24 Q. Okay. And would the proposed PPA affect

1 that flexibility?

2 A. Yes.

3 Q. How so?

4 A. By having diverse sources of power
5 supply, you have the capability of changing
6 utilization response to relative fuel price changes.

7 Q. Okay. Just one last question, which is:
8 You believe that the goal within PJM should be to
9 maintain the current generation mix?

10 A. That's not my testimony.

11 Q. So you don't believe it's necessary to
12 maintain the current generation mix within PJM?

13 A. I didn't testify to that, either.

14 Q. Have you considered whether it's
15 necessary to maintain the current generation mix
16 within PJM?

17 A. My testimony is that one needs to
18 consider the value of fuel and technology diversity
19 in the existing mix in assessing changes.

20 Q. Okay. That's all I have. Thank you.

21 MR. KUTIK: Okay. Mike Settineri.

22 MR. SETTINERI: Just for the record,
23 because I jumped on a little late, I'll just make
24 sure we have an official notice of appearance.

1 Michael Settineri with the law firm of Vorys, Sater,
2 Seymour & Pease on behalf of the PJM Power Providers
3 Group, Electric Power Supply Association, and the
4 Retail Energy Supply Association.

5 - - -

6 CROSS-EXAMINATION

7 BY MR. SETTINERI:

8 Q. Good afternoon, Dr. Makovich. One minor
9 detail I assume: Is it appropriate to call you
10 Dr. Makovich?

11 A. Yes.

12 Q. Okay. Just making sure. Sometimes
13 people prefer not to.

14 I was looking at Attachment LM-1, and
15 just a quick question: How many times have you
16 testified before Congress?

17 A. Three times.

18 Q. And those are the dates listed on
19 Attachment LM-1, correct?

20 A. Yes.

21 Q. Okay. Thank you.

22 I'm going to jump around a little bit
23 here, but I'll try to move along. Let me ask you
24 this question: If we assume that FES is not going to

1 retire the plant -- and when I say "FES," I'm
2 referencing FirstEnergy Solutions.

3 If we assume FES is not going to retire
4 the plants, regarding whether the ESP is approved, is
5 there any reason to implement the ESP program, in
6 your opinion?

7 MR. KUTIK: Objection.

8 THE WITNESS: The -- well, as I said,
9 I've relied on Don Moul's testimony in this regard,
10 which is that I can't assume they're not going to
11 retire the plant.

12 BY MR. SETTINERI:

13 Q. Are you done answering?

14 A. Yes.

15 Q. Okay. And I'm going to go back, though,
16 because I am asking you a hypothetical: If the
17 plants do not retire, regardless whether the ESP is
18 approved -- let me rephrase that.

19 Again, assuming FES is not going to
20 retire the plants, regardless whether the ESP is
21 approved, is there any reason to implement the ESP
22 program?

23 MR. KUTIK: Objection.

24 THE WITNESS: There may be.

1 BY MR. SETTINERI:

2 Q. And what would that reason or reasons
3 be?

4 A. Well, my testimony isn't about this
5 hypothetical case where it's not going to be retired
6 and an assessment of that, the benefits of this
7 contract in that case. I'm assessing what I've been
8 asked to look at, which is that there is a
9 possibility here of retirement.

10 Q. And I understand that, Dr. Makovich.
11 But I'm not asking you what you are testifying to
12 here with that question. I'm asking you: Based on
13 that assumption that I gave you, is there any reason
14 to implement the ESP program, and you indicated that
15 there would be a reason.

16 So my follow-up question to you then is:
17 What is that reason?

18 A. I said there may be a reason.

19 Q. And, again, what would that reason be?

20 A. I can only give you an example and not
21 an exhaustive list of reasons.

22 Q. Well, let's start with the first one.
23 What would the reason be?

24 A. If such a contract were in place and

1 natural gas prices went on another upward cycle, then
2 the benefit of that would accrue to the customers.

3 Q. And how would that benefit accrue to the
4 customers?

5 A. If a runup in gas prices created a
6 dramatic runup in the wholesale price of electricity,
7 this contract would protect customers from that price
8 volatility.

9 Q. And for those retail customers that may
10 have long-term contracts -- when I say "long-term,"
11 let's say up to three-year contracts for retail
12 energy supplies -- would they receive that protection
13 or that benefit?

14 A. It would depend on the terms and
15 conditions of those contracts.

16 Q. Any other reasons to implement the ESP
17 program if FES is not going to retire the plant
18 regardless whether the ESP is approved?

19 A. As I said, there may be.

20 Q. And you gave me one. Any others that
21 come to mind?

22 A. As I said, I haven't thought through
23 your hypothetical to be able to give you a
24 comprehensive list of the reasons.

1 Q. Let's go to Page 6 of your testimony.

2 The first question on the top of the page, "What is
3 the 'missing money' problem?" I just want to ensure
4 that I fully understand that answer.

5 Looking at Line 10 and 11, you indicate,
6 "There are two root causes of the missing money
7 problem." First, and I'm going to paraphrase, is
8 that certain technologies have inherent
9 characteristics that prevent markets from delivering
10 prices high enough to balance demand supply.

11 Are you referencing there the -- that
12 prices are generally too low to generate new
13 investments in the power markets?

14 A. What I'm referencing is that in an
15 energy-only power market, there will be a shortfall
16 and a resource adequacy problem.

17 Q. So the first root cause relate to
18 investments?

19 MR. KUTIK: Objection, asked and
20 answered.

21 THE WITNESS: I said the root cause of
22 the first dimension comes from the inherent
23 characteristics of the technologies used to provide
24 electricity.

1 BY MR. SETTINERI:

2 Q. And I don't understand that; so I'll
3 have to ask it a different way I guess.

4 You say here, "First, power generation
5 technologies have inherent characteristics..." What
6 are those inherent characteristics?

7 A. I provided the example of the extreme
8 case of -- of wind and solar that are technologies
9 that have zero marginal costs. As a result, in a
10 competitive market you'll have a price that clears at
11 zero.

12 Q. And how does that impact other power
13 generation technologies?

14 A. The reason I provided the example is if
15 you had a marketplace with those kinds of
16 technologies, it would fail to provide investment and
17 supply.

18 Q. Okay. And when you say "fail to provide
19 investment and supply," taking that in two steps,
20 when you say the word "investment," are you referring
21 to the construction of new generation facilities?

22 A. In the example that we are discussing
23 that I provided on Page 7 where the technologies are
24 wind and solar, if the price clears at zero there's

1 no incentive to invest.

2 Q. And, again, when you say "invest,"
3 though, I just want to understand is it someone
4 investing in buying a facility?

5 A. I'm talking about there would be a
6 failure to provide an adequate economic signal for
7 investment.

8 Q. Well, again, what do you mean by
9 "invest?" Is it relating to the construction
10 facility, or an equity investor, or coming in and
11 buying a new asset?

12 A. I'm talking about deploying capital in
13 the productive resources for power supply.

14 Q. Does that include construction of a new
15 facility?

16 A. It includes the construction of any
17 facilities.

18 Q. That's what I was trying to get to. I
19 appreciate it.

20 Now, later on in your testimony you
21 referenced the PJM capacity markets at Page 10, Line
22 15 and 16.

23 A. Yes.

24 Q. You state in Line 16, "This addresses

1 the inherent dimension of the missing money
2 problem..."

3 The inherent dimension that you're
4 referencing there, does that relate back to the
5 investment -- into the energy infrastructure and
6 market that we just discussed?

7 A. What we discussed was deploying capital
8 for power production facilities.

9 Q. Again, does that reference the inherent
10 dimension of the missing money problem? Does that
11 relate to that deploying of capital?

12 A. Yes.

13 Q. Okay. And so what I'm trying to
14 understand here is you note that the PJM capacity
15 markets address that issue. What I'm going to try to
16 understand is how -- how does the PJM capacity market
17 address that inherent dimension of the missing money
18 problems?

19 A. It closes the cost recovery gap from the
20 inherent dimension.

21 Q. Okay. Does it eliminate the issue of
22 the inherent dimension of the missing money problem?

23 A. As I previously testified, it is not
24 clear that it fully closes the gap in PJM.

1 Q. Why do you say it's not clear?

2 A. Well, it -- as I'm saying, as I look at
3 the data, there is some uncertainty as to whether
4 it's fully closing the gap.

5 Q. What data are you looking at?

6 A. When I look at the market clearing
7 prices for energy and capacity in PJM.

8 Q. What does that data tell you when you
9 just look at a clearing price?

10 A. The rest of Page 11, I work through what
11 it tells me as it looks like there's still a
12 shortfall for baseload generation.

13 Q. And you say at Page 12, top of Page 12,
14 Line 3 and 4, I'm going to paraphrase it, the
15 shortfall has been chronic in PJM for over a decade;
16 is that correct?

17 A. Yes.

18 Q. Okay. What has been the impact of this
19 shortfall over the last decade?

20 A. The impact has been on the generation
21 mix and --

22 Q. How has that mix changed over the last
23 decade?

24 MR. KUTIK: He hadn't finished his

1 answer; so go ahead and finish.

2 BY MR. SETTINERI:

3 Q. Go ahead, Dr. Makovich.

4 A. And the impact has been to drive
5 continued evolution of market rules.

6 Q. When you say "evolution of market
7 rules," are you referring to PJM rules?

8 A. Yes.

9 Q. Let me ask the -- have you reviewed
10 specifically how the missing money problem, as you
11 frame it, has impacted the Sammis and Davis-Besse
12 plants?

13 A. No.

14 Q. Why not?

15 A. As I previously testified, I've been
16 asked to testify to the value of power supply
17 diversity. And in attaching the study, I've said
18 that one of the threats to that value is the missing
19 money problem.

20 Q. Is it fair to say generally that your
21 testimony is at a policy level versus a
22 plant-specific level?

23 A. I'm not sure what you mean by those
24 terms.

1 Q. Well, I can reframe it a little simpler
2 in the sense that is it fair to say that your
3 testimony is a high-level presentation of the missing
4 money problem, but not a detailed application of the
5 missing money problem to the Davis-Besse and Sammis
6 plants?

7 MR. KUTIK: Objection.

8 THE WITNESS: Yeah. That's not how I've
9 characterized my testimony.

10 BY MR. SETTINERI:

11 Q. Well, how do you characterize it then?

12 MR. KUTIK: Objection, asked and
13 answered. Tell him again.

14 THE WITNESS: I've been asked to testify
15 with regard to the value of fuel and technology
16 diversity and power supply.

17 BY MR. SETTINERI:

18 Q. Is that within the state of Ohio?

19 A. I wasn't asked to focus it on any
20 specific geography.

21 Q. And likewise, you did not focus on any
22 specific plants, correct?

23 A. As I said, that the study was done in
24 looking at the current value of fuel and technology

1 diversity in the US on an interconnection level.

2 Q. And I understand that was your study.

3 MR. KUTIK: I'm sorry. I'm sorry. I'm
4 sorry. Had you finished your answer?

5 THE WITNESS: Yeah.

6 MR. KUTIK: Okay. All right. Go ahead.

7 BY MR. SETTINERI:

8 Q. And I'm talking not about your study
9 that was attached to your testimony, but the actual
10 testimony itself.

11 A. I'm sorry. What's the question?

12 MR. SETTINERI: Why don't the court
13 reporter, can you read back the second-to-last
14 question I asked, please?

15 (Record read back as requested.)

16 MR. SETTINERI: Thank you.

17 BY MR. SETTINERI:

18 Q. So likewise, you didn't focus on any
19 specific plants in your written testimony, correct?

20 A. My written testimony mentions the plants
21 of the Davis-Besse and Sammis plants.

22 Q. But I'm trying to just understand this.
23 You didn't do any analysis of the operation of the
24 plants, correct?

1 A. I did not do an analysis of the
2 operation of those plants.

3 Q. Did you do any analysis, financial or
4 otherwise, of the plants?

5 A. As I've testified, I relied on Don
6 Moul's testimony in that regard.

7 Q. Okay. That's not what I asked you. I'm
8 asking a simple yes-or-no question. I'd like to
9 know: Did you do a financial analysis in regards to
10 plants?

11 You referenced Mr. Moul's testimony, but
12 that didn't answer my question of whether you did an
13 analysis. That's all I want to know.

14 MR. KUTIK: Well, we'll agree to
15 disagree; so I'll object to your question as asked
16 and answered.

17 BY MR. SETTINERI:

18 Q. You can go ahead and answer.

19 MR. KUTIK: If you feel you've answered
20 the question, you can tell him that. Go ahead.

21 THE WITNESS: The question of fuel
22 diversity and the missing money problem is something
23 that applies to the Davis-Besse and Sammis power
24 plants, which is what I've said in my testimony.

1 BY MR. SETTINERI:

2 Q. And that's good, because it's one of the
3 questions I have.

4 Okay. How is it impacting the Sammis
5 and Davis plants?

6 A. My testimony is that renewable power
7 mandates have suppressed the cash flows for baseload
8 power plants, and both these plants are baseload
9 power plants.

10 Q. Let's go to Page 3. A couple quick
11 questions for you there, Dr. Makovich.

12 Page 5 -- I'm sorry, Page 3, Line 5,
13 we'll start with -- let's read the whole sentence,
14 Line 4 you state, "The Economic Stability Program
15 will produce benefits for retail customers because it
16 will prevent the Plants from retiring before it is
17 economic to do so."

18 Are you certain that the ESP will
19 prevent the plants from retiring?

20 A. I've relied on the testimony of Don Moul
21 in that regard.

22 Q. Okay. So your testimony here is
23 simply -- is based on Mr. Moul's testimony that the
24 ESP is needed to prevent the plants retiring, is that

1 a fair characterization?

2 MR. KUTIK: Objection.

3 THE WITNESS: I don't think Don Moul
4 said they would necessarily retire.

5 BY MR. SETTINERI:

6 Q. And just for the record, you don't
7 have -- do you have an opinion on whether these
8 plants will retire?

9 A. As I said, I've testified, they are at
10 risk of retiring.

11 Q. I know you state that, but -- okay. Let
12 me -- I hate to do this, but on what do you base your
13 opinion that the plants may retire?

14 A. On the testimony of Don Moul in that
15 regard.

16 Q. And my follow-up question is: Do you
17 have an opinion, separate from any opinion by
18 Mr. Moul, that either the Sammis or Davis plants will
19 retire?

20 A. I have not made an assessment to assign
21 probabilities to that.

22 Q. Looking at Line 8, Page 3, you --
23 there's a sentence that starts with, "The probability
24 exists that these baseload plants will retire

1 prematurely..." and the sentence continues.

2 I believe earlier you mentioned that you
3 had not done any probability analysis that the plants
4 will retire prematurely. If that is the case, what
5 do you mean by "the probability exists"?

6 A. I mean that there is a chance that these
7 baseload plants will retire prematurely because the
8 value of fuel diversity is not being properly
9 compensated by power market cash flows and thus
10 properly internalized in current power plant decision
11 making.

12 Q. Again, you didn't do any specific
13 analysis of the Davis and Sammis plant, so on what do
14 you base that statement?

15 A. As I previously testified, there are
16 other examples of similar plants where this has
17 happened.

18 Q. And other basis for that statement?

19 A. Yes.

20 Q. What are those?

21 A. The chronic problem of missing money in
22 energy market revenue streams.

23 Q. And when you say "the chronic problem,"
24 I believe it was of missing revenue -- energy

1 revenue. Does that directly apply to the Davis-Besse
2 and Sammis plants?

3 MR. KUTIK: Objection.

4 THE WITNESS: Yes.

5 BY MR. SETTINERI:

6 Q. Okay. Let me ask you this: For a
7 generation fleet owner like FirstEnergy Solutions,
8 what other options are available to address the
9 missing money problem? And I recognized previously
10 you had mentioned there was a list of 13, and I
11 believe you could only remember six of the 13. Do
12 you recall that testimony previously?

13 A. Yes.

14 Q. Okay. Is one option that will be
15 available to a generation fleet owner is to seek tax
16 breaks?

17 A. That was not one of the 13 I assessed.

18 Q. Okay. Have you considered -- are you
19 aware that Ohio has a personal property tax on
20 generating facilities?

21 A. I'm aware that states have -- generally
22 have taxes on the value of power plants. I'm not
23 familiar specifically with the Ohio provisions.

24 Q. Have you ever considered whether

1 targeted tax breaks could be used to address the
2 missing money problem for a specific unit?

3 A. The -- the -- I have not assessed the
4 use of tax breaks as a remedy.

5 Q. And just to double-check, was that -- do
6 you recall if tax breaks were discussed in your
7 article about Bridging the Missing Money Gap:
8 Assessing alternative approaches?

9 MR. KUTIK: Objection, asked and
10 answered. Go ahead and tell him again.

11 THE WITNESS: Yes. In the discussions
12 of the approaches that people are currently using to
13 address this, we don't have an approach which is tax
14 breaks -- property tax breaks.

15 BY MR. SETTINERI:

16 Q. Okay. Are you done answering?

17 A. Yes.

18 Q. Okay. Thank you. Let me ask this
19 question: What can a generation fleet owner do to
20 address the missing money problem within -- let me
21 rephrase that and ask this question: Can a
22 generation fleet owner address the missing money
23 problem by maintaining a diverse generation fleet?

24 A. No.

1 Q. And why not?

2 A. The missing money problem derives from a
3 market intervention, not the generating mix of a
4 supplier.

5 Q. Would that diversity, though -- well, in
6 terms of managing fuel costs, would that allow the
7 generation -- provide the generation fleet owner with
8 a -- considered a hedge against price spikes in one
9 fuel resource versus another?

10 MR. KUTIK: Objection.

11 THE WITNESS: I don't consider what you
12 described an approach to addressing the missing money
13 problem.

14 BY MR. SETTINERI:

15 Q. Okay. Have you reviewed FirstEnergy
16 Solutions' generation fleet makeup?

17 A. I'm generally aware of it.

18 Q. Okay. And how did you become generally
19 aware of it?

20 A. I've worked with FirstEnergy over many
21 years.

22 Q. What is the nature of your work you've
23 done for FirstEnergy?

24 MR. KUTIK: Objection, asked and

1 answered.

2 THE WITNESS: As I've previously
3 testified, FirstEnergy's been a retainer client of
4 IHS.

5 BY MR. SETTINERI:

6 Q. All right. Thank you.

7 Have you -- to prepare -- to write your
8 testimony, did you review any of FirstEnergy
9 Solutions' financial statements?

10 A. No.

11 Q. Do you have an understanding of the
12 financial position of FirstEnergy Solutions?

13 A. I do not have specific information on
14 their financial position.

15 Q. Okay. And previously there was some
16 questions about communicating directly with
17 FirstEnergy Solutions' personnel. I don't know if
18 the record's real clear on that; so I'll ask the
19 question.

20 Have you communicated directly with any
21 FirstEnergy Solutions personnel about the ESP?

22 A. Yes.

23 Q. And who did you communicate with?

24 A. Jim Lang.

1 Q. Anyone else?

2 A. No.

3 Q. Okay. Let me ask you this question: To
4 address the missing money problem, do you believe
5 that all baseload plants should be included in
6 programs like ESP?

7 A. No.

8 Q. Okay. Well, why not?

9 A. There are some baseload plants that are
10 economic to retire.

11 Q. Okay. Let me ask you this question:
12 Given -- correct me if I'm wrong, but I believe you
13 mentioned that the PJM capacity markets have narrowed
14 the gap on the inherent root cause. If you removed
15 the imposed dimension of the missing money problem,
16 would the Davis-Besse and Sammis plants still be
17 exposed to a missing money problem?

18 MR. KUTIK: Objection.

19 THE WITNESS: As I've testified, there
20 can be other factors that could cause a missing money
21 problem. My testimony focuses on the impact of the
22 renewables' mandates.

23 MR. SETTINERI: And, I'm sorry, could I
24 ask the court reporter, I couldn't hear you on that

1 last part of your answer.

2 MR. KUTIK: Read the answer.

3 (Record read back as requested.)

4 MR. KUTIK: Let's go off the record for
5 a second.

6 (Discussion held off the record.)

7 (Recess taken.)

8 BY MR. SETTINERI:

9 Q. Real quick, Dr. Makovich, what
10 information did you review to prepare for your -- to
11 prepare your direct testimony in this case?

12 A. Well, as I've testified, I reviewed Don
13 Moul's direct testimony.

14 Q. And any other documents that you
15 reviewed?

16 A. The Value of US Power Supply Diversity
17 report that I've attached as LM-2.

18 Q. Any others besides those two documents?

19 A. Yes. I have included data on the power
20 prices that cleared at the AEP/Dayton hub. It's
21 included as Figure 2.

22 Q. Okay. And I'm just trying to run
23 through, capture everything. Anything else that you
24 reviewed to prepare your testimony?

1 A. I think that covers it.

2 Q. Okay. And just so I'm clear, are you
3 aware that Mr. Moul submitted both direct testimony
4 and supplemental testimony in this proceeding?

5 A. I am aware that he has filed
6 supplemental testimony.

7 Q. And did you review the supplemental
8 testimony?

9 MR. KUTIK: Objection, asked and
10 answered.

11 THE WITNESS: I have not.

12 BY MR. SETTINERI:

13 Q. Thank you. A few remaining questions
14 here.

15 Page 4, really you don't even have to
16 look at it, I'm wondering, have you ever been
17 involved in a decision to retire a power plant?

18 MR. KUTIK: Objection.

19 THE WITNESS: Yeah. What do you mean by
20 "ininvolved"?

21 BY MR. SETTINERI:

22 Q. Have you had any involvement whatsoever
23 in a decision to retire a power plant?

24 A. Yes.

1 Q. Okay. And how many power plants have
2 you been involved in regarding decisions to retire a
3 plant?

4 A. I don't know the number.

5 Q. Over 10?

6 A. Your question was rather broad. I
7 provide information regarding the business landscape
8 in power to a wide variety of people who use
9 information to make decisions.

10 Q. Okay. And is that what you mean by --
11 or when I asked you the question about being involved
12 in decisions, would that constitute your involvement?

13 A. Yes.

14 Q. Okay. Thank you. Just so I understand,
15 do you -- would you consider a combined-cycle natural
16 gas-fired generation plant to be a baseload plant in
17 certain instances?

18 A. It is a technology that's capable of
19 that role in a portfolio.

20 Q. And under what circumstance would that
21 technology be capable of being a baseload unit?

22 A. Well, the circumstances -- I'm not sure.
23 Can you rephrase the question?

24 Q. Yeah. Number one, what I'm trying to

1 understand is whether you consider a natural
2 gas-fired combined-cycle plant to be a baseload
3 plant. And I understand that certain instances -- I
4 think you clarified that as to certain instances.

5 So what I'm trying to understand is
6 under what circumstances -- let's say under what
7 operational circumstances would you consider a
8 natural gas-fired combined-cycle power plant to be a
9 baseload unit?

10 MR. KUTIK: Objection.

11 THE WITNESS: I'd consider it baseload
12 if it ran at a high utilization rate to serve loads
13 that are seen a high percentage of the time.

14 BY MR. SETTINERI:

15 Q. Okay. So essentially -- okay. Are
16 there any units in the FirstEnergy Solutions fleet
17 that are not being impacted by the missing money
18 problem?

19 A. As I said, I haven't done a specific
20 analysis of the FirstEnergy fleet.

21 Q. Turning to Page 16, Line 12 and 13.

22 MR. KUTIK: I'm sorry. What page?

23 MR. SETTINERI: Page 16.

24 MR. KUTIK: Thank you.

1 MR. SETTINERI: Line 11 through 14.

2 THE WITNESS: Yes.

3 BY MR. SETTINERI:

4 Q. The very last sentence where it starts
5 with, "I would expect that, all else equal, the
6 retirement of Sammis and Davis-Besse in combination
7 with thousands of megawatts of other coal-fired
8 generation in Ohio and elsewhere would result in
9 retail power prices in Ohio that are higher and more
10 volatile than would otherwise occur."

11 Do you see that sentence?

12 A. Yes.

13 Q. On what is that sentence based?

14 A. The sentence is based on my assessment
15 that renewables are depressing the energy market cash
16 flows and disproportionately affecting baseload
17 units.

18 Q. One last question: How long have you
19 been studying the missing money problem?

20 A. For decades.

21 Q. And I notice on LM-1, it looks like you
22 started writing a number of articles starting in 2013
23 through 2014. Assuming that's correct, that you
24 wrote on this issue in the last few years, what

1 created your interest in writing an article on this
2 issue?

3 A. Well, our business involves providing
4 research on the power sector to clients, and this is
5 part of that research.

6 Q. Have you seen a renewed -- or have you
7 seen an -- a heightened interest in the missing money
8 problem since 2013 from your clients?

9 A. I'm not sure if I'd use the term
10 "heightened." What I would say is the missing money
11 problem remains an issue on people's minds.

12 Q. Well, thank you, Dr. Makovich. I have
13 no further questions. Thank you.

14 MR. KUTIK: Are we done?

15 MR. OLIKER: My turn?

16 MR. KUTIK: Is it?

17 MR. OLIKER: I'm ready to go if the
18 witness is ready to continue.

19 MR. KUTIK: Okay. Let's go.

20 - - -

21 CROSS-EXAMINATION

22 BY MR. OLIKER:

23 Q. Dr. Makovich, good afternoon. My name
24 is Joe Oliker. I represent IGS Energy. Are you okay

1 to continue?

2 A. Yes.

3 Q. Okay. Just a few questions for you
4 today. I'll try not to repeat anything, but I
5 apologize, hitting cleanup, it's hard to avoid.

6 For purposes of our discussion today,
7 and I think you've been asked this before, would you
8 understand if I referred to the Ohio Edison Company,
9 The Toledo Edison Company, and Cleveland Electric
10 Illuminating Company as the companies?

11 A. Yes.

12 Q. And FirstEnergy Solutions Corp. will be
13 FES, okay?

14 A. Yes.

15 Q. And Clifty Creek and Kyger Creek
16 collectively will be referred to as the OVEC plant.

17 A. Yes.

18 Q. Okay. Could you turn to Page 3 of your
19 testimony, please?

20 A. Yes.

21 Q. And I understand we've talked just a
22 little bit, but I'm still not sure I understand your
23 answer. You're talking about -- you say, "The
24 Economic Stability Program will produce benefits for

1 retail customers because it will prevent the Plants
2 from retiring before it is economic to do so."

3 When you say "economic" in this
4 sentence, you're referring to the comparison of
5 going-forward costs to closure costs plus replacement
6 costs, correct?

7 MR. KUTIK: Objection, asked and
8 answered.

9 THE WITNESS: I am comparing the costs
10 of going-forward costs to the cost of replacement.

11 BY MR. OLIKER:

12 Q. Okay.

13 A. Yes.

14 Q. We'll come back to that in a second.

15 Now, from a high level, would you say
16 that your testimony takes issue with the --

17 MR. KUTIK: You have to say it again,
18 Joe. Someone was moving papers around, we couldn't
19 hear you.

20 BY MR. OLIKER:

21 Q. Sure thing.

22 Dr. Makovich, from a high level, would
23 you agree that your testimony takes issue with the
24 amount of compensation that is available to the FES

1 plants through the PJM capacity market?

2 A. No.

3 Q. Would you please explain why that's not
4 true?

5 A. My testimony is the problem resides in
6 the missing money in the energy market revenue
7 stream.

8 Q. Do you believe there are any flaws in
9 the capacity market?

10 MR. KUTIK: Objection.

11 THE WITNESS: Can you restate the
12 question?

13 BY MR. OLIKER:

14 Q. What part of my question don't you
15 understand?

16 A. What you mean by "flaws."

17 Q. If you could change the PJM capacity
18 market, would you, and how would you change it?

19 MR. KUTIK: Objection.

20 THE WITNESS: I've not made any
21 recommendations here regarding how I would change the
22 PJM capacity market.

23 BY MR. OLIKER:

24 Q. Let me state it differently: Would you

1 agree that the missing money problem is a product of
2 a revenue shortfall?

3 A. Yes.

4 Q. And would you agree that when you're
5 determining the amount of revenue in the equation,
6 you're considering all revenue available to a point?

7 A. Yes.

8 Q. And capacity revenue is a component of
9 that revenue?

10 A. Yes.

11 Q. For purposes of your missing money
12 problem, you would agree that the amount of capacity
13 revenue that is available to the FES plants is a
14 component?

15 A. Yes.

16 Q. Okay. Dr. Makovich, I'm sorry if you
17 already answered this, but have you evaluated whether
18 there is currently a surplus of capacity in PJM?

19 MR. KUTIK: Objection, asked and
20 answered.

21 THE WITNESS: I've already testified
22 that I do not see a serious surplus capacity problem
23 in PJM.

24 BY MR. OLIKER:

1 Q. Thank you for that answer, Dr. Makovich,
2 but I'm not -- I don't think that answers my
3 question. You mentioned a serious capacity surplus.
4 My question is is there a capacity surplus at all?

5 MR. KUTIK: Objection, asked and
6 answered. If you feel you've answered the question,
7 you can say so.

8 THE WITNESS: I feel I've answered the
9 question.

10 BY MR. OLIKER:

11 Q. Is there a difference between serious
12 capacity surplus and a capacity surplus?

13 A. Yes.

14 Q. And could you please explain whether
15 there is a capacity surplus in PJM -- or, let me step
16 back.

17 Could you explain the difference between
18 a serious capacity surplus and a capacity surplus?

19 MR. KUTIK: Asked and answered, I
20 object.

21 THE WITNESS: A capacity surplus is
22 typically measured with a loss of load probability
23 assessment or reserve margin measure, and there could
24 be trivial differences from the target that do not

1 amount to a serious surplus of capacity.

2 BY MR. OLIKER:

3 Q. Would you define a serious surplus
4 capacity, please?

5 A. Yes. For example, the US as a whole
6 reached a reserve margin of over 40 percent decades
7 ago, which was generally considered a serious surplus
8 of capacity.

9 Q. And could you please explain what level
10 of an installed reserve margin with a gaining of a
11 surplus of -- a serious surplus of capacity?

12 A. In this testimony, I've not created a
13 distinction and a line on reserve margins or loss of
14 load probability to distinguish. I'm simply saying
15 my testimony is that there's not a serious surplus of
16 capacity in PJM.

17 Q. And when you state that, "Without a
18 surplus of generating capacity, it is economic to
19 retire a power plant when the cost of...closing the
20 plant and replacing it with the lowest cost source of
21 equivalent power supply," in that sentence, are you
22 referring to serious surplus or just a surplus?

23 A. A serious surplus.

24 Q. And would you agree that when you're

1 talking about the economic rationality of closing a
2 power plant, your testimony is not evaluating the
3 metrics that FirstEnergy Solutions will consider?

4 MR. KUTIK: Can I have the question
5 read, please?

6 (Record read back as requested.)

7 THE WITNESS: My testimony is I'm not
8 privy to the discussions internally with regard to
9 plant closures for the companies.

10 BY MR. OLIKER:

11 Q. Dr. Makovich, do you have an opinion of
12 the metrics that a rational owner of a power plant
13 would consider in closing it?

14 A. Let me -- can you rephrase the question?
15 I'm not exactly sure what you're asking me for.

16 Q. What part of my question don't you
17 understand, and I'll try --

18 THE WITNESS: Can you read the question
19 back, please?

20 (Record read back as requested.)

21 THE WITNESS: In general, they're going
22 to be evaluating the costs and benefits of continued
23 operation versus closure.

24 BY MR. OLIKER:

1 Q. Okay. Let's try to drill it down maybe
2 a little more. If a plant produces market-based
3 revenue in excess of its marginal cost of operation,
4 will the owner retire it?

5 MR. KUTIK: Objection.

6 THE WITNESS: I'm not sure what you mean
7 by "market-based revenue."

8 BY MR. OLIKER:

9 Q. Take out the market. Let's try that
10 again.

11 If a power plant produces revenue in
12 excess of its marginal cost of operation, will the
13 owner retire it?

14 A. It's possible he could decide to.

15 Q. Can you explain why it's possible that
16 they would retire it?

17 A. It may be that they faced going-forward
18 costs that the -- this cash flow wouldn't support.

19 Q. Okay. Then let's try the question
20 again. Let's assume that the going-forward costs of
21 operating a plant are less than the revenues that
22 that plant will produce. Would you agree that the
23 power plant owner would not retire it?

24 THE WITNESS: Can you read that question

1 back, please?

2 (Record read back as requested.)

3 THE WITNESS: I'm sorry, slow down
4 again. Go ahead, read it again.

5 (Record read back as requested.)

6 THE WITNESS: Not necessarily.

7 BY MR. OLIKER:

8 Q. And why is that?

9 A. This is a decision being made under
10 uncertainty, and there would be uncertainty with
11 regard to the going-forward costs and the revenue
12 streams.

13 Q. Okay. Let's -- Dr. Makovich, thank you
14 for that answer. Let's ask this as a hypothetical
15 now. I'm going to take out some of the variables.

16 Let's assume that the going-forward
17 costs of the plant are certain, and let's assume the
18 revenues of the plant are certain, the going-forward
19 costs are less than the revenues, would you agree
20 that in this hypothetical the plant owner will not
21 retire it?

22 MR. KUTIK: Objection.

23 THE WITNESS: My expectation would be
24 that they would not retire.

1 BY MR. OLIKER:

2 Q. Thank you.

3 Let's talk about -- assuming that a
4 plant owner does retire -- retire, plant closure
5 costs can be significant, correct?

6 A. Yes.

7 Q. And that's another one of the things
8 that a plant owner will consider when they're making
9 their decision, right?

10 A. Possibly.

11 Q. Do you agree that nuclear
12 decommissioning costs are very significant?

13 A. It would depend on the plant.

14 Q. Have you evaluated the closing costs of
15 either the OVEC plants, Sammis, or Davis-Besse?

16 A. No.

17 Q. Do you know whether FES would be able to
18 recover plant closure costs from customers in Ohio?

19 A. No.

20 Q. Assuming they could not recover those
21 closure costs from customers in Ohio, do you agree
22 that they would definitely consider them in making
23 the decision to close the plant?

24 A. Again, as I've testified, I'm not privy

1 to their decision process.

2 Q. Okay. I apologize for jumping around,
3 but you attached an analysis to your testimony. I
4 think it's Figure ES-1. I'll try to help you out
5 with that page number. It is on, I believe, Page 5
6 of Attachment LM-2. Let me know when you're there,
7 Dr. Makovich.

8 A. Page 5 of LM-2, yes.

9 Q. This figure, ES-1, says "US generation
10 mix." And I apologize if you've already said this,
11 but is this installed capacity or is this energy --

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

14 BY MR. OLIKER:

15 Q. -- or something else?

16 MR. KUTIK: Asked and answered. Go
17 ahead.

18 THE WITNESS: This is generation energy.

19 BY MR. OLIKER:

20 Q. Okay. So I think that's all.

21 If you can jump to Figure 14, which is
22 on Page 22. Does that explain why there are
23 different -- this pie chart looks different?

24 MR. KUTIK: Objection.

1 BY MR. OLIKER:

2 Q. Is that installed capacity?

3 A. Figure 14, as the title suggests, is the
4 installed capacity.

5 Q. Thank you. I wanted to make sure of
6 that.

7 Talking about this study, The Value of
8 US Power Supply Diversity, this is largely a
9 discussion of what happens if coal, nuclear, oil, and
10 hydro disappears, correct?

11 MR. KUTIK: Objection.

12 THE WITNESS: No.

13 BY MR. OLIKER:

14 Q. Can you explain why that's not true?

15 A. The reduced diversity case reflects the
16 trend of less hydro, but it doesn't eliminate hydro.

17 Q. Thank you for that clarification.

18 But if we evaluate, am I correct there
19 is a base case and then there's the reduced case,
20 correct?

21 A. The base case is what actually happened
22 between 2010 and 2012.

23 Q. Okay. And would you agree that if --
24 scratch that.

1 A. Sorry, I didn't catch that.

2 Q. Sorry, Dr. Makovich. I'm trying to make
3 sure I don't reask other people's questions.

4 Dr. Makovich, does your analysis in LM-2
5 model anything in between the reduced case and the
6 base case?

7 A. No.

8 Q. And have you evaluated the impact of
9 Davis-Besse, Sammis, and the OVEC plants retiring on
10 the fuel mix in PJM?

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

13 THE WITNESS: I've testified that I've
14 not done a specific analysis of these plants.

15 BY MR. OLIKER:

16 Q. Okay. And have you evaluated what the
17 impact on power prices would be if Davis-Bessie,
18 Sammis, and the OVEC plants were to retire?

19 A. As I said, my testimony does not involve
20 specific analyses of these plants.

21 Q. Okay. On Page 7 of LM-2, you mentioned
22 the Razor Model. What does the Razor Model do?

23 A. The Razor Model simulates the supply and
24 demand in a regional power market -- the interaction

1 of supply and demand in a regional power market.

2 Q. And does it predict power prices?

3 A. Yes.

4 Q. Energy prices or capacity energy prices?

5 A. Energy prices.

6 Q. How about capacity prices?

7 MR. KUTIK: Objection.

8 THE WITNESS: I've testified it analyzes
9 the production costs, the energy prices.

10 BY MR. OLIKER:

11 Q. Okay. Have you used or has IHS used the
12 Razor Model to forecast power prices in PJM over the
13 next 15 years?

14 A. We may have.

15 Q. Would you have been involved in that
16 forecast?

17 A. Other people at IHS may have used it for
18 that purpose. I've not been involved in a forecast
19 using it for PJM.

20 Q. And do you know the results of any
21 forecast of power prices over the next 10 years or 15
22 years in PJM using the Razor Model?

23 THE WITNESS: I'm sorry, could you
24 repeat that question?

1 (Record read back as requested.)

2 THE WITNESS: No.

3 BY MR. OLIKER:

4 Q. Okay. Now, could you please turn to
5 LM-2? I believe it's Page 47. I'd like you to focus
6 on the bottom paragraph. You indicate, "Based on the
7 LDC, in this example baseload generation was modeled
8 at 52.5 percent of capacity and was composed of equal
9 parts gas, coal, and nuclear capacity."

10 First, in this statement, what do you
11 mean by baseload generation?

12 A. The generation that's being utilized to
13 meet power demands that are present with the highest
14 percentage of time.

15 Q. And could you explain what the 52.5
16 percent number is?

17 A. The 52.5 percent is the amount of
18 capacity that was made up of the gas, coal, and
19 nuclear technologies. To be specific, I believe
20 that's of a combined-cycle; gas, coal, and nuclear
21 technologies.

22 Q. That was my next question. I think you
23 just clarified. Simple-cycle combustion turbines are
24 not included in this definition of gas?

1 A. Yes.

2 Q. Would you consider 52.5 percent baseload
3 composed of equal parts coal, nuclear, and gas as a
4 diverse generation mix?

5 A. In this assessment, it was being
6 compared to an all-gas generation portfolio; so I
7 would consider it to be more diverse than the all-gas
8 generation portfolio.

9 Q. Would your answer be the same if we
10 weren't comparing it to an all-gas portfolio?

11 A. Well, diversity is a matter of degree.
12 Since it's made up of more than one source of supply,
13 there is diversity.

14 Q. Okay. Do you consider a power supply
15 that is 40 percent gas, combined cycle, 30 percent
16 coal, 15 percent nuclear, 5 percent hydro, and 10
17 percent renewable to be a cost-effective diverse fuel
18 mix?

19 MR. KUTIK: Objection. That would
20 depend on the conditions in that power system.

21 BY MR. OLIKER:

22 Q. What about PJM?

23 A. As I said, I have not done a
24 PJM-specific analysis for this testimony.

1 Q. Do you believe that natural gas
2 combined-cycled power plants --

3 MR. KUTIK: You need to repeat that,
4 Joe.

5 BY MR. OLIKER:

6 Q. Sure. Do you believe that natural gas
7 combined-cycle power plants cause volatile energy
8 prices?

9 MR. KUTIK: Objection.

10 THE WITNESS: No.

11 BY MR. OLIKER:

12 Q. Could you explain -- I'm happy that you
13 disagree with me. Could you explain why?

14 A. It's the volatility of the fuel input
15 price that creates the volatility in the wholesale
16 price.

17 Q. Do you agree that if a natural gas
18 combined-cycle power plant has firm transportation,
19 you will have less volatile fuel?

20 MR. KUTIK: Objection.

21 THE WITNESS: That's not necessarily the
22 case.

23 BY MR. OLIKER:

24 Q. Why is that?

1 A. People can buy firm transportation
2 without firming up the commodity price.

3 Q. Would you agree it reduces volatility?

4 MR. KUTIK: Objection.

5 THE WITNESS: I've not testified to
6 that, no.

7 BY MR. OLIKER:

8 Q. Do you agree that if a natural gas
9 combined-cycle power plant has firm transportation
10 and hedges its natural gas contract, it will not have
11 volatile cost of production?

12 MR. KUTIK: Objection.

13 THE WITNESS: No.

14 BY MR. OLIKER:

15 Q. Why is that?

16 A. Because the cost of production is going
17 to depend on the delivered cost of gas, and that's --
18 the hedge is simply a financial instrument to offset
19 the volatility or to manage the volatility.

20 Q. Yeah. I understand where we -- where we
21 looked past each other. Let's try this one more
22 time, Dr. Makovich.

23 Would you agree that if a natural gas
24 combined-cycle power plant has firm transportation

1 and contracts for natural gas on a long-term basis,
2 it will not have a volatile cost of production?

3 A. Well, the cost of production can include
4 other factors. What I do believe, it would be less
5 volatile than buying that gas on the spot market.

6 Q. Okay. And would you agree that if a
7 natural gas-fired power plant has dual fuel
8 capability, it will have a less volatile cost of
9 production?

10 MR. KUTIK: Objection.

11 THE WITNESS: It would depend on the
12 characteristics of that dual fuel capability as to
13 how much it would affect the cost of production.

14 BY MR. OLIKER:

15 Q. What characteristics would it depend on,
16 Dr. Makovich?

17 A. I'm aware of limits that have been
18 mandated about hours of operation when plants switch
19 to a liquid fuel.

20 Q. Referring to diesel generator rules?

21 A. That would fall under that.

22 Q. How about oil?

23 MR. KUTIK: Hold on a second. Let's go
24 off the record for a second.

1 (Discussion held off the record.)

2 MR. KUTIK: Could you read the last
3 question, please?

4 (Record read back as requested.)

5 THE WITNESS: What about oil?

6 MR. KUTIK: Read the last two questions,
7 please.

8 (Record read back as requested.)

9 MR. KUTIK: Do you understand the
10 question at this point, Dr. Makovich?

11 THE WITNESS: I'm not sure I understand
12 the question. Can you rephrase the question?

13 BY MR. OLIKER:

14 Q. What types of dual fuel capability do
15 you know about?

16 A. There are gas-fired power plants that
17 can also run on liquid fuels, and that would include,
18 but not exclusively, diesel.

19 Q. What other ones?

20 A. There's No. 2 fuel oil.

21 Q. Any others?

22 A. Kerosene.

23 Q. When -- in the fuel diversity analysis
24 that you have included in your testimony when you

1 refer to oil generation, what type of oil generation
2 are you talking about?

3 A. It includes all the types of oil
4 generation we've just talked about.

5 Q. Okay. Are you familiar with the PJM
6 capacity performance proposal?

7 MR. KUTIK: Objection, asked and
8 answered.

9 THE WITNESS: I am familiar with it,
10 yes.

11 BY MR. OLKER:

12 Q. Do you agree that if it is approved as
13 proposed, it would allow combined-cycle power plants
14 to include the price of firm transportation or dual
15 fuel capability in offers in the capacity market?

16 A. Yeah. Without reviewing the latest
17 version, I really can't testify as to what it can or
18 cannot do.

19 Q. What was the latest version you have
20 reviewed?

21 A. It was a version submitted to FERC
22 months ago.

23 Q. Assuming that the capacity performance
24 proposal allowed combined-cycle generators to include

1 the cost of firm transportation in their offers,
2 would you agree that that will have a tendency to
3 reduce volatility in the PJM capacity energy market?

4 A. I've already testified that that
5 wouldn't necessarily be the case.

6 Q. Could you explain that, please?

7 A. As I said, that the volatility is
8 primarily associated with the commodity price of gas,
9 not the transportation charge.

10 Q. Do you agree that the commodity price
11 spikes occur as a result of a lack of infrastructure?

12 MR. KUTIK: Objection.

13 THE WITNESS: That is a contributing
14 factor.

15 BY MR. OLIKER:

16 Q. And do you agree that those concerns are
17 not present in the summer?

18 A. I did not testify to that.

19 Q. Is your answer no?

20 A. I certainly have seen evidence that
21 deliverability constraints exist in the winter, but I
22 cannot at this point in time tell you if they do not
23 exist at all in the summer.

24 Q. Do you agree that there is a robust

1 pipeline expansion development occurring within the
2 PJM footprint right now?

3 MR. KUTIK: Objection.

4 THE WITNESS: Yeah. I don't know what
5 you mean by "robust."

6 BY MR. OLIKER:

7 Q. Would you agree that there are pipelines
8 that are continuing to be developed in PJM right now?

9 A. I'm aware that there is pipeline
10 development going on within the PJM.

11 Q. On Page 6 at LM-2, you talk about
12 natural gas issues during the polar vortex and forced
13 outage rates, correct?

14 A. Let's see, I don't think it's -- Page 6,
15 did you say?

16 Q. Of Attachment LM-2.

17 MR. KUTIK: Do you want to refer him to
18 a specific text?

19 BY MR. OLIKER:

20 Q. Yeah. "These recent events demonstrated
21 that natural gas deliverability remains a risk and
22 natural gas prices continue to be hard to predict."

23 MR. KUTIK: Where?

24 MR. OLIKER: Under cycle.

1 MR. KUTIK: Where are you on Page 6?

2 Sorry.

3 BY MR. OLIKER:

4 Q. Yeah. Sure. I'm on Page 6, it's the
5 second full paragraph at the bottom. I just wanted
6 you to look at that for context for my next question.

7 MR. KUTIK: Do you know where he's
8 referring? Because I don't.

9 THE WITNESS: I believe it's here where
10 it starts with "However."

11 MR. KUTIK: Okay.

12 BY MR. OLIKER:

13 Q. It's the paragraph that starts with,
14 "The shale gas revolution..."

15 A. Yes.

16 Q. And from a high level, you're talking
17 about natural gas issues during the polar vortex.
18 But my question is: Have you evaluated the issues
19 that coal-fired power plants experienced during the
20 polar vortex?

21 A. I'm generally aware of some of the
22 challenges.

23 Q. Would you agree that general plant
24 failures during the polar vortex were responsible for

1 twice the number of forced outages and natural gas
2 fuel delivery problems?

3 MR. KUTIK: Objection.

4 BY MR. OLIKER:

5 Q. If you know.

6 A. I'm sorry, repeat the question.

7 Q. Would you agree that general plant
8 failures during the polar vortex were responsible for
9 twice the number of forced outages and natural gas
10 delivery costs?

11 MR. KUTIK: Objection.

12 THE WITNESS: I can't testify to that,
13 whether that's true or false.

14 BY MR. OLIKER:

15 Q. Is that because you don't know?

16 A. I'd have to look at the data to testify
17 to that.

18 Q. Have you seen that data?

19 A. I have looked at reports regarding what
20 happened during the polar vortex in PJM.

21 Q. Okay. And would you agree that the
22 winter of 2014-2015 actually saw higher peak loads
23 and colder weather than the polar vortex?

24 A. Again, without having the data in front

1 of me, I can't -- I can't confirm or deny these
2 comparisons.

3 Q. Okay. Let me come at it differently.
4 Would you agree that this past winter was very
5 similar to the prior winter from a weather
6 perspective?

7 MR. KUTIK: Objection.

8 THE WITNESS: Again, the weather's a
9 very complex phenomena, and it's more than just an
10 average temperature comparison. So without doing an
11 analysis of the weather stress this past winter
12 versus the previous winter, I really can't testify to
13 one being more or less severe than the other.

14 BY MR. OLIKER:

15 Q. Do you know if the peak load during this
16 past winter of 2014-2015 was greater than the peak
17 load in the polar vortex?

18 A. As I said, I don't have any of that data
19 in front of me to be able to testify to that.

20 Q. Okay. And that's okay. Would you agree
21 that price spikes during the polar vortex were
22 significantly higher than the pricing that was
23 experienced during this past winter, and that is on
24 energy?

1 A. Again, I'm aware that there were some
2 significant price spikes both this past winter and
3 the previous. I don't have the data in front of me
4 to be able to compare and contrast the degree of
5 those.

6 Q. Have you ever reviewed it?

7 A. Yes. I have looked at the data.

8 Q. When?

9 A. Well, in fact, the -- on Page 10 of my
10 testimony, when it shows the AEP Dayton wholesale
11 power prices, you can see the winter price spikes
12 there in January.

13 Q. And looking -- and we're talking about
14 Figure 2, correct?

15 A. Yes.

16 Q. So do you agree that prices were spiking
17 to less than \$100 in January?

18 MR. KUTIK: Objection.

19 THE WITNESS: No. What I'm showing here
20 is that we had some wholesale hourly prices that were
21 above \$1,500 per megawatt hour.

22 BY MR. OLIKER:

23 Q. And you're referring to January 2014,
24 correct?

1 A. That's right.

2 Q. And if you look down at the other end of
3 your graph, would you agree that the prices January
4 of '15 and December were probably less than \$100 a
5 megawatt hour?

6 MR. KUTIK: Objection, mischaracterizes
7 the testimony. Go ahead.

8 THE WITNESS: The graphic does not
9 include data for January of 2015.

10 BY MR. OLIKER:

11 Q. Okay. I thought you pointed me to this
12 figure as to when you were reviewing pricing from
13 this past winter. Is that not correct?

14 A. I thought your question was do I ever
15 review price data -- winter price data.

16 Q. And have you -- have you reviewed winter
17 price data from the winter of 2014-2015?

18 A. Yes. I have looked at it.

19 Q. When did you look at that data?

20 A. I don't remember the exact dates that
21 I've looked at it, but it is data that I have looked
22 at.

23 Q. Have you reviewed any of PJM or FERC's
24 reports on performance of generating assets during

1 the 2014-2015 winter?

2 A. I may have seen sections from that
3 analysis. I cannot remember specifically what I have
4 and have not looked at in that regard.

5 Q. Okay. I apologize for jumping around,
6 but I wanted to touch on something I think you said
7 to Mr. Soules.

8 Did you mention to Mr. Soules that the
9 Davis-Besse, Sammis, and OVEC plants may be part of
10 this -- of the State of Ohio's implementation of the
11 federal Clean Power Plan?

12 MR. KUTIK: Objection.

13 THE WITNESS: I believe my testimony was
14 they would be -- they could be affected by it.

15 BY MR. OLIKER:

16 Q. I just want to be clear: Do you --
17 would they be affected by it or would they be part of
18 the State's implementation plan?

19 A. My testimony was that we do not have the
20 final rules from the EPA; so we don't know what the
21 implementation plans are going to ultimately look
22 like, but that these plants as part of the generation
23 mix could be affected.

24 MR. OLIKER: I'm sorry. Could the court

1 reporter indicate, did he say affected or effective?

2 MR. KUTIK: Affected.

3 THE WITNESS: Affected.

4 MR. OLIKER: Thank you.

5 MR. KUTIK: All right. Let's go off the
6 record.

7 (Discussion held off the record.)

8 (Recess taken.)

9 BY MR. OLIKER:

10 Q. Looking at Page 11 in your testimony --

11 A. Yes.

12 Q. -- I have a few questions about this.

13 Is this the portion of your testimony that you
14 indicated to Mr. Soules that there are workpapers?

15 A. Yes.

16 Q. Are those going to be provided?

17 MR. KUTIK: The witness has them with
18 him as requested by the notice.

19 MR. OLIKER: Okay. But they haven't
20 been distributed to the parties?

21 MR. KUTIK: We responded to the notice.

22 BY MR. OLIKER:

23 Q. We can walk through it. Am I correct
24 that you are using as a reference of natural gas

1 combined-cycle power plant?

2 A. Yes.

3 Q. And so if I take your \$1,400 a kilowatt
4 and I had a 1,000-megawatt power plant, that would
5 cost \$1.4 billion?

6 MR. KUTIK: I think that's a question.

7 THE WITNESS: Is that a question?

8 MR. KUTIK: Yes.

9 THE WITNESS: Oh.

10 MR. KUTIK: You can tell him if his math
11 is right.

12 THE WITNESS: So go ahead. What is your
13 question?

14 BY MR. OLIKER:

15 Q. I guess is my math right?

16 First -- let's try it differently. This
17 \$1,400-per-kilowatt number, is this tied to a
18 specific size power plant?

19 A. It would be a combined-cycle gas plant
20 at scale.

21 Q. What does that mean? What does "at
22 scale" mean?

23 A. I think you're talking about a 300
24 megawatt or bigger kind of power plant.

1 Q. Would it apply to a 1,000-megawatt
2 plant?

3 A. Yes.

4 Q. So the way the math would work is a
5 1,000-megawatt combined-cycle power plant would cost
6 \$1.4 billion in upfront capital costs, correct?

7 A. Well, that's not the calculation I made,
8 but go ahead.

9 Q. First is -- can you tell me if a
10 1,000-megawatt combined-cycle power plant would
11 require \$1.4 billion in upfront capital costs?

12 A. Yeah. I haven't testified to the
13 construction of a 1,000-megawatt combined-cycle
14 natural gas plant; so I'm not sure what you're asking
15 me to do here.

16 Q. What are you testifying to then? I'm
17 sorry.

18 A. Well, I -- I used the \$1,400 per kW as
19 an upfront capital cost of a baseload natural
20 gas-fired combined-cycle plant at scale.

21 Q. Well, I guess my question is: If we
22 wanted to know the upfront total capital costs, would
23 we multiply the \$1,400 per kilowatt times the
24 nameplate capacity?

1 A. Yes.

2 Q. So going back to my initial question, it
3 would cost \$1.4 billion in upfront capital costs to
4 build a 1,000-megawatt combined-cycle power plant?

5 A. Okay.

6 Q. Is that a yes?

7 A. Yes.

8 Q. When you say with an annual levelized
9 carrying charge rate of 14 percent the annual fixed
10 cost would be \$196 per kilowatt, is that merely 14
11 percent of 1,400?

12 A. Yes.

13 Q. What type of depreciation schedule are
14 you using?

15 A. These plants are typically depreciated
16 over a 25 or 30-year kind of timeframe.

17 Q. Have you reviewed any other studies or
18 projections regarding the upfront capital costs of
19 building a combined-cycle power plant?

20 A. Yes.

21 Q. What studies have you reviewed?

22 A. I've already testified that I've looked
23 at the Energy Information Association's Annual Energy
24 Outlook in 2014 that did a levelized cost of energy

1 analysis for a natural gas-fired combined-cycle
2 plant, and came up with \$77.9 per megawatt hour.

3 Q. Okay. How about on a kilowatt basis,
4 dollars per kilowatt, have you reviewed any studies
5 that make that analysis?

6 A. There must be an underlying assumption
7 for that in the EIA report, but I don't have it in
8 front of me.

9 Q. Have you reviewed the analysis performed
10 by the Brattle Group?

11 MR. KUTIK: Objection.

12 THE WITNESS: I'm not sure what analysis
13 you're referring to.

14 BY MR. OLIKER:

15 Q. I'm referring to -- do you know what the
16 Brattle Group is?

17 A. Yes, I do.

18 Q. Do you agree that they perform analysis
19 for PJM Interconnection from time to time?

20 A. They may.

21 Q. Have you reviewed any of the analysis of
22 the upfront capital costs relating to a
23 combined-cycle power plant that the Brattle Group has
24 performed for PJM?

1 A. No, I have not.

2 Q. Have you reviewed any of the analysis
3 the Brattle Group has done with respect to the
4 upfront capital costs of a combined-cycle power
5 plant?

6 A. Yes.

7 Q. Would you agree that their number is
8 lower than \$1,400 per kW?

9 A. I cannot tell you how it compares to the
10 \$1,400 number.

11 Q. Would you agree that their analysis
12 indicates that a combustion turbine costs less than
13 \$1,000 per kW?

14 A. Again, I cannot --

15 Q. Do you know?

16 A. I cannot verify that for you.

17 Q. Going back to the missing money issue
18 you identify, I'd like to ask you a hypothetical.
19 Assume for a second that the Ohio Commission approves
20 the Economic Stability Program, and Davis-Besse and
21 Sammis otherwise would have been retired, all else
22 being equal in the PJM market, would you agree that
23 the Commission's actions would actually increase the
24 missing money problem for all other plants in PJM by

1 depressing capacity and energy prices?

2 A. No.

3 Q. Why is that?

4 A. I don't understand your connection
5 there. I don't understand the logic of your
6 hypothetical.

7 Q. What part of the logic don't you
8 understand?

9 A. I don't understand why it's going to
10 increase a capacity price.

11 Q. I think you might have missed the part
12 of my hypothetical. Let's try it one more time.

13 Let me know if you don't understand
14 anything along the way, and I'll try to clarify it.
15 But for purposes of this hypothetical, assume the
16 Commission approves the Economic Stability Program,
17 and Davis-Besse and Sammis otherwise would have
18 retired, and then all else -- all else equal in the
19 PJM market, would you agree that the Commission's
20 actions would increase the missing money problem for
21 all other plants in PJM by depressing capacity and
22 energy prices?

23 A. No.

24 Q. Why is that?

1 A. If these plants are retired in your
2 hypothetical, I'm assuming that they're going to be
3 replaced by gas plants and it's going to make things
4 more expensive in the energy dispatch that the energy
5 price will be higher.

6 Q. Did you hear the part of my hypothetical
7 where I said all else being equal?

8 A. So you're not replacing -- well, to keep
9 reliability equal, you'd have to replace it.

10 Q. I'm talking about -- let me ask it very
11 simply: If the Commission issues an order that
12 ultimately depresses capacity prices and energy
13 prices in PJM, would you agree that that order will
14 have the tendency to increase the missing money
15 problem for all other market participants?

16 MR. KUTIK: Objection.

17 THE WITNESS: Yeah. I'm not sure I
18 understand your hypothetical. What kind of order are
19 they going to issue that's depressing the energy and
20 capacity markets?

21 BY MR. OLIKER:

22 Q. That doesn't matter for purposes of this
23 hypothetical, Dr. Makovich.

24 MR. KUTIK: Well, apparently it matters

1 for purposes of his answer; so don't argue with the
2 witness. Just ask another question, please.

3 BY MR. OLIKER:

4 Q. Dr. Makovich, do you believe that the
5 missing money problem prevalent throughout PJM
6 Interconnection?

7 THE WITNESS: Would you read that back,
8 please?

9 (Record read back as requested.)

10 MR. KUTIK: I'm sorry, is your question
11 is it prevalent?

12 BY MR. OLIKER:

13 Q. Yes.

14 A. My testimony is that the inherent
15 problem was prevalent in PJM, which is why PJM has a
16 capacity market. My testimony is also that renewable
17 mandates are a common feature within PJM, and they
18 depress energy prices disproportionately in the
19 off-peak period.

20 Q. Dr. Makovich, if you take 3,000
21 megawatts out of the PJM capacity and energy market,
22 and you don't replace it with anything, do you
23 believe it will impact the price of energy and
24 capacity?

1 A. Yes.

2 Q. So would you agree that if the price of
3 energy and capacity goes up, the missing money
4 problem for other plants in PJM is smaller, all else
5 being equal?

6 A. All else being equal.

7 Q. Is that a yes?

8 A. Well, it would depend on the
9 distribution of those price increases.

10 Q. Let's look at it this way: Would you
11 agree that there are independent power producers in
12 the state of Ohio that are not affiliated with
13 utilities?

14 A. Would I agree that they exist?

15 Q. Yes.

16 A. Yes.

17 Q. Would you agree that if Davis-Besse and
18 Sammis close, all else being equal, the missing money
19 problem for independent power producers in Ohio gets
20 smaller?

21 MR. KUTIK: Objection.

22 THE WITNESS: As I've testified, it
23 would depend on the impact -- what hourly prices are
24 impacted. I don't expect they're all going to be

1 impacted evenly.

2 BY MR. OLIKER:

3 Q. Assume they're all --

4 A. It's not a question.

5 MR. KUTIK: She needs to be able to get
6 the question --

7 THE WITNESS: I'm sorry.

8 MR. KUTIK: -- so that she could have it
9 on the record. So, Joe, you need to state your
10 question again.

11 BY MR. OLIKER:

12 Q. Okay. Let's assume those plants all
13 have the same dispatch costs and they're all at the
14 same hub.

15 A. So what's the question?

16 Q. That retiring Davis-Besse and Sammis
17 decreases the missing money problem for other
18 independent power producers in the state of Ohio at
19 the same hub, assuming they're all the same dispatch
20 cost?

21 A. No.

22 Q. Why is that?

23 MR. KUTIK: Objection, asked and
24 answered. Tell him again.

1 THE WITNESS: Would you read the
2 question back, please?

3 (Record read back as requested.)

4 THE WITNESS: My answer is no.

5 BY MR. OLIKER:

6 Q. My question was why?

7 MR. KUTIK: Which you answered before;
8 so tell him the same answer.

9 THE WITNESS: You've held all else
10 equal, and you've reduced the power supply. I don't
11 see why that's going to make the missing money
12 problem worse.

13 BY MR. OLIKER:

14 Q. I said it will make it better. It will
15 make the missing money problem shrink. Do you agree
16 with that statement?

17 MR. KUTIK: Objection, asked and
18 answered.

19 THE WITNESS: Yeah. I'm confused about
20 what question you've asked me here.

21 BY MR. OLIKER:

22 Q. Okay. Repeat what you think I asked
23 you, and then I can let you know if that's the case.

24 MR. KUTIK: No. That's not the way it's

1 going to happen. Ask him a question.

2 MR. OLIKER: Let's have the court
3 reporter read back my original question.

4 (Record read back as requested.)

5 BY MR. OLIKER:

6 Q. I think you've heard in that question, I
7 said it decreases the missing money problem.

8 A. Right. And my answer is no.

9 Q. Now I'm still waiting to hear why.

10 MR. KUTIK: Objection. He's answered
11 that question, but tell him again.

12 THE WITNESS: It would depend on what
13 hours the prices change.

14 BY MR. OLIKER:

15 Q. Okay. So to add one more layer, the
16 plants are running in the hours where the prices
17 increase. Now do you agree with me?

18 A. Well, it's a different question.

19 Q. Everything else is the same,
20 Dr. Makovich.

21 MR. KUTIK: No, it isn't. You just
22 asked him a different question. So don't argue with
23 the witness, please.

24 THE WITNESS: So my answer was not all

1 the merchant generating plants would have a reduced
2 missing money problem, because some of them wouldn't
3 be running in the hours when prices go up.

4 BY MR. OLIKER:

5 Q. Okay. And then just to close the loop
6 on that, assuming that they're all running, the
7 prices go up, then the missing money problem gets
8 smaller --

9 MR. KUTIK: Objection.

10 BY MR. OLIKER:

11 Q. -- correct?

12 MR. KUTIK: Objection, incomplete
13 hypothetical. Go ahead.

14 THE WITNESS: Again, the hypothetical is
15 a bit difficult to understand, because removing that
16 supply is going to change the dispatch of these
17 existing plants. So it's difficult for me to predict
18 what their cash flow is going to look like.

19 BY MR. OLIKER:

20 Q. Maybe I can ask this at a different
21 angle.

22 Dr. Makovich, would you agree that if
23 the Commission approves the Economic Stability
24 Program, it could be harmful to other independent

1 power producers in Ohio?

2 MR. KUTIK: Objection.

3 THE WITNESS: Not necessarily.

4 BY MR. OLIKER:

5 Q. Do you agree that it could be?

6 MR. KUTIK: Objection.

7 THE WITNESS: I have no reason to
8 believe it's going to be damaging.

9 BY MR. OLIKER:

10 Q. Would you agree that if they do not have
11 a similar purchase power agreement to that which has
12 been proposed by FirstEnergy, they may be at a
13 competitive disadvantage?

14 MR. KUTIK: Objection.

15 THE WITNESS: That's not necessarily the
16 case.

17 BY MR. OLIKER:

18 Q. Then why does FirstEnergy need one?

19 A. There's a difference --

20 MR. KUTIK: Objection. Go ahead.

21 THE WITNESS: Okay. There's a
22 difference between a baseload power plant like we're
23 talking about here with Davis-Besse and Sammis where
24 renewables are depressing the energy price

1 disproportionately in the off-peak hours. What
2 effects that won't effect a merchant generator
3 running a combustion turbine during a peaking period.

4 BY MR. OLIKER:

5 Q. Thank you for that clarification. Now I
6 can artfully ask my question.

7 Would you agree that it is possible that
8 the Economic Stability Program, if approved, will be
9 harmful to baseload power plants owned by independent
10 power producers in Ohio?

11 MR. KUTIK: Objection.

12 THE WITNESS: I -- I don't believe it
13 would be harmful.

14 BY MR. OLIKER:

15 Q. Do you believe they would be
16 competitively disadvantaged?

17 MR. KUTIK: Objection, asked and
18 answered.

19 THE WITNESS: As I said, I don't see why
20 they would be.

21 BY MR. OLIKER:

22 Q. Isn't it the case that those power
23 plants would have to compete against other renewables
24 in PJM, as well as FirstEnergy Solutions' plants that

1 are guaranteed cost recovery?

2 MR. KUTIK: Objection.

3 THE WITNESS: No.

4 BY MR. OLIKER:

5 Q. Why is that not true?

6 A. Because they're all going to continue to
7 compete on the basis of their incremental costs of
8 production in the energy market.

9 Q. Okay. Page 13 of your testimony, you
10 had that coal and nuclear have higher capacity costs
11 than combustion turbine and lower variable costs than
12 a combustion turbine, correct?

13 A. Yes.

14 Q. And then you indicate that the lower
15 variable costs are more than enough to pay for the
16 higher upfront capacity costs. In these statements,
17 are you claiming that the combination of capacity and
18 energy payments necessary to support a coal or a
19 nuclear plant is lower than a combustion turbine?

20 A. No.

21 Q. Can you clarify what you mean then,
22 please?

23 A. What I'm talking about here is that a
24 cost-effective generation mix is made up of peaking,

1 cycling, and baseload plants, and that the
2 proportions are governed by these tradeoffs.

3 Q. Okay. Turning to LM-2, Page 17. Let me
4 try to get to you an exact paragraph cite. Okay.
5 This is -- I'm sorry, it's a mega paragraph; so it
6 might not be that helpful to tell you that. It's the
7 largest one, but I'm focusing on the sentence that
8 starts with, "As Table 1 shows..."

9 It says, "As Table 1 shows, the 2013
10 dispatch cost to produce electricity at the typical
11 US natural gas-fired power plant equivalent to the
12 dispatch cost at the typical US coal-fired power
13 plant with a delivered natural gas price of \$3.35 per
14 MMBtu..."

15 My question is: In this statement, are
16 you referring to combined-cycle power plants?

17 A. Yes.

18 Q. So this does not apply to a
19 simple-cycled power plant?

20 A. That's right.

21 Q. And in this statement, is a typical coal
22 plant a subcritical coal plant or a supercritical
23 coal plant?

24 A. I don't remember.

1 Q. Is there anything you could look at that
2 would refresh your memory?

3 A. Not with me here.

4 Q. Does -- you would agree that IHS
5 projects the price of natural gas in the future,
6 correct?

7 A. Yes.

8 Q. Have you reviewed any of IHS's future
9 projections --

10 A. Yes.

11 Q. -- of natural gas prices?

12 Sorry, I didn't mean to talk over you.
13 Was that a yes?

14 A. Yes.

15 Q. And is that proprietary information?

16 A. Yes.

17 Q. Without giving any answers, are you able
18 to -- do you know the future projections of natural
19 gas prices that IHS has come up with with
20 specificity?

21 A. I cannot recite for you right now what
22 our natural gas price forecast is.

23 Q. Do you know from a high level?

24 A. Yes.

1 Q. And when I say that, please don't give
2 numbers within the 50 cent range for each five years.

3 MR. KUTIK: Objection.

4 THE WITNESS: No. I don't have the
5 numbers in front of me that I will -- would testify
6 to within. I can give you a high level, but not the
7 specific numbers and times.

8 BY MR. OLIKER:

9 Q. And, I'm sorry, by high level, how
10 granular do you mean?

11 A. IHS produces gas price forecasts within
12 a scenario framework. So there are three scenarios
13 that produce a range of gas prices for planning
14 purposes.

15 Q. Have you reviewed the projections of
16 natural gas prices that Witness Judah Rose provided
17 in this proceeding?

18 MR. KUTIK: Objection.

19 THE WITNESS: I have not.

20 BY MR. OLIKER:

21 Q. Have you reviewed any of ICF
22 International projections of natural gas prices?

23 A. I have seen their projections at
24 different points in time.

1 Q. How recently?

2 A. I've seen comparisons. I can't tell you
3 where and when I had seen them.

4 Q. Fair enough. Going back to the \$3.35
5 per MMBtu, would you agree that natural gas
6 combined-cycle power plants are currently competing
7 or beating most coal plants?

8 MR. KUTIK: Objection.

9 THE WITNESS: No.

10 BY MR. OLIKER:

11 Q. Why is that?

12 A. They compete. But if by beating you
13 mean there's no coal-fired generation, then I think
14 the facts are that we do see coal-fired generation.

15 Q. Okay. So stated differently, would you
16 agree that natural gas combined-cycle power plants
17 are currently operating as baseload generation?

18 A. In some cases, but not all cases.

19 Q. And there are coal-fired power plants
20 that are on the margin?

21 A. Yes.

22 Q. Earlier we talked a little bit about
23 natural gas pipeline development. Have you read a
24 report released by the Department of Energy in

1 February of 2015 titled, "Natural Gas Infrastructure
2 Implications of Increased Demand from the Electric
3 Power Sector"?

4 A. No.

5 Q. Okay. In your testimony, you indicate
6 that the Economic Stability Plan is not a subsidy.
7 What is your definition of a subsidy?

8 A. In that particular case, I'm defining a
9 subsidy as a payment that's distorting an efficient
10 market result.

11 Q. So is it your testimony that the payment
12 in this instance puts these power plants on a level
13 playing field?

14 A. That's not what I testified to.

15 Q. You tell me why that's not -- why that's
16 not what you testified to.

17 A. I think the term "level playing field"
18 is vague.

19 Q. Do you agree that subsidy is an
20 out-of-market form of compensation?

21 A. I provided you my definition of subsidy
22 for the statement that I've made.

23 Q. Do you agree with the definition I just
24 provided as well?

1 THE WITNESS: Can you repeat his
2 definition, please?

3 BY MR. OLIKER:

4 Q. I'll just ask it again, Dr. Makovich.
5 Would you agree that a subsidy is an out-of-market
6 form of compensation?

7 A. Not necessarily.

8 Q. But can it be?

9 MR. KUTIK: Objection.

10 THE WITNESS: I believe there are --
11 that the term subsidy could be defined in different
12 ways by different people.

13 BY MR. OLIKER:

14 Q. So you would agree that a subsidy could
15 be defined as an out-of-market compensation?

16 MR. KUTIK: Objection, asked and
17 answered.

18 THE WITNESS: I've testified that I
19 believe people could have different definitions for
20 the term subsidy.

21 BY MR. OLIKER:

22 Q. Would you agree that a baseload power
23 plant in Ohio that is owned by an independent power
24 producer would consider the Economic Stability

1 Program a subsidy?

2 MR. KUTIK: Objection, calls for
3 speculation.

4 THE WITNESS: As I've just testified, it
5 would depend on how they define subsidies themselves.

6 BY MR. OLIKER:

7 Q. Do you agree that the Economic Stability
8 Program will allow Davis-Besse, Sammis, if approved,
9 to avoid the difficult retirement decisions that
10 other independent power producers that own base
11 generation in Ohio will have to consider?

12 MR. KUTIK: Objection.

13 THE WITNESS: Yeah. The question
14 requires me to speculate about the conditions and
15 decision parameters of people that I'm not privy to
16 their decision process.

17 BY MR. OLIKER:

18 Q. Do you agree that guaranteed cost
19 recovery for a power plant allows the plant owner to
20 operate that facility in a way differently than
21 someone that has to live solely by market-based
22 revenues?

23 MR. KUTIK: Objection.

24 THE WITNESS: Not necessarily.

1 BY MR. OLIKER:

2 Q. Why not?

3 A. Well, in the case that we're talking
4 about here, it's only a fraction of total cost
5 recovery.

6 Q. What do you mean, "it's only a fraction
7 of total cost recovery," Dr. Makovich?

8 A. There is still cost recovery that
9 depends on market revenue streams.

10 Q. Do you understand how the Economic
11 Stability Program works, Dr. Makovich?

12 A. I have testified that I have a general
13 understanding, but I do not have the specific terms
14 and conditions of the proposed contract.

15 MR. OLIKER: If I could just have two or
16 three minutes, I may be done.

17 (Discussion held off the record.)

18 MR. KUTIK: Let's go back on the record.

19 BY MR. OLIKER:

20 Q. Dr. Makovich, are you familiar with the
21 general evaluation process that a power plant
22 undergoes when it's considering a new capital
23 project?

24 MR. KUTIK: Objection.

1 THE WITNESS: Your question is quite
2 general. Can you rephrase it?

3 BY MR. OLIKER:

4 Q. Let's do -- are you familiar with the
5 Clean Power Plan?

6 A. I'm sorry, was the question am I
7 familiar? Yes, I'm familiar.

8 Q. So you know about the four building
9 blocks, correct?

10 A. Yes.

11 Q. Do you agree that Building Block 1 is
12 heat rate improvement?

13 A. Yes.

14 Q. Okay. Do you agree that the decision to
15 implement heat rate improvements may be a product of
16 evaluation of the cost of those improvements relative
17 to the revenues that will be received?

18 A. As I've testified, a capital decision
19 would involve an assessment of the costs and
20 benefits.

21 Q. Okay. Do you agree that if one market
22 participant is guaranteed to recover the cost of a
23 heat rate improvement and another market participant
24 must make its decision based upon the market revenues

1 that will be available, the former market participant
2 will have a competitive advantage?

3 MR. KUTIK: Objection, asked and
4 answered.

5 THE WITNESS: Not necessarily.

6 BY MR. OLIKER:

7 Q. Why is that?

8 MR. KUTIK: Objection, asked and
9 answered.

10 THE WITNESS: Again, without knowledge
11 of specifics with regard to these power plants, I
12 can't tell you what the impact is going to be.

13 BY MR. OLIKER:

14 Q. Do you agree that if one party has a
15 guaranteed cost recovery and the other party does
16 not, the first party with guaranteed cost recovery
17 has less risk?

18 MR. KUTIK: Objection.

19 THE WITNESS: Not necessarily.

20 BY MR. OLIKER:

21 Q. Why not?

22 A. There are multiple sources of risk.

23 Q. Risk of -- for purposes of this
24 question, I'm referring to the risk of investment

1 recovery.

2 MR. KUTIK: Objection.

3 THE WITNESS: I'm not sure, but can you
4 restate the question, please?

5 BY MR. OLIKER:

6 Q. Let's go back to your previous answer.
7 What are the different risks that the owner would
8 face?

9 A. With regard to what?

10 Q. You had indicated, I believe, that there
11 are different kinds of risks. What type of risks
12 were you indicating in your answer?

13 A. You had asked me a question about two
14 different power plants where some aspect of cost
15 recovery was different, and you did not specify any
16 of the other parameters of risk, and asked me if one
17 would necessarily be less risky than the other, and I
18 can't answer that question for you.

19 Q. Okay. Fair enough, Dr. Makovich.

20 Let's use the old parameters: All else
21 being equal, one power plant is guaranteed cost
22 recovery for heat rate improvement capital
23 expenditures and another power plant is not, do you
24 agree that the risk is much less for the company and

1 the power plant that has guaranteed cost recovery?

2 A. Not necessarily.

3 MR. KUTIK: Objection.

4 BY MR. OLIKER:

5 Q. Okay. I hope you heard me say all else
6 being equal.

7 A. I did.

8 Q. Why was that not necessarily true?

9 A. It would depend on the characteristics
10 of our starting position.

11 Q. And as I said, all else being equal.

12 MR. KUTIK: Well, he's answered that
13 question. So what's your next question?

14 MR. OLIKER: Answer -- the answer
15 indicated that the starting positions are not the
16 same, and that variable has been taken out of the
17 equation.

18 MR. KUTIK: No. That's not what he
19 said.

20 BY MR. OLIKER:

21 Q. Dr. Makovich, can you please clarify
22 your answer?

23 A. I said all else being equal, which means
24 we've got a base situation that hasn't changed other

1 than the one thing you mentioned.

2 Q. Is that your answer, Dr. Makovich?

3 A. Yes.

4 Q. This may be the last hypothetical.

5 Dr. Makovich, assume for a second that there are four
6 power plants that are identical to the power plants
7 that are the subject of FirstEnergy's application.
8 They're located on plots of land that are directly
9 next door each of those power plants, almost like
10 having a twin. Would you agree that if the Economic
11 Stability Plan is approved, the FirstEnergy Solutions
12 power plants will have the competitive advantage?

13 MR. KUTIK: Objection, asked and
14 answered.

15 THE WITNESS: No.

16 BY MR. OLIKER:

17 Q. Why is that?

18 MR. KUTIK: Asked and answered.

19 THE WITNESS: I've already said, they're
20 going to be -- they're going to continue to compete
21 in the energy market on the basis of their
22 incremental generating costs.

23 BY MR. OLIKER:

24 Q. Do you disagree that those plants would

1 face a risk of retirement that the FirstEnergy
2 Solutions plants would not?

3 MR. KUTIK: Objection, asked and
4 answered.

5 THE WITNESS: We've got similar
6 locations and similar plants, but ownership
7 structures, financial structures could be different
8 in this hypothetical. So I can't tell you how they
9 would each fare.

10 BY MR. OLIKER:

11 Q. So you're saying because there's a
12 chance the FirstEnergy plants -- the FirstEnergy
13 Solutions plants won't close, there's a chance that
14 those ones will not, either?

15 THE WITNESS: Can you read that back to
16 me?

17 (Record read back as requested.)

18 MR. KUTIK: Objection.

19 THE WITNESS: Yeah. That's not my
20 testimony.

21 BY MR. OLIKER:

22 Q. Is it your testimony that the Economic
23 Stability Program does not provide a benefit to
24 FirstEnergy Solutions?

1 A. I did not testify to that.

2 Q. And going back to your rationality, the
3 economic rationale for retiring a power plant, is
4 your analysis the traditional framework used in an
5 integrated resource planning process?

6 A. Not necessarily.

7 Q. Is it the process used in a regulated
8 environment?

9 A. Not necessarily.

10 Q. This may be a little off of this
11 subject. I'm curious regarding your testimony in
12 Michigan. Would it be any different if the Michigan
13 transmission owners were all members of PJM
14 Interconnection?

15 MR. KUTIK: Would what be different?

16 MR. OLIKER: His testimony.

17 MR. KUTIK: Which testimony?

18 BY MR. OLIKER:

19 Q. Dr. Makovich, you submitted testimony
20 recently in Michigan, correct?

21 A. Yes.

22 Q. Would there be any aspect of your
23 testimony you would have changed if Michigan was
24 entirely located within PJM?

1 MR. KUTIK: Objection. Now you really
2 are getting far afield; so I hope you're done.

3 MR. OLIKER: Very close, David.

4 MR. KUTIK: Well, you said it was 15
5 minutes over an hour ago; so we should be done, like,
6 now. But go ahead and answer that question.

7 THE WITNESS: The testimony in Michigan
8 had to do with the conditions in Michigan which
9 involved partial retail choice in the MISO market
10 with a small piece in the southwest corner of
11 Michigan being in PJM.

12 BY MR. OLIKER:

13 Q. My question is: If all of Michigan was
14 in PJM, would your testimony have looked different?

15 A. Yes.

16 Q. And how so?

17 A. In the way the capacity market would be
18 expected to work.

19 Q. Therefore, you believe the problems
20 experienced in Michigan would be smaller --

21 MR. KUTIK: Objection.

22 BY MR. OLIKER:

23 Q. -- right?

24 A. I did not testify to that. I've not

1 done a quantification of the impacts under the
2 hypothetical you've presented.

3 MR. OLIKER: David, this is my last
4 question.

5 BY MR. OLIKER:

6 Q. Dr. Makovich, you do not believe that
7 retail choice leads to a lack of diversification of
8 supply, correct?

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

11 (Record read back as requested.)

12 THE WITNESS: I have not testified that
13 retail choice in any form is affecting the diversity
14 in PJM. I'm not sure the linkage that you're asking
15 me about here.

16 BY MR. OLIKER:

17 Q. Sorry, I hoped we were done, but I'll
18 try to refine it. Competition itself doesn't lead to
19 a lack of diversity of generation, correct?

20 MR. KUTIK: Objection, incomplete
21 hypothetical.

22 THE WITNESS: Yeah. I'm -- I'm confused
23 about your question about retail competition and
24 power supply.

1 BY MR. OLIKER:

2 Q. Well, I tried to ask it broader of
3 wholesale competition, Dr. Makovich. You're not
4 testifying that wholesale competition or retail
5 competition erode fuel diversity, correct?

6 MR. KUTIK: Objection.

7 THE WITNESS: I have not testified that
8 competition erodes fuel diversity.

9 MR. OLIKER: Okay. Thank you. That's
10 all the questions I have, Dr. Makovich. I appreciate
11 your time.

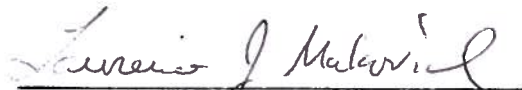
12 MR. KUTIK: Okay. We will read the
13 transcript, and at this point we are off the record.

14 (Thereupon, the deposition concluded
15 at 4:45 p.m. Signature not waived.)

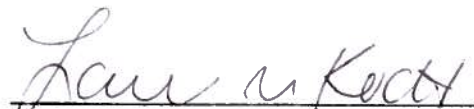
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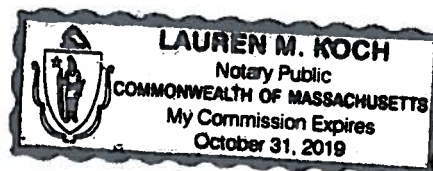
1 State of Ohio :
2 County of : SS:
3 :

4 I, Lawrence J. Makovich, Ph.D., do
5 hereby certify that I have read the foregoing
6 transcript of my deposition given on Wednesday,
7 May 27, 2015; that together with the correction page
8 attached hereto noting changes in form or substance,
9 if any, it is true and correct.

10 
11 Lawrence J. Makovich, Ph.D.

12 I do hereby certify that the foregoing
13 transcript of the deposition of Lawrence J. Makovich,
14 Ph.D. was submitted to the witness for reading and
15 signing; that after he had stated to the undersigned
16 Notary Public that he had read and examined his
17 deposition, he signed the same in my presence on the
18 8th day of June, 2015.

19 
20 Notary Public



21 My commission expires October 31, 2019.
22 ---
23
24

ERRATA SHEET

Please do not write on the transcript. Any changes in form or substance you desire to make should be entered upon this sheet.

TO THE REPORTER:

I have read the entire transcript of my deposition taken on the 27 day of May, 2015, or the same has been read to me. I request that the following changes be entered upon the record for the reasons indicated. I have signed my name to the signature page and authorize you to attach the same to the original transcript.

Page	Line	Change	Reason
51	9	"and" to "in"	clarification
62	4	"average" to "diverge"	clarification
96	16	"of a" to "of having a"	clarification
106	23	"Ver" to "Variables"	clarification
217	1	"What" to "These"	clarification
217	2	delete "That"	clarification

Date June 8, 2015 Signature: Lawrence J. Makovick

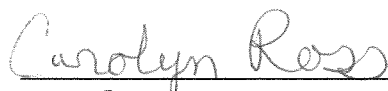
CERTIFICATE

State of Ohio :
County of Muskingum : SS:

I, Carolyn D. Ross, Registered Professional Reporter and Notary Public in and for the State of Ohio, duly commissioned and qualified, certify that the within named Lawrence J. Makovich, Ph.D. was by me duly sworn to testify to the whole truth in the cause aforesaid; that the testimony was taken down by me in stenotype in the presence of said witness, afterwards transcribed upon a computer; that the foregoing is a true and correct transcript of the testimony given by said witness taken at the time and place in the foregoing caption specified and completed without adjournment.

I certify that I am not a relative, employee, or attorney of any of the parties hereto, or of any attorney or counsel employed by the parties, or financially interested in the action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Columbus, Ohio, on this 29th day of May, 2015.



Carolyn D. Ross,
Registered Profession
Reporter and Notary
Public in and for the
State of Ohio.

My commission expires April 3, 2019.

(CDR-78541)

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Case No(s). 14-1297-EL-SSO

Summary: Deposition (Public) of Lawrence J. Makovich electronically filed by Mr. Tony G. Mendoza on behalf of Sierra Club