BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO

- - -

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

- - -

PROCEEDINGS

before Mr. Gregory Price, Ms. Mandy Chiles, and Ms. Megan Addison, Attorney Examiners, at the Public Utilities Commission of Ohio, 180 East Broad Street, Room 11-A, Columbus, Ohio, called at 10 a.m. on Tuesday, September 8, 2015.

- - -

VOLUME VI

- - -

ARMSTRONG & OKEY, INC.
222 East Town Street, Second Floor
Columbus, Ohio 43215-5201
(614) 224-9481 - (800) 223-9481
Fax - (614) 224-5724

- - -

APPEARANCES:

FirstEnergy Corp.
By Mr. James W. Burk
and Ms. Carrie M. Dunn
76 South Main Street
Akron, Ohio 44308

Calfee, Halter & Griswold LLP
By Mr. James Lang
and Mr. N. Trevor Alexander
The Calfee Building
1405 East Sixth Street
Cleveland, Ohio 44114

Jones Day
By Mr. David A. Kutik
901 Lakeside Avenue
Cleveland, Ohio 44114

On behalf of the Applicants.

Bruce E. Weston, Ohio Consumers' Counsel
By Mr. Larry Sauer
Ms. Maureen R. Grady
Mr. William J. Michael
Mr. Kevin F. Moore
Ms. Ajay K. Kumar
Assistant Consumers' Counsel
10 West Broad Street, Suite 1800
Columbus, Ohio 43215-3485

On behalf of the Residential Consumers of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company.

Ohio Partners for Affordable Energy
By Ms. Colleen L. Mooney
231 West Lima Street
Findlay, Ohio 45840

On behalf of the Ohio Partners for Affordable Energy.

APPEARANCES: (Continued)

Bricker & Eckler, LLP
By Mr. Dane Stinson
and Mr. Dylan Borchers
100 South Third Street
Columbus, Ohio 43215-4291

Bricker & Eckler, LLP
By Mr. Glenn S. Krassen
1001 Lakeside Avenue East, Suite 1350
Cleveland, Ohio 44114

On behalf of the Northeast Ohio Public Energy Council, Ohio Schools Council, and Power for the Schools.

Earthjustice
By Mr. Shannon Fisk
Northeast Office
1617 John F. Kennedy Boulevard, Suite 1675
Philadelphia, Pennsylvania 19103

Earthjustice
By Mr. Michael Soules
1625 Massachusetts Avenue NW, Suite 702
Washington, D.C. 20036

Sierra Club Environmental Law Program
Mr. Tony Mendoza
85 Second Street, 2nd Floor
San Francisco, California 94105

Richard Sahli Law Office, LLC
By Mr. Richard C. Sahli
981 Pinewood Lane
Columbus, Ohio 43230-3662

On behalf of the Sierra Club.

McNees, Wallace & Nurick LLC
By Mr. Frank P. Darr
and Mr. Samuel C. Randazzo
21 East State Street, 17th Floor
Columbus, Ohio 43215

On behalf of the Industrial Energy Users of Ohio.

APPEARANCES: (Continued)

IGS Energy
By Mr. Joseph Oliker
6100 Emerald Parkway
Dublin, Ohio 43016

On behalf of IGS Energy.

Taft, Stettinius & Hollister LLP
By Mr. Mark S. Yurick
and Mr. Devin D. Parram
65 East State Street, Suite 1000
Columbus, Ohio 43215

On behalf of The Kroger Company.

Vorys, Sater, Seymour & Pease, LLP
By Mr. M. Howard Petricoff
Ms. Gretchen Petrucci
Mr. Stephen M. Howard
and Mr. Michael J. Settineri
52 East Gay Street
Columbus, Ohio 43215

On behalf of Retail Energy Supply Association, PJM Power Providers Group, Electric Power Supply Association, Constellation NewEnergy, and Exelon Generation, LLC.

Mike DeWine, Ohio Attorney General
By Mr. William L. Wright,
Section Chief
Mr. Thomas G. Lindgren
Mr. Thomas W. McNamee
Mr. Steven L. Beeler
Assistant Attorneys General
Public Utilities Section
180 East Broad Street, 6th Floor
Columbus, Ohio 43215

On behalf of the Staff of the PUCO.

APPEARANCES: (Continued)

Kravitz, Brown & Dortch, LLC
By Mr. Michael D. Dortch
and Mr. Richard R. Parsons
65 East State Street, Suite 200
Columbus, Ohio 43215

On behalf of Dynegy, Inc.

Carpenter Lipps & Leland LLP
By Ms. Kimberly W. Bojko
Ms. Rebecca L. Hussey
280 North High Street, Suite 1300
Columbus, Ohio 43215

On behalf of the Ohio Manufacturers' Association Energy Group.

Carpenter Lipps & Leland LLP
By Mr. Joel E. Sechler
280 North High Street, Suite 1300
Columbus, Ohio 43215

On behalf of EnerNOC, Inc.

Boehm, Kurtz & Lowry
By Mr. Michael L. Kurtz
Mr. Kurt J. Boehm
Ms. Jody Kyler Cohn
36 East Seventh Street, Suite 1510
Cincinnati, Ohio 45202

On behalf of the Ohio Energy Group.

Environmental Law & Policy Center
By Ms. Madeline Fleisher
21 West Broad Street, Suite 500
Columbus, Ohio 43215

On behalf of the Environmental Law & Policy Center.

APPEARANCES: (Continued)

Stone Mattheis Xenopoulos & Brew, PC
By Mr. Michael Lavanga
Mr. Garrett A. Stone
Mr. Owen J. Kopon
1025 Thomas Jefferson Street, N.W.
Eighth Floor West Tower
Washington, D.C. 20007-5201

On behalf of the Nucor Steel Marion, Inc.

Barth E. Royer, LLC
By Mr. Barth E. Royer
2740 East Main Street
Bexley, Ohio 43209

and

Taft, Stettinius & Hollister LLP
By Mr. Adrian D. Thompson
200 Public Square, Suite 3500
Cleveland, Ohio 44114-2300

On behalf of the Cleveland Municipal School District.

Spilman, Thomas & Battle, PLLC
By Mr. Derrick Price Williamson
Ms. Carrie Harris
Ms. Lisa Hawrot
1100 Bent Creek Boulevard, Suite 101
Mechanicsburg, Pennsylvania 17050

On behalf of Wal-Mart Stores East, LP, and Sam's East, Inc.

Mr. Richard L. Sites
155 East Broad Street
Columbus, Ohio 43215

Bricker & Eckler, LLP
By Mr. Thomas J. O'Brien
100 South Third Street
Columbus, Ohio 43215-4291

On behalf of the Ohio Hospital Association.

APPEARANCES: (Continued)

Ohio Environmental Council
By Mr. Trent A. Dougherty
and Mr. John Finnigan
1145 Chesapeake Avenue, Suite I
Columbus, Ohio 43212

On behalf of the Ohio Environmental Council and the Environmental Defense Fund.

Mr. Thomas R. Hays
8355 Island Lane
Maineville, Ohio 45039

On behalf of the Northwest Ohio Aggregation Coalition and the Individual Communities.

Ice Miller, LLP
By Mr. Christopher Miller,
250 West Street, Suite 700
Columbus, Ohio 43215-7509

On behalf of the Association of Independent Colleges and Universities of Ohio.

American Electric Power
By Mr. Steven T. Nourse
Mr. Matthew J. Satterwhite
One Riverside Plaza
Columbus, Ohio 43215

On behalf of the Ohio Power Company.

Mr. Craig I. Smith
15700 Van Aken Boulevard #26
Shaker Heights, Ohio 44120

On behalf of Material Sciences Corporation.

Meissner and Associates Law Firm
By Mr. Joseph Patrick Meissner
5400 Detroit Avenue
Cleveland, Ohio 44102

APPEARANCES: (Continued)

Kegler, Brown, Hill & Ritter
By Mr. Christopher J. Allwein
and Ms. Margeaux Kimbrough
Capitol Square, Suite 1800
65 East State Street
Columbus, Ohio 43215-4294

On behalf of the EverPower Wind Holdings, Incorporated.

- - -

INDEX

- - -

- - -

INDEX (Continued)

- - -

- - -

Tuesday Morning Session,
September 8, 2015.

- - -

EXAMINER PRICE: Let's go back on the record.

Good morning. The Public Utilities Commission has set for hearing at this time and place in the matter of the application of Ohio Edison Company, the Cleveland Electric Illuminating Company and the Toledo Edison Company for Authority to provide for a standard service offer pursuant to Revised Code 4928.143 in the form of an electric plan, being Case No. 14-1297-EL-SSO.

My name is Gregory Price. With me is Mandy Chiles and Megan Addison. We are the Attorney Examiners to preside over today's hearing. As has been our practice, let's go ahead and take abbreviated appearances starting with the company

MR. BURK: On behalf of the companies, James W. Burk, Carrie M. Dunn. Also on behalf of the companies, James Lang and Trevor Alexander of the Calfee law firm and David Kutik of the Jones Day law firm.

MR. SAUER: Good morning, your Honors. On behalf the residential customers of the

FirstEnergy companies, the office of Ohio Consumers' Counsel, Larry Sauer, Maureen Grady, Ajay Kumar, William Michael, and Kevin Moore. Thank you.

MR. KURTZ: Good morning, your Honors. For OEG, Mike Kurtz.

MR. McNAMEE: On behalf of the staff of the Public Utilities Commission of Ohio, Thomas Lindgren, Steven Beeler, and I am Thomas McNamee.

MR. STINSON: On behalf of the Northeast Ohio Public Energy Council, Power for Schools, Ohio Schools Council, the firm of Bricker & Eckler, Glenn Krassen, Dane Stinson, and Dylan Borchers.

MR. OLIKER: Good morning, your Honors. On behalf of IGS Energy, Joe Oliker.

MR. FISK: Good morning, your Honors. On behalf of the Sierra Club, Shannon Fisk, and with me is Michael Soules.

MS. FLEISHER: Good morning, your Honors. On behalf of the Environmental Law & Policy Center, Madeline Fleisher.

MS. BOJKO: Good morning, your Honors. On behalf of the Ohio Manufacturers' Association Energy Group, Kimberly W. Bojko and Rebecca L. Hussey.

MR. PETRICOFF: On behalf of the Retail

Energy Supply Association, the Electric Power Supply Association, PJM Power Providers Group, Exelon Generation, and Constellation NewEnergy, the law firm of Vorys, Sater, Seymour & Pease, Howard Petricoff, Gretchen Petrucci, Mike Settineri, and Steve Howard.

MR. HAYS: Good morning, your Honors, Tom Hays on behalf of NOAC and the individual communities.

MR. O'BRIEN: Good morning, your Honors. On behalf of the Ohio Hospital Association, Richard L. Sites and Thomas O'Brien.

MR. DARR: On behalf of IEU-Ohio, Frank Darr and Sam Randazzo.

MR. PARRAM: Good morning, your Honors. On behalf of the Kroger Company, Devin Parram and Mark Yurick.

MS. KINGERY: On behalf of the nonparty Duke Energy Ohio, Amy Spiller and Jeanne Kingery.

EXAMINER PRICE: Thank you.

Mr. Alexander, would you care to state for the record the entities that signed the confidentiality agreement with Duke Energy Ohio regarding Mr. Rose's testimony from the previous Duke ESP?

MR. ALEXANDER: Yes, your Honor. As of

this moment, the parties who have signed that confidentiality agreement and returned it to the companies are Sierra Club, IGS Energy, OCC, OHA, Mr. Hays, IEU-Ohio, OEC, RESA and P3, ELPC, OMA, and AEP Ohio.

EXAMINER PRICE: Thank you.

MR. KURTZ: Your Honor, OEG is in the process of signing it. I think it's probably done this morning.

EXAMINER PRICE: Okay. Thank you.

MR. STINSON: The statement would be true for NOPEC, Power for Schools and OSC.

EXAMINER PRICE: Thank you.

FirstEnergy, call your next witness.

MR. ALEXANDER: Your Honor, the companies would call Judah Rose.

(Witness sworn.)

EXAMINER PRICE: Please state your name and business address for the record.

THE WITNESS: My name is Judah Rose, spelled J-u-d-a-h Rose, and my address is 9300 Lee Highway, Fairfax, Virginia 22031.

EXAMINER PRICE: Thank you.

Please proceed.

- - -

JUDAH L. ROSE

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

DIRECT EXAMINATION

By Mr. Alexander:

Q. Mr. Rose, did you prepare a prefiled direct testimony in this proceeding?

A. Yes, sir, I did.

(EXHIBITS MARKED FOR IDENTIFICATION.)

MR. ALEXANDER: And, your Honors, we had previously provided the court reporter with copies of that prefiled direct testimony and had them marked for identification as Companies' Exhibit 17 and 18 confidential.

Q. Mr. Rose, do you have copies of your prefiled direct testimony in front of you?

A. Yes, sir.

Q. And do you have any changes or corrections to that prefiled direct testimony?

A. Yes, I have two.

Q. And what is the first one?

A. On page 5, line 23, where it says the word "natural gas" it should read "coal." Again, that's page 5, line 23, where it says "natural gas," it should say "coal."

Q. And what is your second change?

A. On page 47 in table 8, close to the bottom row, it says 3034, I meant 2034. So the 3 goes to a 2 on page 47, table 8.

MR. OLIKER: I'm sorry. Could you have that one repeated.

THE WITNESS: So table 8, page 47, the second to the bottom row in the table says "3034." It should say "2034."

MR. OLIKER: Thank you.

Q. (By Mr. Alexander) Mr. Rose, subject to those corrections, if I were to ask you the same questions again today as appear in your direct testimony, would your answers be the same?

A. Yes, sir.

MR. ALEXANDER: Your Honor, I move for admission of Companies' Exhibit 17 and 18, and the witness is available for cross-examination.

EXAMINER PRICE: We will defer ruling on admission of Companies' Exhibit 17 and 18 until the conclusion of cross.

Mr. Fisk.

MR. FISK: Thank you, your Honor.

- - -

CROSS-EXAMINATION

By Mr. Fisk:

Q. Good morning, Mr. Rose.

A. Good morning.

Q. How are you doing today?

A. Great.

Q. Okay. So you are testifying here on behalf of the Ohio Edison Company, Cleveland Electric Illuminating Company and the Toledo Edison Company; is that correct?

A. Yes, sir.

Q. Okay. Can we agree to refer to those three entities collectively as the companies?

A. Yes, sir.

Q. And are you generally aware of a proposed transaction under which FirstEnergy Solutions would sell capacity, energy, and ancillary services from its Sammis, Davis-Besse plants and its share of the OVEC plants to the companies?

A. I have some knowledge. That wasn't the focal point of my testimony, but I have some general knowledge.

Q. Okay. And you are not offering any opinions in this proceeding as to whether the Commission should approve that proposed transaction,

correct?

A. That's correct.

Q. And you first became involved in this proceeding sometime in the spring of 2014; is that right?

A. Yes, sir.

Q. And you were initially contacted about being involved in this proceeding by Mark Hayden; is that right?

A. He was one of the initial people that I spoke to. I don't know if he was actually the first one, but he was -- if he wasn't the first, he was the second.

Q. Okay. And you've also spoken with David Pinter regarding this proceeding; is that right?

A. Yes, sir.

Q. Okay. And you've also spoken with Scott Casto regarding the proceeding; is that right?

A. Yes, sir.

Q. Okay. And, to your knowledge, have you communicated with anyone regarding this proceeding who is employed by any of the companies?

A. I don't know the corporate affiliations of all the parties or their agency agreements, but what I do know is my contract is with the companies.

I've always felt that I was working for the companies as indicated in my testimony.

Q. And you've never communicated with Jay Ruberto regarding this proceeding, correct?

A. I don't remember. The name is familiar and -- I don't remember.

Q. So you don't remember any communications with him?

A. Correct. I can't say that I never spoke to him. The name is very familiar, however.

Q. Okay. And you have never communicated with Jason Lisowski regarding this proceeding; is that right?

A. No, that's not correct. In my deposition, I said I wasn't sure what I remembered, or I may have misspoke, but I have had some conversations with Jason.

Q. And when do you recall those conversations?

A. After the deposition.

Q. Okay. And what were the nature of those conversations?

A. They were related to the interface between the work that we were doing and the work that he was doing.

Q. Okay. In your testimony you offer projections of market energy and capacity prices over the next 20 years; is that right?

A. Yes, sir.

Q. Okay. And you also offer in your testimony projection of natural gas prices over the next 20 years, right?

A. Yes, sir.

Q. Okay. And would you agree that near natural gas price projection is an important parameter in your energy price projection?

A. Yes, but I just want to be clear as what I mean by important. It's primarily important in the long run. So, for example, this year gas prices are down, but the electrical energy prices that the power plants would receive are not down in a major way, or much less. So in the near term, gas prices play a role and the importance increases over time. So I just want to make sure that people are not confused that there is a significant difference between the role of gas in the near term and gas in the long term.

EXAMINER PRICE: Let's go off the record.

(Discussion off the record.)

(Record read.)

Q. (By Mr. Fisk) Okay. You also provide in this proceeding a projection of future carbon costs; is that right?

A. Yes, sir.

Q. Okay. And then is it your understanding that projections of energy and capacity prices and your projection of carbon costs were used as inputs in modeling done by FirstEnergy to forecast the revenues and costs of the Sammis, Davis-Besse and OVEC entitlement?

A. Yes, it's my understanding.

MR. ALEXANDER: Objection, your Honor.

EXAMINER PRICE: Grounds?

MR. ALEXANDER: Compound.

EXAMINER PRICE: Well, he already answered it. Were you finished with your answer? Okay.

A. Yes, we provided forecasts and yes, I understand the companies use them. I was not involved in the use of them. It wasn't the focal point of my analysis and work.

Q. Okay. So you were not personally involved in any of the modeling that FirstEnergy may have done in this proceeding?

A. Except for -- not to minimize. It's

obviously very important to provide prices. We provide a price forecast, as you indicated, for electrical energy which is the most important capacity and CO-2 which is also important.

Q. Okay. But beyond that, you didn't have any involvement in the modeling?

A. Correct.

Q. Okay. And would you agree that the market energy price would be a significant factor in the amount of revenue that could result from selling the energy from the Sammis, Davis-Besse and OVEC entitlement?

A. Yes. So about 80 to 85 percent of the revenues that a power plant would receive comes from the sales of electrical energy primarily in the day-ahead PJM market. Secondarily, the remaining 15 to 20 percent would be primarily capacity related. So electrical energy is by far the largest revenue source available to power plants in PJM.

Q. Okay. Great. And if you turn to your testimony on page 4, lines 9 through 2. Are you there?

A. Yes, sir.

Q. Okay. And you have a discussion there about unanticipated developments that have lowered

market energy and capacity prices over the past few years; is that correct?

A. Yes.

Q. Okay. And then you list these five such unanticipated developments; is that right?

A. Yes, sir.

Q. Okay. And one of those is the great recession; is that right?

A. Yes. Just to amplify on that just previously, which is that we're missing about a fifth of the economy because of the great recession. It's the worst performing economy since the 1930s, and we didn't anticipate that the rescission would occur and there wouldn't be a snap back afterwards. We are missing about a fifth of the economy relative to long-term average growth.

Q. Okay. And as a result, there's lower demand than what was expected; is that right?

A. Yes. That's a significant factor obviously in supply and demand analysis.

Q. Okay. And all else being equal, lower demand generally would have a downward effect on energy prices; is that right?

A. Yes, particularly when it's unexpected.

Q. And it would also generally have a

downward effect on capacity prices; is that right?

A. Yes, that is if it creates excess capacity in the capacity markets, that can be a very significant factor, and that was part of what's happened in the last, say, five years or so, in addition to regulatory problems, structural problems in the capacity markets.

Q. Okay. And when you say "excess capacity," are you referring to capacity over reserve margins?

A. Yes. So typically PJM would like to have, if you will, equilibrium or economically efficient outcome. Typically it is around a reserve margin of 15 percent over expected summer peak. So when you have 20 percent or a 25 percent, that's excess capacity relative to that measure.

Q. Okay. And another unanticipated development that you identify is increased natural gas supplies from fracking; is that right?

A. Yes, sir. It's well understood or well known that there has been significant developments in gas technology and, in particular, as manifested in the development of the Marcellus shale, which is in the northern United States.

Q. And so if we had been sitting here in

2007 and projecting future energy prices, we likely would not have foreseen the developments that you listed on page 4, lines 12 to 22, of your testimony; is that right?

A. Yes, that is, losing a fifth of the economy relative to expectations was not expected. And while there was some expected improvement in technology, it was at a much higher rate than anticipated. I'm sorry. Let me just also say that the other critical -- third critical thing is that the delay in actually structuring properly the capacity market in PJM was not anticipated, and that was a long time coming.

Q. Okay. So, as a result, projections made, say, in 2007 likely would have overestimated energy prices; is that right?

A. I believe so. I was referring more to projections that were in the 2010, 2011 period. I didn't go back, but I think that that's possible.

Q. Okay. And you would agree that there is a potential for unanticipated developments over the next 15 to 20 years, correct?

A. Yes, both on the upside and downside, so that no one expects to lose another fifth of the economy that was a one in 70-year event. We think

that the shale technology is -- it's going to improve. It's primarily a mature situation. We are not going to find another Marcellus. There is not another Marcellus out there. And hopefully the very significant improvements in the last few months in the capacity markets will continue, but there's potential for unanticipated upside, a downside, and that's why due consideration of hedge possibilities is important.

Q. And so there's significant uncertainty and variability in market prices both in terms of multi-year periods and shorter term periods; is that right?

MR. ALEXANDER: Objection.

EXAMINER PRICE: Grounds?

MR. ALEXANDER: I believe it's compound and misstates Mr. Rose's testimony.

EXAMINER PRICE: Response?

MR. FISK: I am happy to break it up. If Mr. Rose feels it misstates his testimony, he can say that.

Q. (By Mr. Fisk) Would you agree there is significant uncertainty and variability in market prices in terms of the multi-year periods?

A. Yes. Yeah, I would think that's fair,

yes.

Q. Okay.

A. But I think -- I just want to make sure that I get a chance to answer the question that you originally had so, again --

EXAMINER PRICE: You can't object to your counsel's objection.

A. I'm sorry to interrupt.

Q. So in any given year, market energy prices could be significantly lower than what you're projecting in this proceeding; is that right?

A. It could be significantly lower, and they could be significantly higher. I did want to emphasize something that may not be common understanding of what's involved in forecasting. It's true you have a better near term view of what's likely to happen because you have more information about the near term than the long term.

One would conclude potentially that forecasting next year or the year after has less uncertainty than in the long run. But in the long run, you have the law of large numbers working for you. So you have multiple trials or multiple years, and so what happens is you have less variability in the forecast.

So it's like trying to estimate what's the chance of flipping a coin and getting a heads. If you just have one or two years, the near term, and you get two tails, you would conclude you never have a chance of getting a heads. Whereas, when you are forecasting for the long run, you'll know that you are going to get information about flipping a coin and also what the long term average price is going to be.

MR. FISK: Your Honor, I would move to strike everything after "higher" as nonresponsive to the question I asked.

EXAMINER PRICE: I am going to deny your motion to strike because I found his answer to be very interesting and useful to the Commission.

But, Mr. Rose, from this point on, please listen to counsel's question and answer the question and only the question. Mr. Alexander will have an opportunity on redirect to help fill out anything in the record that you feel needs to be filled out.

THE WITNESS: Yes, sir.

MR. FISK: Thank you, your Honor.

Q. (By Mr. Fisk) When you reference "long term," am I correct that's five years or greater?

A. Yes, I think that's a fair definition.

Q. Okay. And short term is anything less than five years?

A. Yes. I mean sometimes I distinguish in the medium term, say three years, three or four, et cetera, versus one or two, but that's fair.

Q. Okay. And you would agree that in any given year, capacity prices could be significantly lower than what you are projecting in this proceeding; is that correct?

A. Yes. And the same answer I gave earlier with respect to it could be lower, it could be higher.

Q. And do you recall doing work regarding the Flint Creek plant in Arkansas?

A. Yes, sir.

Q. In that case, you provided testimony regarding a proposal to retrofit a coal-fired power plant; is that right?

A. Yes, sir.

MR. FISK: May we approach, your Honor?

EXAMINER PRICE: You may.

Q. Mr. Rose, you have been handed an exhibit that will be marked as SC Exhibit 9.

EXAMINER PRICE: It will be so marked.

(EXHIBIT MARKED FOR IDENTIFICATION.)

Q. And it is entitled "The Direct Testimony of Judah L. Rose on Behalf of the Southwestern Electric Power Company;" is that correct?

A. Yes, sir.

Q. And this is the redacted version of the testimony that was filed with the Arkansas Public Service Commission; is that right?

A. So appears.

Q. Okay. And if you could take a look through it and confirm whether this appears to be a copy of the testimony you submitted regarding the Flint Creek plant.

A. It does appear so.

Q. Okay. And this was produced in discovery in response to Sierra Club Set 1-RPD-39 Attachment 1. And with regards to the Flint Creek project, if you turn to page 7, you describe a four-part assessment that ICF carried out; is that correct?

A. Yes, sir.

Q. Okay. And the first step in your analysis is that you calculated the present value revenue requirements for the Flint Creek plant and other options under a base case outlook; is that right?

A. Yes, that's the first and most important

element.

Q. Okay. And then in the second part, you analyze the present value revenue requirements under six alternative scenarios; is that right?

A. Yes, with respect to economic drivers, yes.

Q. Okay. And those economic drivers were natural gas prices, coal prices, and CO-2 prices; is that right?

A. Yes, sir.

Q. Okay. And the alternative scenarios that you analyzed, those are frequently referred to as sensitivities; is that right?

A. Yes, sir.

Q. Okay. And if you look at line 21 on page 7, am I correct that the purpose of running the sensitivity analysis is to examine long-term average uncertainty in key economic drivers?

A. Yes, sir.

Q. Okay. And in the present proceeding, you did not do any sort of sensitivity analyses, correct?

A. Yes, that's correct.

Q. Okay. But it is ICF's practice to always ask their clients if they want sensitivities; is that right?

A. Yes. And, you know, in some cases, we do not do sensitivity cases. I can elaborate on that if you would like. In some cases, we do.

Q. And the purpose of a sensitivity is to evaluate how the present value revenue requirements for a proposal would change if certain economic drivers were different; is that right?

A. Yes. That's a fair characterization.

Q. Okay. So, for example, if natural gas prices were lower than your base case projection, you would do a sensitivity analysis to determine how that would affect your revenues?

A. Yes, that's an example.

Q. Okay. Give me one second here. And if you look on page 18 of this exhibit, if you look at line 5, you state that "Every $1/MMbtu increase or decrease in the natural gas price forecast results in an approximately $7/ to $8/MWh (in real dollars) advantage or disadvantage to Flint Creek coal generation over natural gas generation." Do you see that?

A. Yes. That was referring to an approximate long-term estimate, not necessarily the short-term.

Q. Okay. So over the long term, if natural

gas prices are lower than the base case, that could have a significant impact on the dollars per megawatt-hour that's generated from operating a coal plant; is that right?

A. Yes, in the long term. And, as you can see, the forecast went out to 2035. So, yes, in the long term, but not so in the short-term.

Q. Okay. Coal plants dispatch in competition with natural gas plants, correct?

A. Yes. Although, in most hours in Ohio today, coal plants are dispatching in competition with each other. That's the primary form of competition that's occurring in Ohio today in most hours. In some hours, I would say about 20 to 25 percent of the hours, gas is the marginal source, and so there is competition primarily among gas and coal and gas and gas. But most of the hours, it's coal on coal.

Q. And the lower the gas price is, the more competitive the natural gas plant would be in comparison to the coal plant, correct?

A. Yes, all else equal.

Q. Okay.

A. Assuming nothing else has changed.

Q. And that's true even in the short term,

right?

A. Yes. It depends -- it's not linear, so what happens is that if gas prices are strong like they were in 2014, the last full year we have, it has some effect if the gas prices go down some. But it really has an effect at very low gas prices, close to price floor.

MR. FISK: May we approach?

EXAMINER PRICE: You may.

MR. FISK: This I will ask to be marked as Sierra Club Exhibit 10.

EXAMINER PRICE: It will be so marked.

(EXHIBIT MARKED FOR IDENTIFICATION.)

MR. FISK: And this is a document that was produced in discovery, OCC Set 7-RPD-066 Attachment 1-a.

Q. (By Mr. Fisk) And, Mr. Rose, am I correct this document is "ICForecast: Executive Energy Outlook-Data Tables"?

A. Yes, sir.

Q. Okay. And have you seen this document before?

A. Yes, sir.

Q. Okay. And the header at the top of the page identifies this as 2013 Quarter 4. However, on

all the other pages, it's identified as Quarter 3 of 2014; is that right?

A. Yes, sir.

Q. Okay. And I believe we agreed in your deposition that this document is from Quarter 3, 2014, not Quarter 4 of 2013; is that right?

A. Quarter 3, 2014 is what it is.

Q. Okay. Thank you. And this document is an example of ICF-generated quarterly forecasts for various energy market parameters; is that right?

A. Yes, sir.

Q. Okay. So this document includes projections of coal prices; is that right?

A. Yes, sir.

Q. Okay. And natural gas prices?

A. Yes, sir.

Q. Okay. And on-peak power prices; is that right?

A. Yes.

Q. Okay. And then also a projection of renewable energy certificate prices?

A. Yes, sir.

Q. Okay. And ICF updates these projections quarterly; is that right?

A. Yes, sir.

Q. Okay. And you have not updated any of your projections in this proceeding, correct, since they were filed?

A. That's correct. I haven't rerun my analysis. We are doing this on a quarterly basis.

Q. You are doing this --

A. I'm sorry. We are talking about the executive energy outlook, right?

Q. Yes.

A. That's done on a quarterly basis.

Q. Okay. So ICF produces updated projections on a quarterly basis, but you have not updated any of your projections in this proceeding since they were submitted last year, correct?

A. Yes.

Q. And looking on page 1 of this document, it states at the very beginning, "The ICForecast: Executive Energy Outlook now includes price projections for Reference, High and Low cases for all of the covered markets." Do you see that?

A. Yes, sir.

Q. Okay. So am I correct that essentially the ICF now has sensitivities on their natural gas price projections?

A. Yes. It's run through a single model,

unlike in this case, but we do have those sensitivity cases.

Q. And the low and high cases represent a reasonable range of prices around the reference case; is that right?

A. Are you -- yes, I think that's a fair statement.

Q. Okay. And am I correct that the low and high gas price forecast included in this quarterly outlook was then used to develop low and high projections of energy prices?

A. Yes. And so when -- by reasonable, we mean reasonable long-term prices, not just -- not a given year but over a multiple-year period. As I indicated, this is run through a single model, not a complicated set of models or -- and is very limited reporting relative to what we reported here.

Q. Okay. And if you turn to the fifth page of this exhibit, you have there the "Natural Gas Prices - Reference Case;" is that right?

A. I see that.

Q. Okay. And then the next two pages are the high case and the low case for natural gas prices; is that right?

A. Yes.

Q. Okay. And so this quarterly outlook has a reference case, high case and low case for natural gas for each year of 2014 through 2037; is that right?

MR. ALEXANDER: Objection. Asked and answered.

EXAMINER PRICE: Sustained.

MR. FISK: I guess I was just trying to clarify that it's for each year, not just -- because he had referenced earlier that this was only long term, and this is stating that it's for each year.

EXAMINER PRICE: Fair enough. I will reverse my previous ruling, and he can answer the question.

MR. FISK: Thank you, your Honor.

Can I have that question read back?

(Record read.)

A. Yes, that's correct. And what I said earlier about the low and high case being oriented towards the long-term average is also correct, but there are numbers for each individual year.

Q. Okay. But in the current proceeding, you only provided a single natural gas price projection, right?

MR. ALEXANDER: Objection. Asked and

answered.

EXAMINER PRICE: Sustained.

Q. If you -- let's see. If you could turn to page 46 of your testimony. If you look at lines 9 to 10, it states, "Natural gas prices are an important determinant of on-peak wholesale power prices in the ATSI Zone and AEP-Dayton Hub markets." Do you see that?

A. Yes. And the full sentence reads, if you include lines 11 and 12, that it's increasingly important over time. We had that discussion. So it's important to have both parts of the sentence in the record.

Q. Sure. And for your natural gas price projection for 2015 and 2016, you rely on NYMEX futures; is that correct?

A. Yes, that's correct. We rely on the futures for the first two years of the forecast.

Q. And am I correct that those two years of your projection are not confidential?

A. Yes, sir, that's correct.

Q. Okay. And so for 2015, you had projected using NYMEX futures, a natural gas price of $4.17 per million BTUs; is that correct?

A. In real 2013 dollars per million BTU,

yes, that's correct. That number happens to be equal to the 2014 price when you take into account the nominal dollars.

Q. Okay. And for 2016, the NYMEX future amount that you used was $4.02 per million BTU in 2013 dollars; is that right?

A. Yes, sir.

MR. FISK: May we approach, your Honor?

EXAMINER PRICE: You may.

MR. FISK: Ask this document be marked as Sierra Club Exhibit 11.

EXAMINER PRICE: It will be so marked.

(EXHIBIT MARKED FOR IDENTIFICATION.)

Q. (By Mr. Fisk) and, Mr. Rose, have you been handed a document with a title at the top that says "Henry Hub Natural Gas Spot Price (Dollars per Million BTU."

A. Yes, sir.

Q. And the document refers to the U.S. Energy Information Administration; is that right?

A. It does.

Q. Okay. And are you aware of what the U.S. Energy Information Administration is?

A. Yes. It's a part of the U.S. Department of Energy.

Q. Okay. And the Energy Information Administration in part provides or reports on Henry Hub natural gas spot prices; is that right?

A. Yes.

Q. Okay. And would you consider the Energy Information Administration a reliable source of information?

A. It's something that I do look at, let's put it that way.

Q. Okay.

A. You know, sometimes we don't agree with what the U.S. EIA is forecasting, for example, but I think it's a source that we need to look at frequently.

Q. Okay. Leaving aside forecast, do you have any reason to believe in terms of reporting actual results that -- do you have any reason to believe the Energy Information Administration information would be inaccurate?

MR. ALEXANDER: Objection, your Honor.

EXAMINER PRICE: Grounds?

MR. ALEXANDER: Could we have some foundation for this exhibit? We have introduced the exhibit and then moved on to questions about EIA. Can we have some foundation?

MR. FISK: That's what I am doing.

EXAMINER PRICE: That's what he is doing. Give him some leeway.

MR. ALEXANDER: Thank you, your Honor.

THE WITNESS: Could I have the question read back, please?

(Record read.)

A. No. Looking at it, for example, just eyeballing it, 2014 looks like it's averaging 4.37, which I know to be the last full year for which we have gas price data is around $4.37 BTU. So that looks consistent.

Q. Okay. Great. And this document also identifies the Henry Hub natural gas spot prices for 2015 through July; is that correct?

MR. ALEXANDER: Objection. Your Honor, we haven't established whether the witness has any familiarity with this document at all, so object to lack of foundation.

MR. HAYS: Your Honor, if I may be heard. I believe this is something to be judicially noticed. It's purports to be NYMEX prices from the Henry Hub. They are readily verifiable. If they come back tomorrow with different numbers, then they are different numbers, but this is a classic case of

administrative notice, judicial notice.

MR. FISK: In addition, Mr. Rose has already testified that the 2014 numbers look correct to him, and I am asking about the 2015 numbers now.

MR. ALEXANDER: Your Honor, if I may address the initial point? With regard to the actual numbers, if counsel would like to ask Mr. Rose about any specific number, he is more than capable of doing that.

With regard to authenticating the document, we first have to establish that this document is a true and accurate copy of what it purports to be. Right now we have no evidence in the record of that point.

With regard to judicial notice, we have to authenticate this is a true and accurate document what this purports to be. So for that reason, I object to lack of foundation.

EXAMINER PRICE: Let's just give Mr. Fisk a little more leeway. We can deal with this when we get to admission.

Q. (By Mr. Fisk) Do you need the question read back?

A. Yes, sir.

(Record read.)

A. Yes, it appears so. Again, I haven't seen the document before. But based on my knowledge of gas prices this year, it seems like it's a -- it seems like it's a correct estimate.

Q. Okay. And so the numbers identified for 2015 for each month through July are all under $3 per million BTU; is that correct?

A. Yes, that's correct.

Q. Okay. And the projection that you used in this proceeding for 2015 is $4.17; is that right?

A. Yes. In real dollars, yes.

Q. Okay. So it would be higher if you adjusted for current dollars, correct?

A. Yes. It would be $4.34.

Q. Okay. So your projection for 2015 natural gas prices is more than a dollar higher than what has been experienced so far in 2015; is that right?

A. Yes. Gas prices have been very low this year. But, as I indicated, fortunately it hasn't affected to the same degree the electrical energy prices, which is a critical parameter in this case.

EXAMINER PRICE: Do you mind if I ask a question? When did you do your projection?

THE WITNESS: So the projection that we

did was done in Q2ish, 2014, so it was done 16 months ago.

EXAMINER PRICE: Thank you.

MR. FISK: Can I have his answer before that one read back.

EXAMINER PRICE: Yes. Let's have the question and answer two questions ago.

MR. FISK: Thank you.

(Record read.)

MR. FISK: I would like to move to strike everything after "yes" as not responsive to the question that was asked.

MR. ALEXANDER: Your Honor, the witness has just given context for his answer.

EXAMINER PRICE: We'll deny the motion to strike. You have got to box him in better than that.

Q. (By Mr. Fisk) And if you go back to Exhibit Sierra Club 9, the Flint Creek testimony, this testimony was submitted in February of 2012, correct?

A. Yes, sir.

Q. And if you turn to page 19, there's a table labeled "Exhibit 5" that says "ICF Henry Hub Gas Price Projection;" is that correct?

A. Yes.

Q. Okay. And for the year 2016, the projection in nominal dollars is $5.97; is that right?

A. Yes. This is a projection that was done in late 2011.

Q. Okay. And now your projection for 2016 in the current testimony, the nominal dollars is $4.28; is that right?

A. Yes. We've lowered our forecast.

Q. Okay. And so that's a reduction of a $1.70 per million BTU, is that right, approximately?

A. Yes. There was a significant adjustment in the 2012 to 2013 period.

Q. Okay. And do you know what the Chicago Mercantile Exchange is?

A. Yes.

Q. Okay. And does Chicago Mercantile Exchange report Henry Hub natural gas price futures?

A. Yes, I believe so.

Q. Okay. And do you reference to the Chicago Mercantile Exchange for such projections?

A. I usually reference the NYMEX, the New York Mercantile Exchange, but if you have a particular reference, I will be glad to take a look at it.

MR. FISK: May we approach?

EXAMINER PRICE: You may.

MR. FISK: And if we can have this marked as Sierra Club Exhibit 12.

EXAMINER PRICE: So marked.

(EXHIBIT MARKED FOR IDENTIFICATION.)

MR. FISK: Thank you.

Q. (By Mr. Fisk) And, Mr. Rose, you've been handed a document that at the top says "Henry Hub Natural Gas Futures Settlements - CME Group;" is that correct?

A. Yes.

Q. Okay. And, to your knowledge, CME, is that Chicago Mercantile Exchange?

A. To my knowledge, yes.

Q. Okay. Have you ever seen CME Group reports of Henry Hub natural gas futures settlements?

A. I frequently look at NYMEX futures. So I will leave it at that.

Q. Okay. Looking at the document in front of you, there's identified -- it says "Open." Do you see that second column in the table?

MR. ALEXANDER: Objection.

EXAMINER PRICE: Grounds?

MR. ALEXANDER: Did I cut you off?

MR. FISK: No.

MR. ALEXANDER: Objection. Lack of foundation. We haven't established any foundation for this document, and the witness didn't testify he had ever seen the document before. In fact, he testified he relied on NYMEX.

EXAMINER PRICE: Sustained.

MR. FISK: Your Honor, I was still trying to lay a foundation for the document.

EXAMINER PRICE: Okay.

MR. HAYS: Your Honor, we would again point out this can be administratively noticed by the court, as it's widely published. The witness has recognized it's a known source, that if they have a problem with this, they can certainly subsequently come in and produce other versions of this and show the incorrect portions.

EXAMINER PRICE: Well, I just -- I do think it is fair to ask the witness if he's familiar with what these projections would look like for CME. Do you understand what I am saying? So far he is saying all you've listed from CME, checks Chicago Mercantile Exchange at times, and generally looks at the NYMEX.

MR. FISK: Yes.

EXAMINER PRICE: So if you can try a little more foundation on this one.

MR. FISK: Okay. I will do my best, your Honor. Is the pending question, is that sustaining the objection?

EXAMINER PRICE: It was sustained.

MR. FISK: You are sustaining it, okay.

Q. (By Mr. Fisk) Do you see at the bottom there is -- at the bottom of the page, there is a link for the source of this document?

MR. ALEXANDER: Objection. The witness testified he had never seen the document before, so I don't know how he can testify what the source was.

EXAMINER PRICE: He can answer this one.

A. I mean I see what it says. I'm not sure what to say. I don't memorize all the hyper links.

Q. Fair enough.

EXAMINER PRICE: In the course of your employment with ICF, have you ever looked, search for Chicago Mercantile Exchange prices? You have expressed you are familiar with it.

THE WITNESS: Right.

EXAMINER PRICE: Do you ever or does anybody under your direction ever searched for Chicago Mercantile Exchange prices?

THE WITNESS: I mean I look at futures prices all the time. If they are down 30 percent over the last 18 months and it's the single most volatile commodity I traded in the United States, two and a half times more volatile that the S&P 500, so it is an extremely volatile number, and I do follow it.

Q. (By Mr. Fisk) Okay. And when you say futures are down over 30 percent over the last 18 months, are you referring to natural gas futures?

A. Yes. In particular, if you look at the delivery price in 2019 from 18 months ago, it's almost $5. So it's come down just in the last 18 months. And, as I indicated, this is the most volatile commodity trade in the United States, and it has to be pretty volatile to be two and a half times more volatile than the S&P 500 and more volatile than oil prices. So it's extremely volatile. It moves dramatically. It's extremely volatile and underlies the volatility of natural gas relative to, for example, coal.

Q. Okay. And the futures that you were referring to that have fallen 30 percent, is that -- I believe you said -- you referred to 2019; is that right?

A. Yeah. That was the number. Yes, that was the number I looked at recently. It's extremely -- again, an extremely volatile number.

Q. Okay. And that 30 percent drop has happened since your testimony -- since the natural gas price projection in your testimony in this proceeding, correct?

A. As it turns out, it started about 18 months ago, which is about the time I filed. And it's associated with a collapse in natural gas drilling that demonstrates it's unsustainable. So we are at the lowest level of gas drilling in 30 years. So it's not a sustainable situation, and it's a very volatile number.

Q. Okay. And your projection in this proceeding, futures also for natural gas were also factored into your projection of gas prices in 2017; is that right?

A. It was an average of the 2017 prices, was an average of the futures in our own projection. It makes sense to use it for two, two and a half years of futures. It makes a little sense for two or three -- say three or four years out. Makes no sense for the long term. It is not a reasonable basis for forecasting the long-term prices.

Q. Okay. So futures now are approximately 30 percent lower than the prices you use in the first two and a half years of your forecast in this proceeding; is that right?

A. Something on that order, yes.

Q. Okay. You have provided in this proceeding, I believe, a carbon price forecast; is that right?

A. Yes, sir.

Q. Okay. And that carbon price forecast is a national forecast, correct?

A. Yes.

Q. Okay. So it is not Ohio specific?

A. That is correct. It was developed on a national basis, yes.

Q. Okay. And are you aware of the Clean Power Plan?

A. Yes, sir.

Q. Okay. And the Clean Power Plan, am I correct, establishes carbon emission goals on a state-by-state basis; is that right?

A. Yes, expressed in pounds CO-2 per megawatt-hour and as described in the regulatory impact analysis.

Q. Okay. So Ohio has a specific goal that

may be different from the goal of other states, correct?

A. Yes, 1,400 pounds per megawatt-hour in the near term and approximately 1,100 or so by 2030.

Q. Okay. And that near-term figure starts applying in 2022; is that right?

A. January 1, 2022 is the beginning of the program.

Q. Okay. And so am I correct that it is a national carbon price forecast that -- that forecast did not evaluate what the Clean Power Plan carbon-related costs might be in Ohio specifically, right?

A. No. But we thought it was a reasonable estimate, and we still think it's a reasonable estimate as to what would likely occur here in Ohio. And it's not that dissimilar to some of the implementation scenarios in the EPA's regulatory impact analysis, which I'll add parenthetically was done by staff that report to me and did not have economic sensitivity cases, which again is not uncommon in our work.

MR. FISK: I would move to strike the addition regarding ICF's work.

EXAMINER PRICE: I think we'll strike

everything beginning with the parenthetical.

MR. FISK: Thank you, your Honor.

Q. (By Mr. Fisk) But the carbon price forecast that you developed for this proceeding, that was developed before the Clean Power Plan was finalized?

A. Yes. The Clean Power Plan was finalized in August of this year, and my testimony was filed in August last year. And, as I indicated, I think our forecast is still a reasonable forecast, but we now have final regulations in place. They haven't been put into the federal register yet. But for all intents and purposes, I think they are finalized.

Q. And the draft Clean Power Plan was issued in July of 2014; is that correct?

A. July 2, something like that, 2014, yes.

Q. Okay. And your carbon price forecast was developed in May 2014; is that right?

A. Yes. You know, Mayish, Juneish, something like that, yes.

Q. Okay. So your carbon price forecast even predated the draft of the Clean Power Plan, correct?

A. Yes. We correctly anticipated that there would be CO-2 regulations, and we made our best estimate of what we thought was expected to occur,

and so that was included in our analysis.

Q. Okay. And Ohio's carbon emission goal was reduced between the draft and the final Clean Power Plan, correct?

A. Yes. It was tightened by about 10 percent relative to the draft.

Q. Okay. And you have not produced in this proceeding any analysis of the costs of Ohio complying with the final Clean Power Plan, correct?

MR. ALEXANDER: Objection. Asked around answered.

EXAMINER PRICE: Overruled.

A. I haven't filed. When I look at our forecast, our latest corporate forecast, they are fairly similar to what we have here. But I haven't filed those, so I am telling you about them now.

Q. Okay. So none of the parties in this proceeding had any opportunity to review what you are telling us now, correct?

A. Correct. As you can imagine, things are moving very quickly since these were announced during August.

MR. FISK: May we approach, your Honor?

EXAMINER PRICE: You may.

MR. FISK: If we could have this marked

as Sierra Club Exhibit 13.

EXAMINER PRICE: It will be so marked.

(EXHIBIT MARKED FOR IDENTIFICATION.)

Q. (By Mr. Fisk) Mr. Rose, you have been handed what's been marked as Sierra Club Exhibit 13, which is the companies' responses to Sierra Club Set 1 Interrogatory 39; is that correct?

A. Yes, sir.

Q. Okay. And you are identified as the witness on this response; is that correct?

A. Yes, sir.

Q. Okay. Have you ever seen this document before?

A. Yes, sir.

Q. Okay. And the question here asks in subsection B to "Identify the probabilities that ICF gave to each of the three referenced CO-2 price scenarios and explain the basis for such probabilities." Do you see that?

A. Yes, sir.

Q. And then there is an answer that identifies various probabilities for three different scenarios; is that right?

A. Yes, sir.

Q. Okay. And am I correct that in

developing the CO-2 price forecast, you weighted three different potential futures regarding carbon; is that right?

A. Yes. In order to get an expected value, there is a possibility weighted value for our inputs and outputs. We did explicitly conduct a probability weighting, yes.

Q. Okay. And one of the scenarios that you weighted was Waxman-Markey; is that right?

A. Yes. As you can see, we gave it an extremely low weight until 2037.

Q. Okay. And that scenario would be if something similar to what congress had been considering in 2009 and '10 with regards to carbon were enacted into law; is that right?

A. Yes. It's an exemplar of a titer CO-2 program, which we give, as you can see, almost no probability until 2037. And even then, the number is very low.

Q. Sure. And then a second scenario that you factored in was assuming some sort of a CO-2 mass cap of 1,000 to 1,500 pounds per megawatt-hour; is that right?

A. Yes. The moniker mass cap also means cap and trade, and that's one of the three that we looked

at.

Q. Okay. And then the third scenario was no CO-2 policy; is that right?

A. Yes. As we sort of discussed in the deposition, that could be thought of as a set -- what they call complimentary measures that don't manifest themselves in a dollar-per-ton number. So the no refers to not having a dollar ton number.

Q. Okay. So no CO-2 policy, that means there would be no carbon regulation at all, no direct carbon regulation; is that right?

A. No direct carbon regulation. There might be things like incentives for renewables, but there wouldn't be, for example, a cap or an emission limit that would result in a dollar-per-ton number.

Q. Okay. And so in 2023, you weighted a no CO-2 policy at a 40 percent weight, correct?

A. Yes. Our current number is 50 percent.

Q. You are currently weighting a no CO-2 policy of 50 percent?

A. Yes, sir, for 2023.

Q. Even though the Clean Power Plan goes into effect in 2022?

A. Yes. We it think there is a 50/50 chance that it will be struck down as illegal by the courts.

Q. Okay. And you're not a lawyer, correct?

A. No. I am not a lawyer. But with that caveat, we do have to make judgments as to what we think is likely, and it's just not my opinion. You know, I am the co-chair of the practice. It's a large company. We do obviously a lot of work in CO-2, and it's a legally questionable regulation. I can expand on why I think it is legally questionable.

Q. No. That's --

A. But I am not a lawyer.

Q. Okay. But as the law stands today, there is a CO-2 policy going into effect before 2023, correct?

A. Yes, as we anticipated in the period of time in which it hadn't even be proposed. So we anticipated it, but we've always said that there is a wide range of possible outcomes, including the fact there won't be a CO-2 program. We continue to have that view. And the critical thing is to get a probability of weighted value. In this particular case, the range of outcomes is pretty wide.

Q. Okay. But as the law stands today, it would not -- the 2023 weighting for no CO-2 policy should be zero, correct?

MR. ALEXANDER: Objection. Asked and

answered.

EXAMINER PRICE: Sustained.

Actually, I would have sustained it on a different ground than he said. I think you are mischaracterizing his testimony but --

MR. FISK: Okay.

EXAMINER PRICE: I am sustaining it regardless.

Q. (By Mr. Fisk) And would you consider a CO-2 price estimate that is more than double ICF's estimate to be unreasonable?

A. It would be different -- I mean, we have a situation in this case where there is an extremely broad discrepancy between, for example, what we thought for 2020 between the two witnesses that had numbers for that.

I think that's something we probably should discuss in confidential, and I don't think that number is reasonable by any means, and it's reflective of a particular issue. But I would like to be more specific. We have to have a specific context for that. It depends what year. It depends when it was done. And it depends on a range of circumstances. We need to be concrete.

Q. Okay. We will punt that to the

confidential session then.

If you could turn to page 5 of your testimony and starting on line 19. You project -- you list reasons why you are projecting higher electrical energy prices; is that correct?

A. Yes, relative to the 2009 to 2013 average of $34, and the year-to-date prices are above $34.

Q. And one of your reasons for projecting higher energy prices is demand growth; is that right?

A. Yes, sir.

Q. Okay. And am I correct that demand growth is also one of the reasons you are projecting higher capacity prices?

A. It's one of the reasons, yes.

Q. Okay. And if you turn to page 5 of your testimony, lines 9 through 12, you state that your analysis relied on PJM's 2014 peak and energy demand forecast; is that right?

MR. ALEXANDER: Your Honor, could I have that question reread, please?

EXAMINER PRICE: You may.

(Record read.)

A. Yes.

Q. Okay. And would you agree that all else held equal, if the growth and demand is lower than

projected in PJM's 2014 forecast, that would tend to reduce increases in energy prices?

A. It might to a degree. I would like to run that through my models. I am not sure -- I don't believe it would be significant because already at the demand levels we have, we have had a dramatic increase in capacity prices. And, as I indicated, even with the low gas prices, our electrical energy prices -- the actual electrical energy prices this year are actually higher than the benchmark I set in the testimony.

Q. And what source are you relying on for the actual energy prices?

A. I am reviewing the -- I don't have the actual specific source, but year-to-date AEP-Dayton prices are around $35, $36 a megawatt-hour in a very mild summer, and that's above what I was setting as a benchmark price even low gas prices.

If we had normal gas prices, gas prices that were sustainable, we would have numbers similar to our forecast. So we don't need a lot of demand growth, and there's already been a huge increase in capacity prices since we filed our testimony as we anticipated.

MR. FISK: Could I have that answer read

back?

(Record read.)

MR. FISK: I would move to strike everything after "source" as not responsive to the question that was asked.

MR. ALEXANDER: Your Honor, he was explaining the source was his personal knowledge, the background of his personal knowledge, on this topic, including where he developed his understanding of his estimate of current market prices. Counsel opened the door to this.

EXAMINER PRICE: We will strike everything beginning with "if, if we."

MR. FISK: Okay. Thank you, your Honor.

Q. (By Mr. Fisk) Is this a source you normally consult to determine what energy prices are?

A. Yes. We look at reported prices from various different sources.

Q. Can you identify any of those?

A. Sometimes we go to PJM. Sometimes we go to newsletters like Megawatt Daily. So we track very carefully electrical energy prices, as I discussed, and capacity prices are published directly by PJM itself.

Q. Okay. So you would consider PJM's

recording of energy prices to be a reliable source; is that correct?

A. Yes. In general we do rely on PJM as a source of electrical energy and other prices and other information. If you have a specific source you want me to look at, I would be glad to.

Q. And you consider PJM a reliable source of capacity prices; is that correct?

A. Yes. I would like to see the specific document, but, you know, we just recently reviewed the BRA results, and it's a PJM document, the transition function results, all of which are dramatically higher.

MR. FISK: Can we approach?

EXAMINER PRICE: You may.

MR. FISK: Mark this as Sierra Club Exhibit 14.

EXAMINER PRICE: So marked.

MR. FISK: Thank you.

(EXHIBIT MARKED FOR IDENTIFICATION.)

Q. (By Mr. Fisk) Okay. Mr. Rose, you have been handed Sierra Club Exhibit 14, which is the companies' response to Sierra Club Set 1 Interrogatory 28; is that correct?

A. Yes.

Q. And you are identified as the witness on this response; is that right?

A. Yes.

Q. Okay. And have you seen this document before?

A. Yes.

Q. And if you look at the subsection C to the request, it says, "Identify, in percent or amount, the size of the impact that Mr. Rose expects demand growth to have on energy prices and capacity prices." Do you see that?

A. I'm sorry. Could you repeat that, please.

Q. Referring to subsection C of the request, it says, "Identify, in percent or amount, the size of the impact that Mr. Rose expects demand growth to have on energy prices and capacity prices;" is that correct?

A. I do see that in section C.

Q. Okay. And your response under both the original and supplemental response is that you have not performed such analysis; is that right?

A. I have not done a computer simulation of a change in a single variable. You have just a single case, which is not uncommon, but I do have

some qualitative sense of what I think the impacts are based on the various different factors just as I described earlier.

MR. FISK: Your Honor, could we go off?

EXAMINER PRICE: Yes.

(Recess taken.)

EXAMINER PRICE: Let's go back on the record. Please proceed.

MR. FISK: Thank you, your Honor.

Q. (By Mr. Fisk) Mr. Rose, I believe before the break, we just talked about -- you made a reference to energy prices being $35 to $36 per megawatt-hour; is that correct?

A. Year-to-date all hours AEP-Dayton.

MR. ALEXANDER: Mr. Fisk, could you turn on your microphone.

MR. FISK: There we go.

Q. (By Mr. Fisk) Okay. Year-to-date all hours, okay. And how do you -- in calculating the all hours numbers, how many hours of that is peak hours?

A. About half the hours are peak.

Q. Okay. And the other half are off peak?

A. That's correct.

Q. Okay.

A. I was focused on the average because we have baseload power plants.

Q. Okay. And so if you turn to your testimony, page 34, Table 7, this table identifies forward electrical energy prices in dollars per megawatt-hour; is that correct?

A. Yes, from the period of April 2014, the actual forecast is around, as I recall, $40 a megawatt-hour for AEP-Dayton versus 38.6. Last year it was 44. And, as I indicated, our numbers are --

EXAMINER PRICE: You have to turn your mic back on.

A. There we go. As I indicated, were down a few dollars a megawatt-hour, much less than a percentage basis than the gas price.

Q. Okay. So actual energy prices year-to-date in AEP Dayton hub is lower than what you had projected in your testimony for 2015, correct?

A. Yes, a few dollars lower. This is the electrical -- the all hours electrical energy price, and the decrease is a lot smaller than the gas price, the decrease.

Q. Okay. And do you know the all hours energy price to date for the ATSI zone?

A. Subject to my recollection sitting here,

it's about $2 or so higher. So if it was 35, 36 for Dayton, it's like 37, 38 for ATSI. Again, it is very mild summer thus far. It was a 17 percent decrease in cooling degree days this year relative to last year in Columbus. So it's been quite a mild summer. That's a factor in explaining the difference.

Q. Okay. And the data in Table 7, just to confirm, are those the energy prices that you provided in your forecast to the companies?

A. No. So if you turn to -- it's confidential once it gets to a certain point. But if you turn to Attachment II, Roman Numeral II, on page -- that's where you would find our forecast, and this is a -- the number that's in -- the numbers on 7 are forward prices from April 2014. In there, I also provided historical prices, and I also provided forecast.

Q. Okay. So Attachment II is the actual forecast you provided to the companies?

A. Yes, sir.

EXAMINER PRICE: Let's go off the record for a minute.

(Discussion off the record.)

EXAMINER PRICE: I think Mr. Fisk was making this clear, but Table 7 is not your projection

of energy prices?

THE WITNESS: No, sir.

EXAMINER PRICE: That was the report of forward energy prices at the time you prepared your testimony?

THE WITNESS: That's correct. We used forward gas prices for the first two years. We did not -- we then projected electrical energy prices. We did not use these directly.

EXAMINER PRICE: Thank you. Thank you, Mr. Fisk.

MR. FISK: Thank you, your Honor.

Q. (By Mr. Fisk) And the $35 to $36 figure that you testified to earlier regarding AEP Dayton hub, that would be in nominal dollars; is that correct?

A. Yes. Year-to-date numbers would be in nominal dollars.

Q. Okay. So without referencing any of the numbers in Attachment II, it would be comparable to the fifth column on Attachment II, "AEP-Dayton Hub Price Nominal;" is that right?

A. Yes, sir.

Q. Okay. And am I correct all of the numbers in Attachment II are considered confidential;

is that right?

A. Yes, sir.

Q. Okay. And I believe a few minutes ago you also testified to an estimated year-to-date ATSI energy price; is that correct?

A. Yes. It's just subject to recollection.

Q. Okay. And that price that you provided was also nominal dollars; is that right?

A. Yes. It's the actual dollars that were incurred this year, the main point being there is a year-to-date the prices have been a few -- you know, roughly 10, 15 percent lower than I forecast. Part of that was a mild summer. Part of that is to highlight the fact that gas, while significant, is down more on a percentage basis. Its impact on the electric energy prices is very muted. So the forcast, again, is within 10 or 15 percent.

Q. And you are referring there to the ICF forecast?

A. Yes.

Q. Okay. Do you have your workpapers with you?

A. I believe so. Is there a specific one?

Q. So I know that some of your workpapers are confidential. I was going to refer you to the

first page. It has zonal coincident peak demand and energy assumptions. Do you see that?

A. Yes, sir.

Q. Okay. And is that -- is any of that page confidential?

A. No, I don't believe so.

MR. FISK: Your Honors, do you have copies? We have copies of the workpapers if you need them.

EXAMINER PRICE: We have them.

MR. FISK: Okay.

Q. (By Mr. Fisk) So this page provides essentially PJM's 2014 load growth forecast; is that correct?

A. Yes, sir.

Q. Okay. And you used this load growth forecast in your projections of energy and capacity prices; is that correct?

A. Yes, sir.

MR. FISK: May we approach?

EXAMINER PRICE: You may.

MR. FISK: I would like to have this marked as Sierra Club 15.

EXAMINER PRICE: It will be so marked.

(EXHIBIT MARKED FOR IDENTIFICATION.)

Q. (By Mr. Fisk) So, Mr. Rose, you have in front of you a document that's been marked Sierra Club Exhibit 15, and that is titled "PJM Load Forecast Report - January, 2015;" is that correct?

A. Yes, sir.

Q. And have you seen this document before?

A. I believe so. So I believe so.

Q. Okay. And feel free to take a minute to look through it, but do you know whether this document is PJM's January 2015 load forecast?

A. I mean, it's so labeled.

Q. Okay. Do you know if it is essentially the 2015 version of the PJM load forecasts that you relied on in your workpapers?

A. I believe so.

Q. Okay. If you turn to page 2 of this document. It actually has a 2 at the bottom. It's the -- wait a second. It's the back of the fourth actual piece of paper. And there's a series of five bullet points on the page; is that correct?

A. Yes.

Q. Okay. And the fourth bullet point says, "Compared to the 2014 Load Report." Do you see that?

A. Yes.

Q. Okay. And it says the -- continuing that

sentence, it says, "The 2015 PJM RTO summer peak forecast shows the following changes for three years of interest." Do you see that?

A. Yes.

Q. Okay. And the three years of interest identified there are 2015, 2018, and 2020. Do you see that?

A. Yes.

Q. And for each of those, the 2015 forecast is between 2.5 and 2.9 percent lower than the 2014 forecast; is that right?

A. Yes, that's what it says.

Q. Okay. And looking at your workpaper on the page, it says, "On all coincident peak demand and energy assumptions," the first chart on that page says "Growth peak demand megawatts." Do you see that?

A. Yes, sir.

Q. Okay. And your source for that table is table B-10 in the February 2014 PJM load forecast; is that right?

A. Yes, sir.

Q. Okay. And if you turn to table B-10 in Sierra Club 15.

A. B as in boy?

Q. B as in boy, yes. It says page 70 at the bottom.

A. Okay. Yes, sir.

Q. This table B-10 is identified as "Summer Coincident Peak Load for Each PJM Zone, Locational Deliverability Area and RTO." Do you see that?

A. Yes, I do see that.

Q. Okay. And the table B-10 in Sierra Club Exhibit 15, is that the 2015 version of the table B-10 that you relied on in your workpaper?

A. I don't have the -- it in front of me, but it appears to be so. I mean, I have obviously the B-10 for 2015. I don't have the B-10 for 2014, but I believe they are comparable tables.

Q. Okay. And on Sierra Club Exhibit 15 there is a, towards the bottom of table B-10, this is a line for PJM RTO, do you see that?

A. Yes, sir.

Q. And then there's a peak loads identified for each year of 2015 to 2030. Do you see that?

A. Yes, I do.

Q. Okay. And the peak loads identified in Sierra Club Exhibit 15 for PJM RTO are lower for each of those years than the peak loads identified in your workpaper for those years; is that right?

A. Yes. They are also increasing and also all higher than the 2014 actual below normal, but they are lower than the numbers in my workpapers.

Q. Okay. And would that be the same for the ATSI zone that the 2015 peak load forecast in table B-10 is lower than the ATSI forecast identified in your workpaper?

A. Yes. It's about 200 megawatts lower out of 13,000.

Q. Okay. And if you could in Exhibit -- Sierra Club Exhibit 15 turn to table E-1 which is page 86 and just let me know when you're there.

A. Yes, I'm on page 86.

Q. Okay. And table E-1 is labeled annual net energy (gigawatt hours) and growth rates for each PJM western and PJM southern zone, geographic region, and RTO; is that correct?

A. Yes, sir.

Q. Okay. And on page 86 there is the projections for 2015 through 2025; is that right?

A. Yes, each of which is -- shows low growth over time, yes.

Q. And on page 87 is the projections for 2026 through 2030; is that right?

A. On page 87, did you say?

Q. Yes.

A. Yes, and they continue to show growth each year.

Q. Okay. And for table E-1 in Exhibit Sierra Club 15, is that the 2015 version of the data produced in your workpaper in the second table on that -- on the first page of your workpapers?

A. It's -- it is the corresponding numbers, yes.

Q. Okay. Great. And for the PJM RTO, which is the last lines on table E-1 on Sierra Club 15, am I correct that the annual net energy forecasts for each year are lower in Exhibit 15 than the projections you set forth in your workpapers?

A. Yes. They are lower but they all show growth and in every single year.

Q. Okay. And it's the same for the ATSI projections identified in Sierra Club Exhibit 15, table E-1, those are all lower than the projections you set forth in your workpaper, correct?

A. Yeah. I can't go through each one, but I believe that's the case.

Q. Okay.

A. And, again, it's growing in every year so.

Q. Okay.

EXAMINER PRICE: So what you're testimony is it's growing every year but less than you projected?

THE WITNESS: Yes. And it's also I don't think a significant factor because we are already getting the large increase in capacity prices, and they are relatively strong energy prices that I forecast. I don't believe 2-1/2 percent adjustment is a big deal or determinative -- I don't think it's a significant effect, and you can see that because the capacity prices are increasing dramatically. So we also have enough demand to achieve the increases we are forecasting.

EXAMINER PRICE: Thank you.

Q. (By Mr. Fisk) You have not evaluated, however, how -- in terms of doing any modeling of how a reduction in the demand forecast would affect your energy or capacity price forecasts, correct?

MR. ALEXANDER: Objection, misstates prior testimony.

MR. FISK: I am asking him -- it was a question as to whether he has done it.

A. So I haven't done a single --

MR. ALEXANDER: Hang on.

EXAMINER PRICE: I haven't ruled yet, but you can go ahead and answer anyways.

THE WITNESS: I will go ahead and wait for a ruling.

EXAMINER PRICE: Overruled.

A. I haven't done a single variable change on the 2014 forecast we provided here in this case. But it's my judgment, albeit based on sort of qualitative factors and my experience, that it would not have a significant effect on our outcome and the evidence in support of that is that we are already seeing very significant increase in prices, and so the demand is adequate to achieve that.

Q. The increase in prices you are referring to is capacity prices; is that correct?

A. Yes. So, for example, the BRA, the base residual auction, went from 120 to 165. The RTO price in the transition auction went from 60 to 134. We've seen increases in capacity prices around all markets with capacity, New England, New York, PJM, and MISO. That's what we forecast in 2014, that there would be significant increases, and they are afoot.

MR. OLIKER: Your Honor, I would object to that answer, move to strike given that this is a

statement that the demand increase is significant enough to achieve his forecast price increase and unless we are allowed to put his price forecast increase in the record and compare it in the public record. If we are not allowed to make that comparison now, then the statement in the public record should be stricken.

MR. ALEXANDER: Your Honor, counsel -- who actually asked the question asked what capacity price increase he was talking about. He merely identified exactly what increases he was talking about, and as far as the quantification, at the end if there is going to be one record, nothing in that answer was confidential. In the confidential record you can ask him all the questions about his forecast you would like. But, right now, nothing in that answer was confidential. There is nothing to strike on that basis.

EXAMINER PRICE: Yeah, I am not following your motion to strike.

MR. OLIKER: My concern is he said his price projection is accurate based upon these demand levels, but we can't then ask him what his price projection is relative to what the price from the BRA was. So, now, we have a statement in the public

record that there is no impact; and, now, we can't compare it until we are in the confidential record, and then I can't cite it openly.

EXAMINER PRICE: The examiners will be able to put two and two together and the Commissioners will be able to put two and two together and they will come to the right decision.

MR. OLIKER: Thank you, your Honor.

MR. FISK: Can I have 2 minutes?

EXAMINER PRICE: Yes.

MR. FISK: Thank you.

(Discussion off the record.)

Q. I believe just one more set of questions. Mr. Rose, if you can turn to page 21 of your testimony and if you look at lines 8 through 12, there is a Q and A there regarding the relationship between wholesale and retail power pricing. Do you see that?

A. Yes, sir.

Q. Okay. And you haven't prepared in this proceeding any sort of forecast of retail power rates for the companies' customers, correct?

A. No. I just -- based on my experience with retail, which is quite extensive, I am making a statement about the relationship between wholesale

and retail that they move together, but I have not done a detailed forecast of retail prices in this proceeding.

Q. Okay. And you haven't performed any sort of quantitative analysis of retail price volatility in the companies' service territory, correct?

A. Not in this case.

Q. Okay, okay. And I believe a question ago you said you hadn't done any sort of detailed forecast; is that right?

A. Yes.

Q. Okay. And you haven't done any forecasts of retail power prices for the companies' customers, correct?

A. Yes, that's correct. I was referring to my general experience with retail and the relationship between wholesale and retail.

MR. FISK: Okay. I have nothing else on the public record.

EXAMINER PRICE: Thank you.

Let's go off the record

(Discussion off the record.)

EXAMINER PRICE: Let's go back on the record.

At this time we will break for lunch and

reconvene at 1:15. Thank you all.

(Thereupon, at 12:03 p.m., a lunch recess was taken until 1:15 p.m.)

- - -

Tuesday Afternoon Session,
September 8, 2015.

- - -

EXAMINER PRICE: Okay. Let's go ahead and go on the record. Mr. Oliker.

MR. OLIKER: Thank you, your Honor.

- - -

JUDAH L. ROSE

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

CROSS-EXAMINATION

By Mr. Oliker:

Q. Good afternoon, Mr. Rose. My name is Joe Oliker. I am with IGS Energy. Just a few questions for you today.

A. Good afternoon.

Q. First, I want to touch base on something you said to Mr. Fisk. You indicated that there were forward energy prices for all hours and also a forecast created by ICF for 2015, '16, and '17, correct?

A. Yes.

Q. Do you know which of those two energy projections Mr. Lisowski used in his projection?

A. My understanding is that he did a set of

runs that involved all of the ICF projections which for two years, the first two years, did use forward gas prices which -- but none of the forecasts we did had forward power prices. I only presented them for reference purposes.

Q. Okay. I'm sorry. Just so I understand, what is on Attachment III, I believe -- I'm sorry, I believe it's Attachment II, for 2015 and 2016, do you know if Mr. Lisowski used those prices that were provided by ICF?

A. Yes, that's my understanding. Obviously he is the best witness to answer that, and my point was that these are coming out of ICF modeling and only for two years as inputs we used forward gas prices. In all the years, we are using either our forecast or, in one year, a combination of the two.

Q. Okay. Thank you. And also you mentioned all hours energy prices. Is that 80 hours of on peak and 88 hours of off peak?

A. Approximately the convention in the industry is to divide the hours in half approximately between on peak and off peak. So all hours is the average of the two approximately.

Q. So it's equally one to one, 84 and 84?

A. Not exactly, but it's close. And when we

are looking at baseload power plans, we usually focus in on all hours prices, but we are forecasting prices hourly by node in the analysis that we recited here.

Q. Okay. On page 16 of your testimony, you provide a list of factors that you claim are depressed capacity in energy prices. On that list, going on to page 17, you indicate that PJM tariff rules regarding imports allowed capacity that was not physically deliverable to bid into the capacity market. Is that a good summary?

A. Yes. In particular, in one year, there was 7.5 gigawatts approximately of imports that never subsequently had not exceeded 5 gigawatts under new rules.

Q. And you would agree that PJM has addressed the issue that you've identified in your testimony and now requires a capacity resource that is not physically located in PJM to be pseudo tied to PJM?

A. Overall I believe PJM's rules have adequately addressed the capacity import issue.

Q. And the capacity import issue that we have been discussing was actually addressed prior to the base residual auction that was held in 2014, correct?

A. Yes, and so what I was explaining was the history going into my testimony was a capacity price around $82 a megawatt-day. Of course, the most recent prices are double that, and we indicated that we had a major, major increase coming, which was validated by what has actually happened. So I wanted to give some context as how you could go from 80 to doubling, and part of the context is related to the power imports. More importantly, there were other structural problems that have been addressed by FERC.

MR. OLIKER: Your Honor, I would move to strike everything after the word "yes."

MR. ALEXANDER: Your Honor, the question was somewhat broad, and it asked for the purpose of this portion of the testimony. So I think the witness is giving context.

EXAMINER PRICE: Let's have the question back again.

(Record read.)

EXAMINER PRICE: We will go ahead and grant the motion to strike.

MR. OLIKER: Thank you, your Honor.

Q. (By Mr. Oliker) And on page 18, you identify a list of factors you believe will lead to an increase in capacity and energy prices. One of

those factors is planned coal retirements in 2015 and 2016.

Now, regarding that statement, you would agree that the base residual auctions held in 2015-16, '16-17, '17-18 and '18-19 would already include the impacts of those retirements.

MR. ALEXANDER: Your Honor, may I have that question reread, please?

EXAMINER PRICE: You may.

(Record read.)

MR. OLIKER: Your Honor, I would actually strike my own question and rephrase it.

Q. (By Mr. Oliker) Mr. Rose, would you agree that the base residual auctions for delivery years 2016-'17, '17-'18, '18-'19 would already reflect the coal retirements that were planned for 2015 and '16?

A. No, I would not, and the reason for that is because we've just seen, for example, in the transition auction, the prices went from 60 to 134, and that increase is associated with the fact that they fixed the structural problems that were depressing the effect of the retirements.

So while the retirements had occurred, the impacts have been suppressed by FERC policies and, the correction of those FERC policies has had

dramatic results. What I would say is there's different outcome in the energy market where we are seeing some of the effects already of the retirements. We have an incredibly high ratio of electrical energy to gas prices. So, no, it hasn't been reflected.

MR. OLIKER: Your Honor, I would also move to strike that answer as the base residual auction has already been held, and everything he said is nonresponsive to my question whether we've already seen the impact of that supply shift.

MR. ALEXANDER: Your Honor, his answer was no, and the explanation of why the answer was no is directly responsive to his question. So, therefore, it should not be stricken.

EXAMINER PRICE: I agree. The motion to strike will be denied.

Q. (By Mr. Oliker) Mr. Rose, you would agree that the plant retirements for 2015 and '16 are primarily smaller subcritical coal plants without environmental controls?

A. I think in terms of the numbers of units, yes, it's primarily uncontrolled power plants, not exclusively but primarily.

Q. And you would agree subcritical coal

plants have higher heat rates as opposed to supercritical coal plants?

A. Yes, based on the thermodynamics of -- subcritical tends to be lower thermal efficiency than supercritical. You have to take a look at each individual plant, but the main thing is that they are smaller, less economies of scale and they tend to be less controlled for NOx and SO-2.

Q. I think you started to answer my next question within your answer, but you would agree that the higher a plant's heat rate, the less efficient a plant is from a marginal cost perspective?

A. Everything else being equal, that is, if you are burning the exact same delivered fuel cost, if you have a higher heat rate, you are less thermally efficient in converting the chemical energy to electrical energy, that's true. Again, there are other things that affect the variable costs, but that's held constant if that is the case.

Q. Okay. Earlier you discussed with Mr. Fisk the current natural gas prices. Would you agree that subcritical coal plants generally cannot compete with natural gas when the price is $3 per MMbtu?

A. Certainly more difficult than when you

have a normal gas price, a sustainable gas price. I think you have to take a look at the specific conditions. Each power plant has got a different delivery price, a different market condition. As I indicated, power prices are very high in this region and not being affected so much by the gas prices. So that's giving a cushion to some of the plants. You have to take a look at each individual circumstance.

Q. Earlier you discussed some of the CO-2 projections in your testimony. Before we go any further, are the assumptions underlying those projections confidential?

A. Some of them are, some of them aren't. Maybe if you ask the question, then we can sort of see if it's a problem.

Q. Okay. Regarding the Clean Power Plan, you would agree that while it does not go into effect until 2022, there are elements of the Clean Power Plan that may take effect in 2020, such as increased incentives for renewable energy?

A. Yes, the plant does have reporting requirements. States have to make a decision as to how they want to implement the program, which can be very significant. I can talk a little bit about why that can be very significant. So there are things

that have to be done before 1-1-22.

Q. And you would agree that part of the Clean Power Plan is to promote renewable generation development by 2020?

A. Yes, but I don't remember the exact provision, but I don't disagree with that.

Q. And that may increase energy prices, correct?

A. It's possible, but I don't think it's a significant factor. For example, there is only 400 megawatts in Ohio of renewable wind. It's very, very small compared to other states.

Q. Just to clarify, that's -- you're discussing what is available today, correct?

A. Yes, but it's also indicative of what I think is likely to occur in the future. I don't see this as a state that's going to have massive amounts of renewables, neither does EPA.

Q. Have you spoken with the General Assembly, Mr. Rose?

MR. ALEXANDER: Objection. Argumentative.

MR. OLIKER: I'm just curious.

MR. ALEXANDER: Objection.

EXAMINER PRICE: He's objected to your

question. I will put it a different way. Have you testified recently before the General Assembly about the outcome in Ohio on renewable energy?

THE WITNESS: I have not.

MR. OLIKER: Thank you, your Honor.

THE WITNESS: I was referring to the EPA projections of 2000 megawatts spread out over time for Ohio. I think there are states that have 10,000 to 15,000 megawatts. So I don't think it's likely to be a huge factor in electrical energy prices here in this state.

EXAMINER PRICE: Thank you.

Q. (By Mr. Oliker) One of the factors you also discuss in your testimony regarding increasing natural gas prices is the growth of LNG export facilities. Would you agree that there is shale gas in foreign countries?

A. There is.

MR. ALEXANDER: Objection. Compound.

MR. OLIKER: I don't believe the first part was a question, your Honor. It was a prefatory statement.

MR. ALEXANDER: Your Honor, I don't believe prefatory statements are particularly appropriate. I think we should ask the witness

questions.

EXAMINER PRICE: He asked a question. Overruled.

MR. ALEXANDER: Your Honor, just a point of clarification, is the question on whether there is shale gas in foreign countries, or is the question whether shale gas in foreign countries affects LNG exports? That was my problem with the compound nature of the question.

MR. OLIKER: I didn't ask that first part.

EXAMINER PRICE: Let's read the question back again.

(Record read.)

A. Yes, and that's something we have taken into account in our forecasts. Unfortunately, for Japan, for example, it is not well endowed with shale gas. There is no place that's comparable to the United States in terms of the availability of shale gas, and LNG export facilities are under construction right now, as are pipelines to Mexico. There is very significant increases in the LNG exports forecasted taking into account the distribution of shale gas worldwide.

MR. OLIKER: Again, I would say move to

strike, that most of that answer is not responsive to my question, which was whether gas exists in foreign countries.

EXAMINER PRICE: I think in the context of your prefatory statement, it was a perfectly adequate response.

MR. OLIKER: Thank you, your Honor.

Q. (By Mr. Oliker) And on page 17 of your testimony, you refer to PJM area and state "Prices are especially low in these areas" -- so let me rephrase that. Sorry. Page 17, referring to natural gas prices, you state that "Prices are especially low in these areas because they are currently inadequately served by natural gas infrastructures." Regarding this statement, you would agree that the low price difference you refer to is base differential?

A. Yes.

Q. And you would agree that base differential is the locational difference, either plus or minus, from the Henry Hub price?

A. Yes.

Q. And you agree that the Henry Hub is located in Louisiana.

A. Indeed but --

Q. That's all my question is.

A. Okay.

EXAMINER PRICE: First, let him finish his response beginning with "but." Then you can object and move to strike, which I am going to grant because you began with "but," which is an open invitation to strike.

A. While it's true -- I mean, you know, I think while it's true that Henry Hub is located in Louisiana and that's frequently quoted, what we're observing is because of inadequate infrastructure, you see a remarkable high electrical energy price here in Ohio in the wholesale market price relative to the gas price, but there is not enough infrastructure to use it.

So it can be very misleading to look at what's going on in the gas market and trying to explain what's going on in the PJM electrical market, which is the market that's determining how much revenue power plants receive.

So this infrastructure issue is a broad-based, and it also explains why we have the highest gas prices ever recorded in U.S. history in 2014, the last complete year. We had gas prices that reached $120 BTU. So it's not only what goes on at

Henry Hub, and it's not even what goes on in the production areas, it's also what goes on in delivery, and we have seen very high prices just in the last full year, 2014.

MR. OLIKER: Your Honor, now I would move to strike. My question was the Henry Hub located in Louisiana.

EXAMINER PRICE: I am forced to agree with Mr. Oliker. I think those are very interesting points that I am sure Mr. Alexander will be happy to elicit on redirect, but it is unresponsive to the location of the Henry Hub. The motion to strike will be granted.

MR. OLIKER: Thank you, your Honor.

Q. (By Mr. Oliker) And would you also agree that if the current reduced oil prices is sustained would lead to reduced demand for natural gas?

MR. ALEXANDER: Could I have that question reread, please.

EXAMINER PRICE: Please.

(Record read.)

Q. Yes. In that hypothetical situation in which gas prices remain at current levels, which we don't expect to happen, there would be somewhat lower demand for natural gas. I would say that our

forecast is that natural gas demand over 10 years is going to increase by a third. It will be the largest increase in a 10-year period ever, and that would be less, but it still would be extremely large.

MR. OLIKER: Your Honor, I would move to strike everything starting with "Our forecast."

EXAMINER PRICE: Denied. You are asking some pretty broad questions. I really do think he is trying to give context to them other than the geographic questions.

MR. OLIKER: Thank you, your Honor.

Q. (By Mr. Oliker) And on page 22 of your testimony, you indicate that one of the critical causes of volatility is a lack of firm natural gas delivery capability at many major gas power plants. Now, would you agree that as infrastructure investment increases, the availability of firm transportation is likely to increase?

A. I would say that that's true, again, with that predicate. But it's also true that it's -- the amount of increase might not be enough to solve the problem, which is most of the gas power plants have been built with nonfirm transportation. And that creates volatility, because in the event there is very high demand for gas, the interruptible power

plants are knocked off and they don't get gas supply.

Q. And you are familiar with the capacity performance product, correct?

A. Yes, sir.

Q. You agree that the capacity performance product requires the power plant, including a natural gas power plant, to deliver power regardless of conditions in all hours?

A. No. And the reason I don't agree with that is that if you don't provide the power, you're hit with a penalty. So it's not a requirement. It's just that there is a penalty. And the basic structure is there's penalties and bonuses. So it is not a requirement to deliver.

Q. Thank you for that clarification. You agree that the penalties could be severe?

A. The penalties could be significant, as could the bonuses since they are the flip side of the penalties, but it's not an absolute requirement to deliver. It's an absolute requirement to pay the penalties or receive the bonuses.

Q. Thank you. Do you agree that approximately 30,000 megawatts of natural gas-fired power plants cleared in the '16-'17 transition auction?

A. I don't agree or disagree. I don't have the exact number handy.

Q. Do you agree it was close?

MR. ALEXANDER: Objection. Asked and answered.

EXAMINER PRICE: Overruled.

A. I don't agree or disagree. I just don't have that particular number handy.

Q. Have you reviewed that number?

A. I reviewed the base residual auction, but I don't remember that particular statistic.

Q. Do you agree if a natural gas-fired power plant does, in fact, have firm pipeline transportation, if an operational flow order is issued, the generator will still receive gas up to its firm pipeline reservation rates?

A. I can't agree to that. I'm familiar with operational flow orders, but the legal details of that and the tariff details are -- I don't have it handy. I think it varies. So I can't answer that.

Q. You don't know; is that the answer? I'm sorry.

A. Yes.

Q. Thank you. Going back to the capacity performance product, you'll agree that a power plant

can include the costs of obtaining firm pipeline capacity in their offer?

MR. ALEXANDER: Your Honor, could I have that question reread, please?

EXAMINER PRICE: You may.

(Record read.)

A. Yes. Under the following circumstances, that is, if they are bidding up to around 220, 230 dollars a megawatt-day, they don't have to offer any information in what they paid for -- pipeline reservation doesn't matter. It is, however, something that they could include if they wanted to bid above the bid cap, which is approximately above 220, 230 dollars a megawatt-day.

Q. Just to clarify, is it your testimony that you do not believe a natural gas-fired power plant can bid below $230 a megawatt-day and include firm pipeline transportation?

A. No. What I am saying is if it wanted to make an assertion that a significant factor in its bid was the gas pipeline cost, it could, but that would only be relevant if they wanted to bid above the bid cap, which is around 220, 230 dollars a megawatt-day. There is no proof required. It's anything paid up to the bid cap is deemed competitive

by FERC.

Q. Are you referring to new generation, Mr. Rose?

A. No. I am referring to existing plants.

Q. And to follow up on that, is it your testimony that the base residual auction cannot clear below $230 a megawatt-day if it includes bids from gas-fired generators that include firm pipeline transportation?

A. No. All I am saying is that a bid up to 220 to 230 dollars a megawatt-day is deemed competitive by FERC. That's three times the level at which they were accepting bids previously and as an example of why we anticipated such a massive increase in the capacity price because there was going to be such major structural changes.

Q. Let me ask you a simple hypothetical. Assuming a megawatt-day clearing price of $234 and there is 30,000 megawatts of natural gas-fired generation that agrees to provide that product, would you agree that those 30,000 megawatts finds that price to be competitive?

A. I think that that's -- that's true, yes.

Q. Thank you. Regarding the capacity performance product, would you agree that one of the

anticipated outcomes is that it will reduce energy prices over the long term?

EXAMINER PRICE: Could we have that question back, please?

(Record read.)

Q. And I would add to that relative to the previous RPM capacity design.

MR. ALEXANDER: Could we have the whole question read as one, please?

EXAMINER PRICE: Yes. Please read the entire question including his addendum.

(Record read.)

A. I think the answer is yes, that is, the main thing that the capacity performance thing is doing is, as we anticipated, going to have very positive large impact on capacity prices.

As I also testified, the previous structure was unsustainable, and what it was is that it was not sending the right price signal for reliability. And if you have a reliability problem, you are going to have very high prices in the energy market eventually. Eventually it is not sustainable.

So it's -- I think the answer is sort of yes, you would hopefully avoid the situation in which you have a catastrophic failure of the system. And

leading up to that, there might be some high electrical energy prices you could avoid.

Q. You've talked in your testimony a little bit about generation performance during the polar vortex. Would you agree that during this past winter for 2014-2015, outage rates were approximately 10 percent lower than during the polar vortex? Actually, scratch that. That question was awful.

Would you agree that in the winter of 2014-2015, the forced outage rates during the peak hour were approximately 13 percent relative to the 22-1/2 percent during the polar vortex?

MR. ALEXANDER: Can I ask that be reread, please.

EXAMINER PRICE: Yes. Why don't you reread the question again.

(Record read.)

MR. ALEXANDER: Objection. Compound and assumes facts not in evidence.

EXAMINER PRICE: Response?

MR. OLIKER: I don't believe it was a compound question. It was only comparison of the two numbers. And if he knows the answer, he will know it. If not, we can move from there.

EXAMINER PRICE: Where are you citing to

the testimony on the polar vortex?

MR. OLIKER: I'm not sure I had a page number.

EXAMINER PRICE: Don't worry about it. You can answer if you know.

A. I don't have the exact numbers handy for the most recent winter. What I do know is that directionally it sounds correct, because PJM itself said on August 20, if this was a repeat of the polar vortex due to the retirements, it would shed load. And since it didn't shed load, I assume that there was some lower forced outages, and so I think directionally it's correct. I don't have the numbers, and I am not sure exactly what units you are referring to.

Q. Do you agree that during the winter of 2014-2015, uplift charges were significantly smaller than during the polar vortex?

A. Yes. Again, I don't have the exact numbers, but because in one year we had the highest gas prices ever of $120 a million BTU, and the other one we didn't, I would assume that the uplift charges are lower, but I don't have the specific numbers handy. If you have a reference, I will be glad to look at them?

Q. Have you reviewed the PJM winter report from 2015?

A. I have reviewed that, yes.

Q. Okay. We will come back to that. On page 25, you provide a table of natural gas prices at the Henry Hub, Chicago City Gate and Dominion South during the polar vortex. And then on page 26 -- first, are you done with page 25?

A. Yes, sir.

Q. On page 26, you indicate that the Chicago City Gate price is more directly relevant than Henry Hub because it is located in PJM. Regarding that statement, would you agree that the Dominion South is located in the western Pennsylvania/Ohio border?

A. Yes, but it's not significant because the price is not manifesting itself in the electrical energy market. We talked about the fact the infrastructure doesn't allow that to be manifested. The Chicago price is more relevant, and I think it proves the point that 2014 Chicago delivered cost is very similar to our forecast of delivered costs over time, which we will talk about in the confidential.

Q. Mr. Rose, if a natural gas-fired power plant in Ohio is buying gas, would you agree they are more likely to buy at Dominion South than they are at

Chicago City Gate?

A. I think it depends on where they are, and I think the problem is there are hardly any gas plants in Ohio. There are not that many certainly in the south, and the Dominion South is not affecting the electrical energy prices.

The ratio of electrical energy prices to Dominion South gas prices is three times that which you would expect of a commodity that was available. So it's clearly that Dominion South is not at this time driving the electrical energy prices in Ohio, and Chicago is much more relevant.

Q. And to follow up on that, if natural gas-fired power plants are built in Ohio, they are more likely to buy gas at Dominion South?

A. I think it would be more economic for them to, which is why we think that gas prices will become more important over time, and it also happens to be a time for the gas prices to recover.

Q. Okay. Turning to what is marked as Table 4, and this has 2014 natural gas prices. Now, am I correct --

EXAMINER PRICE: Mr. Oliker, are you talking about Figure 4?

MR. OLIKER: It may be.

EXAMINER PRICE: On page 23?

MR. OLIKER: I am referring to Table 4, I believe, your Honor.

MS. BOJKO: It's 28.

MR. OLIKER: It hard when there are both figures and tables.

EXAMINER PRICE: Thank you, Ms. Bojko. Page 28, Table 4.

MR. OLIKER: Thank you.

Q. (By Mr. Oliker) And, now, the price --

MR. ALEXANDER: Your Honor, was there a question pending before the clarification?

EXAMINER PRICE: No.

MR. OLIKER: I don't think so. I was just trying to get him on the same page as me, the same table as me.

MR. ALEXANDER: Thank you, your Honor.

Q. (By Mr. Oliker) Mr. Rose, if we look at the price average for megawatt-hour, the Henry Hub natural gas, now, these numbers here, this is really an MMbtu price, right?

A. Yes, sir. It's -- I apologize. It says dollars per mega-watt hour, but it should say dollars per million BTU for any of the gas prices.

Q. And that would be under the daily

standard deviation as well?

A. All rows starting at where it says "Henry Hub natural gas average price," and it starts at $495 per megawatt-hour, it should be a dollar per million BTU all the way down.

Q. Is the same error reflected in Dominion South and Chicago City Gate?

A. Yes, it should say dollars per million BTU, and I was trying to wait for the right time to clarify. These are prices through June 2014, not 4/2014 calendar year.

Q. That's my next question, Mr. Rose. If we look at 2014, you get a price of $4.90 per MMbtu. Would you agree that the number for 2014 is really about $4.39?

A. Yes, I would agree, and I used 4.37 as the price, the last full year for which we have data.

Q. Okay. And the average price for 2015 is about $2.82.

A. Year-to-date is approximately at that level, yes. I don't believe it's sustainable, but it is what it is.

Q. Would you agree that last winter was nearly as cold as the polar vortex, if not colder?

A. Yes, I think there are some differences

between years, but it was cold. Winter '14-'15 was cold, and winter of '13-'14 was cold.

Q. And one of the impacts that we saw during this past winter is that shale gas production outpaced prior estimates, correct?

A. It did, and it was also the lowest drilling level ever recorded, so this is not a sustainable outcome. And there's no major forecast available, either mine or DOE or EPA's, that says that.

Q. You would agree that you're -- I think that might be confidential. I am going to hold that back.

You talked a little bit with Mr. Fisk about forward prices that you found on the intercontinental exchange. Do you remember that discussion?

A. I think you are referring to the Chicago Mercantile Exchange.

Q. I am referring to electric prices.

EXAMINER PRICE: Which exhibit are you referring to?

MR. OLIKER: So many. Let me see. Yeah, what I am referring to is Table 7 in your testimony.

EXAMINER PRICE: Oh.

Q. (By Mr. Oliker) And I believe the numbers are from the S&L financial report on the page 34. And one of the things I would like to follow up on a little bit, you indicated that current prices are currently 10 to 15 percent lower than what you have contained in this table, correct, for 2015?

A. Yes, approximately. The year-to-date prices for, for example, AEP Dayton are around $35 a megawatt-hour.

Q. And you would agree that if you were to look at current forward contracts, you would see prices going down in 2016, 2017, 2018, and 2019 in each year?

A. No, not in any significant way. The prices are pretty much steady at 35 or so dollars a megawatt-hour.

Q. When was the last time you looked at -- do you look at plats, Mr. Rose?

A. On occasion, yes.

Q. When was the last time you looked at plats?

A. I don't remember. I have looked at the forward prices for AEP Dayton within the last week.

Q. And it's your testimony that the price in 2016 through '19 stays constant and does not

decrease?

A. It's approximately the same price at around 35, 36 dollars a megawatt-hour. Subject to my recollection sitting here it's pretty constant.

Q. Okay. How long of a snapshot in time did you look at when you looked at plats a week ago? Was it one day?

A. I don't remember. It's a recent reporting of the forwards.

Q. You also, I believe, indicated earlier that you provided a projection of capacity prices, correct?

A. Yes, sir, I did.

Q. Without talking about the numbers themselves, let's talk about some conversions. You typically provide capacity prices as a kilowatt year, correct?

A. Yes, sir.

Q. But if we wanted to convert a kilowatt year to a megawatt-day, you agree we would multiply that number by .365?

A. No. We would multiply by .274.

Q. So would we divide it by .365? Did I have that backwards, Mr. Rose?

A. I think, yeah.

Q. Okay. Thank you. Just so the record is clear, to convert a kilowatt year to a megawatt-day, you divide it by .365?

A. Correct, or multiply by 2.74. It's equivalent.

Q. Likewise, now, if he wanted to convert a megawatt-day to a kilowatt-year, we multiply the megawatt-day price by .365, correct?

A. Yes, that's correct.

Q. Okay. And if we wanted to evaluate the impact of a deviation between your forecast and what may actually occur for capacity prices, would you agree that we would times the kilowatt year deviation by the amount of kilowatts?

MR. ALEXANDER: Objection just to form.

EXAMINER PRICE: Could I have the question back again.

(Record read.)

A. I think for a given year, assuming that all the kilowatts transact at spot price, yes.

Q. Okay. And to take that a step further, we could multiply -- to translate this into megawatts, we just times the kilowatt-year amount by 1000 to see the impact on 1 megawatt?

A. I think you have to divide by 1000. One

kilowatt times 1 megawatt of 1000 kilowatts equals megawatts.

Q. Maybe my question was poor. If you are forecasting the price of capacity to be $50 a kilowatt year and then it comes in at 49, so we have got a one kilowatt-year difference, if we want to determine the impact of that on 1 megawatt of capacity, we would just multiply 1 times 1000, correct? Because there is 1000 kilowatts in a megawatt.

A. Yes, sir.

Q. Okay. And, likewise, for every single kilowatt-year difference between the forecast and the actual, the impact on 1000 megawatts would be a million dollars?

A. Yes, sir.

Q. And for 3000 megawatts, $3 million.

A. That sounds right, yes.

Q. Okay. And some more of the conversions, capacity price are not on a calendar year basis, correct?

A. That's correct. They are on a PJM year basis, which goes from June 1 to the following May 31.

Q. So for turning it into a calendar year,

we have to wait then, correct?

A. Yes. So, for example, even in this state, the capacity performance plan that's in place right now, it's only partly in place, and we still don't have any full calendar year numbers to compare.

Q. Sorry to jump around here. Going to line 14 of page 37, you indicate that there are a few new power plants forecast to be built in PJM. Now, would you agree in your forecast, you did not account for the construction of the Oregon Clean Energy Center, the Middletown facility, Carroll County, or Lordstown Power Plant?

MR. ALEXANDER: Objection. Compound.

A. So --

MR. ALEXANDER: Hold on. Hold on.

EXAMINER PRICE: Don't answer that yet. Just break them down at a time for me.

MR. OLIKER: Sure.

Q. (By Mr. Oliker) Mr. Rose, when you drafted your testimony, did you consider that the Oregon Clean Energy Center would be constructed?

A. I don't remember.

Q. Did you consider whether the Middletown natural gas-fired power plant would be constructed?

A. No. I had large amounts of construction

in areas of western PJM in my forecast. This is referring to the firm power plants that are forecast to be added. I apologize if it's not fully clear. And among the firm power plants at that time, almost every single one was located in eastern PJM. The model itself has a more diverse build-out pattern.

Q. To follow up on that, did you consider the construction of the Carroll County power plant?

A. Again, I actually do have my workpapers here. Let me go through those. In my list of firm builds which were plants under construction or cleared the auction, I don't have those power plants. But what I have is nonfirm generic builds, which would correspond fairly closely, I believe, to construction of new plants in western PJM.

Q. Could you tell me which page in the workpaper you are on, Mr. Rose?

A. Yes. I am looking at the one that may be best for the confidential session, but I am looking at the one that's marked firm builds, and it doesn't have a page number on it. It's about six pages in.

Q. And so I understand, you mentioned generic construction. Is it your testimony that your model would considered different power plant construction than what's listed in this workpaper?

A. Yes. So the way the modeling works is if a power plant is under construction slash has cleared the market and we think it's very likely to come on, it's considered a firm build, and there is a list of those. Then the model on its own, the IPM model, determines what generic -- we call it generic builds. They are generally new gas-fired combined cycles that have characteristics similar to other new gas-fired combined cycles, and there's construction in western PJM, not just in eastern PJM.

Q. Okay. I wanted to follow up on the model. Now, going to -- and I believe this is public, ICF new plant proxy financing assumptions for PJM. I believe it's toward the end.

A. Of what?

Q. Your workpaper. Let me know when you are there.

A. Yes, I'm there, but why do you think that it's public?

Q. I think it was on the internet. Though, you can't always trust.

A. If you have a reference that shows those public, that's one thing. I would prefer to discuss this in a confidential session.

Q. Hold on. I have your workpapers.

MR. OLIKER: Can we go off the record for one second, please?

EXAMINER PRICE: We may.

(Discussion off the record.)

(Recess taken.)

EXAMINER PRICE: Okay. Let's go back on the record.

MR. OLIKER: Thank you, your Honor.

EXAMINER PRICE: Do we have a question pending?

MR. OLIKER: I believe we do.

EXAMINER PRICE: Can we have the question back again.

(Record read.)

Q. (By Mr. Oliker) Mr. Rose, as you proceed, do you agree that this information is public?

A. Yes.

Q. And can you explain to me the 100 percent merchant combustion turbine column under nominal pretax? Is that that rate?

A. Which number are you referring to?

Q. I am looking at the first column, 100 percent merchant combustion turbine.

A. I'm sorry. And the question is?

Q. Is the 7.8 percent a debt rate?

A. Yes.

Q. So am I correct that your model for forecasting power prices assumes a debt rate of 7.8 percent in constructing the capital costs of the power plant?

A. No.

Q. And explain why that is.

A. If you look over the next column where it says adjusted combined cycle, you have a 5.8 percent debt rate. That's the one that we are using to establish long-term capacity prices to the extent it's being set which frequently is by new combined cycle construction.

Q. Okay. And, likewise, on the return on equity, you took a 13.3 percent and adjusted it to 10.8, correct?

A. Yes.

Q. And is it your belief that a 7.8 percent debt rate is something that a merchant power plant would find in the market?

A. We are not using 7.8. We are using a 5.8, and it is in part because we think that's a better number to reflect what we think is likely to occur. And these are long-term numbers, numbers that would be in place for the 20-year horizon.

Q. And that's my question. Where does the 7.8 percent come from?

A. It's coming from the long-term subinvestment grade average five-year interest rate as of approximately two or three years ago. So it was reflective of conditions that we thought obtained two or three weeks ago when we did the analysis, but we are using the 5.8 right now.

Q. Okay.

A. One of the things we are struggling with is we are at super low interest rates, and we have a 20-year projection, and so the question is what do we do in that circumstance, and what we are trying to do is adjust downward the financing assumptions to make sure that the price is sufficiently reflective of the long term but also taking into account the fact that we have the lowest interest rates over the last few years ever.

Q. Would you agree then it would be unreasonable for a merchant generator to assume a debt rate in the range of 4-1/2 percent for the next 15 years?

A. Not necessarily. If they were going to get the financing today, I think that that would be an unusual outcome, but it is the case that some

corporate entities have interest rates this low, so it depends in part on who is actually building the plant.

Q. Okay. So then to follow up on that, there may be generation that's being constructed in PJM now that has a lower debt rate than 5.8 percent?

A. Yes, and some might have higher, and what occurs today we don't think is sustainable over the long term, because it's at all time historic lows, and we are projecting also for the long term.

Q. Okay. Please tell me if this is confidential. From a high level we have, would you agree, two things going on in your forecast of capacity prices. We have the RPM prices in your testimony, and then there are ICF prices going out, I think, starting in 2020.

A. I don't think that's correct. We have RPM prices through 2018 in part, and then thereafter, they are forecasts from ICF.

Q. And that's -- I guess my question is, starting with the '18-'19 delivery year, is that exclusively from the ICF model?

A. I believe it's an interpolation between the BRA number and a number coming out of the model for 2020.

Q. Okay. And that's what I am trying to get to. If, for example, the 2018-'19 price is different than what you had projected, would that also impact the 2019-'20 price because of the interpolation?

A. I am not sure I understand your question.

Q. Could you explain what you meant by the use of the word "interpolation"?

A. So we have a BRA price or an RPM price like you said, and then we have a 2020 forecast, and we have a linear interpolation between the two. So I am still not sure what your question is.

Q. And I guess what I am trying to understand is how you created the capacity prices between when the known quantities existed and when the ICF projection began in 2020? Because of the interpolation, once the 2018-19 prices are known, could that affect your forecast of 2019-20 prices?

A. It's possible. You know we might put in the '18-19 price and that could affect the forecast.

Q. Okay. You also identify in your testimony that the EPSA decision that is currently on appeal at the U.S. Supreme Court may impact capacity prices. Now, would you agree that assuming the EPSA decision does stand, states could still provide compensation for demand response?

MR. ALEXANDER: Can I ask that question be reread, please.

EXAMINER PRICE: Please.

(Record read.)

A. Yes, it is the case that states could provide that. And in our forecast, we have a large amount of interruptible load, which is the main form of demand response historically. And currently in the PJM markets, we have accounted for large amounts.

If, however, the decision is done quickly, which it will come out some day, any day, we are not really sure when, while there could be some efforts on the part of states, I don't think it would be immediately getting us back to the level that's in our forecast with the level that's clearing in the market. And I think it would be difficult for all the states to recreate the incentives that have been created by FERC in a timely manner.

Q. And would you agree that given the choice between two reputable sources, a rational economic participant, which is the higher one, all else being equal?

A. Yes, I think that that's reasonable.

Q. And you would agree that FirstEnergy's application contains a proposal for an interruptible

rider?

MR. ALEXANDER: Objection. This is beyond the scope of his testimony.

EXAMINER PRICE: He can answer if he knows.

A. I don't know.

Q. Would you agree that $329 a megawatt-day is higher than the unconstrained portion of PJM capacity prices we've ever seen?

A. Yes. The current price is the second highest ever obtained at 165. Previous high was approximately 173. So the number that you indicated is higher. We just experienced the second highest BRA price ever.

Q. And that converts to something in the range of $120 a kilowatt year, correct?

A. What -- I'm sorry, what converts to what?

Q. The $329 a megawatt-day converts to approximately $120 a kilowatt-year.

A. Yes, that is the correct conversion.

Q. Or $10 a kilowatt-month.

A. Approximately, yes.

Q. Mr. Rose, we talked a good deal about your forecasts of power prices and capacity prices. Would you agree that this is not the first time

you've made forecasts for Commission proceedings in Ohio?

A. Yes.

Q. And, in fact, back in 2011, you provided a forecast of electricity and capacity prices for Duke Energy Ohio.

A. Yes.

Q. And you would agree in that testimony, you indicated that over the next five years, capacity prices and energy prices are going to rise?

MS. KINGERY: Your Honor, I would like to object. It is irrelevant to this proceeding.

EXAMINER PRICE: Overruled.

MR. OLIKER: Thank you.

MR. ALEXANDER: Your Honor, I would like to object to any discussion of the calculations, confidential calculations, included in Mr. Rose's Duke testimony pursuant to the protective order issued originally in that case, which is still in effect as far as I understand, and your Honors' previous ruling regarding confidentiality in this proceeding.

EXAMINER PRICE: She shouldn't be making that objection. You should have been making the relevance objection. If we are treading dangerously

close to confidential materials, then we will simply keep it on the confidential portion of the transcript. You can ask that later.

MR. OLIKER: I will do my best, your Honor. Actually, I believe that question is stated publicly in the Duke testimony.

EXAMINER PRICE: Okay. Do you have a reference for that?

MR. OLIKER: Yes. Maybe the easier way to do this, your Honor, would be -- can I please approach the witness?

EXAMINER PRICE: You may.

MR. OLIKER: Thank you.

MR. ALEXANDER: Are you going to mark this?

MR. OLIKER: Yes, eventually. I would like to mark as IGS Exhibit 2 --

EXAMINER PRICE: So marked.

MR. OLIKER: -- the redacted testimony of Judah Rose, 11-3549.

(EXHIBIT MARKED FOR IDENTIFICATION.)

MR. OLIKER: Just to make sure we stay out of trouble with the confidential information, I think this would quell our discussion.

EXAMINER PRICE: Thank you.

Q. (By Mr. Oliker) Mr. Rose, do you see the document that's been marked IGS Exhibit 2? Notably, your exhibit probably doesn't have anything written on it.

A. Right. Mine's not marked.

Q. Is this testimony that you filed in Case No. 11-3549 in 2011 on June 20?

A. It looks that way.

Q. And if I turn to page 10, line 11, it states, "The projected electrical energy price increase between 2009 and 2015, cumulatively, on a nominal basis is 65 percent;" is that correct?

A. That's not my forecast. That's just the forward prices that were then current.

Q. Okay. Would you agree that electric prices did not, in fact, rise by 65 percent on a nominal basis in that same timeframe?

MR. ALEXANDER: Objection.

EXAMINER PRICE: Grounds?

MR. ALEXANDER: States in his testimony -- he explained forward prices are not his projections.

EXAMINER PRICE: He can still answer the question. I understand it's not his projection. It was the forwards at the time.

MS. BOJKO: Excuse me. Can you turn your mic on when you are making your objections?

THE WITNESS: Could I have the question read back to me, please.

EXAMINER PRICE: Please.

(Record read.)

A. Yes, they increased 49 percent. Just one second, please. What I just calculated the 49 percent was 2009 to 2014. We do not know what the 2015 price is yet. So I can't answer the question as to what the increase would be.

Q. Would you agree that the year-to-date price in 2015 relative to 2009 is not a 49 percent increase? It is a lower number.

A. Yes, the last -- yes. Year-to-date number is a lower number. But, again, we don't know what 2015 is going to end up at. The last full year is 49 percent.

Q. And earlier you indicated that the prices increased through 2015 are based on forward contracts, correct?

A. Yes, price forward contracts.

Q. So in this testimony, you relied on forward contracts for three and a half years of pricing?

A. Yes, at the request of the client.

Q. And at the time you filed this testimony, you would agree from a high level, it was a proposal to provide cost-based regulation to Duke Energy Ohio's generating assets, correct?

MR. ALEXANDER: Objection, your Honor. Now we have gone, I believe, beyond the scope of relevance as to the accuracy of Mr. Rose's forecast in that proceeding as to what Duke was requesting to receive in that proceeding.

EXAMINER PRICE: Mr. Oliker?

MS. KINGERY: I would join in that objection also with regard to the fact that this question goes beyond the scope of Mr. Rose's testimony in that proceeding.

MR. OLIKER: It's a foundational question regarding the context of why the projection was provided.

EXAMINER PRICE: Overruled.

A. Do you have a citation for my testimony?

Q. Let's see. I do, I believe. Page 7, line 13. Tell me when you are there.

EXAMINER PRICE: Let's go off the record for one moment.

(Discussion off the record.)

EXAMINER PRICE: Let's go back on the record.

Q. (By Mr. Oliker) We are on page 7, line 13, and is it my understanding the proposal is "Customers would pay a nonbypassable charge equal to Duke's Energy Ohio's capacity revenue requirements for capacity, including regulated recovery of and on capital, less a portion of the margins earned by Duke Energy Ohio's primarily coal-fired fleet from energy sales to the marketplace."

A. Yes, and it goes on to describe the credits. I guess I would just prefer to say that it stands on its own, res ipsa loquitur, it says what it means, and I am afraid of mischaracterizing the arrangement which was not the focal point of my testimony, but there are clearly market-based elements here as well.

Q. And that's what I am trying to get at. Am I correct that under the proposal, there would be a cost-based rate for Duke's generation that would be offset by the market-based revenues that generation earns?

MR. ALEXANDER: Objection, your Honor. Again, relevance. The witness just testified the details of Duke's capacity proposal was not the

foundation of his testimony, and this is solely a reference. So I think object again to relevance.

EXAMINER PRICE: He can answer if he knows. Overruled.

THE WITNESS: So could I have the question read back, please?

EXAMINER PRICE: You may.

(Record read.)

A. I think it was a more complicated arrangement than that. It was, it says later, on a profit-sharing mechanism, et cetera. So I am just afraid of mischaracterizing the arrangement.

Q. Okay. Thank you for that clarification, but one of the things it was intended to guard against, and you identified this on page 8, line 11, regarding customer protection, it provides protection against volatility in both electrical and energy capacity prices, correct?

A. Yes, that's what it says.

Q. And then you say further, on page 9, line 20, "Between 2012 and 2021, the wholesale and retail market prices delivered to Duke Energy Ohio will increase."

A. I'm sorry. Where are you?

Q. Page 9, line 20.

A. Yes. And we don't know what 2021 is going to be, but that's what the forecast is or was at the time.

Q. And the reasons for the energy price increase are indicated on page 10, line 19, and also on page 11; am I correct?

A. Yes, this is what it says. Again, I want to make sure we don't go into confidential information.

Q. Okay. Now, if we go to page 44, staying in the public, you further elaborate on those factors which are environmental regulations, economic recovery in the U.S. and PJM, rising electricity demand and rising natural gas prices, correct?

A. Yes.

Q. Would you agree that in this forecast that you provided to Duke Energy Ohio, you used the same IPM model you used to provide a forecast for FirstEnergy?

A. We used the IPM in both cases, and in this case, we refer to 2016 onwards. In this case, we used GE MAPS as the main forecasting tool, but we also used IPM, supplemented with IPM.

Q. Did you use GE MAPS in the FirstEnergy case as well in this case?

A. No, I don't believe so.

MR. ALEXANDER: I'm sorry. Can I have that question and answer reread. I think it might have come out garbled.

EXAMINER PRICE: Let's have the question and answer back, please.

(Record read.)

Q. (By Mr. Oliker) I can restate that question. It should read "FirstEnergy," which is this case, instead of "also in this case."

EXAMINER PRICE: Just start over.

Q. Actually, one second. Mr. Rose, is it your testimony you did not use GE MAPS for the FirstEnergy forecast?

A. No. I used it for the FirstEnergy forecast. I did not use it in the Duke proceedings.

Q. Okay. Would you agree that the factors contained on pages 44 and 45 are similar to the factors you identify in your testimony in this case?

A. They are similar, though. The specifics are very different, but I can't really discuss that until we get into confidential session.

MR. OLIKER: If I could have one minute, your Honor.

EXAMINER PRICE: You may.

Let's go off the record.

(Discussion off the record.)

EXAMINER PRICE: We are back on the record.

MR. OLIKER: Thank you, your Honor.

Q. (By Mr. Oliker) And on page 57 of what's IGS Exhibit 2, the ICF gas market model, is that the same type of model you used in this case?

A. Yes. The specifics of the model are different, but it's the same model.

EXAMINER PRICE: Can you repeat your answer, please.

THE WITNESS: The specifics of the model are different, but it's the same model.

EXAMINER PRICE: Thank you.

Q. (By Mr. Oliker) Okay. And moving away from your Duke testimony, earlier we talked about potential carbon prices. Would you agree that, in general, carbon regulation will decrease the margin of a coal plant?

A. Yes, I would agree with that, but it's a very general statement. There are issues about the specifics of any particular regulation, about the timing of the regulation, and also taking into account offsetting factors that would affect the

magnitude. So it's a general idea, but you have to get into the specifics as to what the magnitude is. And by the same token of course, it would make the value of a nuclear unit go up.

Q. Would you agree that carbon regulation could have the tendency to make a coal-fired generation unit the marginal unit that establishes power prices?

A. Again, it's a very general concept. There are 8,760 hours in a typical year. There might be an increased percentage of the hours of the year in which the coal unit becomes a marginal price-setting unit.

Again, it depends on the specifics of the individual plant, and there are offsetting factors. When you have carbon regulation, you also have higher gas prices, and other -- there are other impacts as well, but we really need to talk about the specifics in order to get really at the impacts.

Q. And to follow up on that, if coal becomes the marginal unit, would you agree that you would at the same time have CO-2 regulations increasing power prices but no additional margin to the coal plant?

A. Compared to what? If the coal plant is the marginal price-setting unit, that means power

prices are higher, and that's a big deal in the forecasting that we have been doing. And it's better for the coal plant, I think, is what you are asking than if a gas plant was on the margin because there would be more of a compensatory increase in the electrical energy prices. And so I think that that's the general impact, but we need to get into the specifics, and we will get away from the general.

Q. Okay. Let's ask very simply. If there's a $7 megawatt-hour carbon tax and power prices increase $7, would you agree that we're seeing prices rise but no additional margin for a coal plant, all else being equal?

MR. ALEXANDER: Objection. Asked and answered.

EXAMINER PRICE: Overruled.

A. First of all, the carbon program, the regulations would manifest themselves in a dollar per ton, not a dollar per megawatt-hour. And if a coal plant was on the margin, it would tend to increase the electrical energy prices by a number not dissimilar from -- if it was $7 a ton, you would get something on the order of 7 or 8 dollars an increase in the price if the coal was the marginal price-setting unit.

If the coal plant's efficiency is higher than the price-setting unit, there is going to be another coal plant that's going to be setting the price, then it would have a higher revenue. And, of course, the nuclear unit would do better.

MR. OLIKER: I believe that the rest of my questions are confidential.

EXAMINER PRICE: Thank you.

MR. OLIKER: Thank you, your Honor.

EXAMINER PRICE: Ms. Fleisher.

- - -

CROSS-EXAMINATION

By Ms. Fleisher:

Q. Mr. Rose, I am Madeline Fleisher. Can we turn to your direct testimony at page 46. And on lines -- I guess just to turn back to page 45 and provide context here, you are discussing that IPM model, correct?

A. Yes, ma'am.

Q. And on page 46, lines 2 to 4, it says "Energy efficiency and demand side management programs are evaluated in an integrated framework with other resource options." Can you just explain what that means with respect to the operation of the IPM model?

A. Yes. The model can make a decision in terms of what resources are optimal. The integration is that you're integrating a consideration of, for example, a supply side resource with a demand side resource. The most common demand side resource in PJM is interruptible load, but there is also energy efficiency programs. So it depends on the particular application. But as a general matter, you could consider both supply and demand resources on equal footing. It takes into account their actual characteristics in terms of being able to provide for meeting the demands and need for capacity and energy.

Q. Okay. And would that add any additional energy efficiency or demand response on top of your basic assumption of the level of those resources?

A. I mean, it depends on the particular application. The model has the capability to evaluate an energy efficiency or an interruptible demand program as well as a range of supply programs, and so it could make a decision to pick one or the other or multiple ones in some combination.

Q. Okay. I think it might help to talk about in specific terms, so just to give as an example, in the public workpapers, there's the table you have on efficiency and demand response, which I

think it's the second page of your workpapers.

Okay. So to take, just as an example, 2018 where there is assumed 6.7 percent demand response as a percentage of PJM RTO peak load, would the IPM model ever forecast any demand response beyond that 6.7 percent?

A. It could, but this is sort of what we were talking about before. Even though there is the possibility that there might be a court decision that would eliminate interruptible load as a resource that could receive direct compensation from FERC, we still have around 11,000 megawatts. I think that that is a conservatively high number, and there is the possibility of a very dramatic decrease in the amount of megawatts.

So, for example, in the most recent BRA, about 11,000, 10,000 megawatts of interruptible cleared. Almost every single megawatt cleared not under the capacity performance but under the old base product. That goes away in two years. So you could have either a dramatic decrease in terms of direct participation either through the court decision or through the full implementation of the CP. So I think we are conservatively high in that regard.

MS. FLEISHER: Your Honor, I would move

to strike everything after -- I believe his first words were "it could." I was simply asking what the model could project, not anything about the reasonableness of that assumption.

MR. ALEXANDER: Your Honor, when she asked the question about what the model can do, he had to explain in the context as far as why the model provided the different number in each year and what it took into account. So he is directly responsive to the "could" question.

MS. FLEISHER: I am happy to respond, if that would be useful.

EXAMINER PRICE: It would. I just want to see what your question is again.

MS. FLEISHER: Sure.

EXAMINER PRICE: You may respond.

MS. FLEISHER: Okay. In terms of that being context, it's context for the 6.7 percent, I wasn't asking about what's the rationale for this 6.7 percent. I am just asking about the operation of the model itself. Either the model can go beyond the 6.7 percent or not. That has nothing to do with what might be happening in the world of policy regarding demand response.

A. In this particular --

EXAMINER PRICE: Hold on. You are not on. We are discussing striking your previous testimony.

We are going to deny the motion to strike. I think you opened the door to his lengthy answer. Next question.

MS. FLEISHER: Okay.

Q. (By Ms. Fleisher) Since we are going down this road, how would the model determine whether there's demand response available beyond that amount?

A. There would be a price for the demand response, and then there would be -- the model would go through the calculus of whether or not that particular option was economic compared to other resource options that are available to it. So this is a general statement.

Q. Okay. And what would be the source of the price for the demand response being used by the model?

A. That would be an assumption, and that would be based on a consideration of the value of electricity to customers and what we think a reasonable number is for that, and also the specific regulations in place and the penalties and bonus structure.

Q. Okay. And can you tell me what the details of what that assumption is that you are using, or you don't know?

A. In this particular situation, it's relatively simple. We are capping the amount of interruptible load at 6.7 percent of the peak. We are doing that for the reasons I indicated earlier, which the number we have here we believe is high given both the court decision or the court case that's outstanding, but also the fact that under the capacity performance, there are significant penalties for failure to perform, which wasn't the case previously.

And as it turns out, we now know in the BRA that there wasn't hardly any demand resource until it cleared in the CP product. Almost everything that cleared was in the base product alone. So that more than justifies the fact that we limited it.

If we are not going to limit it, what we would look at is the value of electricity to customers generally, and there is an unserved energy cost literature on that. And what it indicates is that electricity is very valuable to customers and, therefore, they would not want to be interrupted

generally. And that's why we are not seeing demand resources clear in the market when they are subject to the penalties, which actually would then make their participation meaningful in the marketplace.

Q. Okay. I don't mean at all to be disrespectful, but I am hearing a contradiction in your testimony. You said that you capped demand response at 6.7 percent, but then you had said previously that the model could produce demand response beyond the 6.7 percent. So I just want to be very clear which it is.

A. Right. The numbers that you are seeing here are set by assumption at 6.7 percent. The model separately has the capability to make its own decision. We did not want to exercise that capability because we wanted to be conservative in the amount of DR that we had.

MS. FLEISHER: Your Honor, given that he is now saying that demand response did not go beyond the 6.7 percent cap, if I am understanding correctly, can we revisit that motion to strike the previous answer? Because if it can't go beyond the 6.7 cap, you can't have context for the circumstances in which it would.

EXAMINER PRICE: No. Let's move on.

Q. (By Ms. Fleisher) Okay. All right. Then just to make sure the record is entirely clear, as you ran the model for purposes of this case, the IPM model would not produce demand response beyond that 6.7 percent level; is that correct?

A. Yes, ma'am.

Q. Okay. Likewise, for your energy efficiency projections on the same page, the model would not produce energy efficiency beyond the percent you assumed in that table, correct?

A. The energy efficiency is a little bit different. There are two types of energy efficiency. There is the energy efficiency that participates in the capacity market, and this is the number that we are using for the capacity market, and that is, as you can see, small compared to the interruptible load. Most of what happens historically and currently in PJM is that interruptible load clearing.

Separate from that, forms our view of demand growth, but it's not explicitly in the model, it's more reflective of the overall demand growth levels, which we think accommodate energy efficiency that does not participate as a resource in the capacity market.

Q. So putting aside your view of demand

growth in terms of your modeling of resources in the PJM market that would affect levels of dispatching and prices, would there be any energy efficiency beyond, let's say, for 2019 the .8 percent efficiency projected in that year?

MR. ALEXANDER: Could I have that question be reread, please?

EXAMINER PRICE: You may.

(Record read.)

MR. ALEXANDER: Object as vague.

EXAMINER PRICE: He can answer if he understands it.

A. While the model is considering what resources count towards meeting the demand for capacity, it only sees the 1350 megawatts; for example, in 2018 the .8 percent. When you are looking at how energy efficiency affects energy market conditions which then affect the capacity market, then it's reflected in the demand growth. This is just the portion that is clearing as a resource in the capacity market.

Q. Okay. And with respect to the demand growth issue, you are relying on the energy efficiency assumptions incorporated in the PJM 2014 load forecast; is that correct?

A. Yes, that's correct. And -- that's correct.

Q. And are you familiar with PJM's load forecast manual for producing the 2014 load forecast?

A. I have some familiarity. If you have a specific reference, I would be glad to take a look at it.

Q. Are you aware that the PJM as of the time of preparing the 2014 load forecast incorporated energy efficiency based on historic energy efficiency levels?

A. What I am aware of is they did a statistical analysis that took into account trends in energy efficiency.

Q. And those would be historic trends, correct?

A. Yes. That's may recollection sitting here. If you have a reference again, I would be glad to take a look at it.

Q. And are you aware that PJM's load forecasting manual incorporates energy efficiency that has been bid into the PJM RPM capacity market for the subsequent years for which the auctions have been conducted?

A. Yes, as we do. That's what we are

looking at here.

Q. Okay. And are you aware of any way in which the PJM 2014 load forecast would incorporate energy efficiency greater than historic trends and that had not been bid into the PJM capacity market?

A. No, not sitting here subject to recollection. But that trend was an increasing amount, so I just want to make sure it's clear that it was anticipating more energy efficiency over time.

Q. Okay. And are you aware that as of the 2015 load forecast, PJM had changed its load forecasting approach so as to better take into account future energy efficiency?

A. Yes. We were discussing that there was an interim adjustment that was made, and it was in the material we were discussing earlier. So it was an interim adjustment that resulted in a 2.5 percent adjustment in demand.

Q. And, actually, let's turn to Sierra Club -- the 2015 load forecast. I am forgetting which number that is. Sierra Club 15, on the page numbered 1, and the bullet point about midway down the page starting "The introduction of a binary variable into the load forecast model" just to give you a reference point as to where I am.

And it says, "PJM introduced this change as a short-term solution as it pursues its announced intention to better reflect usage trends such as adoption of more energy efficient end uses and behind the meter generation which are not currently captured in the forecast model." Is that the change in forecasting that you are referring to?

A. Yes. I refer to it as interim. I think they refer to it in their filing at FERC as interim. It's the short-term solution. And as I indicated earlier, I don't think it has a significant effect on our results. And it's still a very difficult issue to address.

Q. And are you aware of the details of this interim change?

A. I have some knowledge. And, as you can see here, it's essentially what's known as a -- they call it a binary variable. It's also known as a dummy variable, and it's because they are trying to deal with something they don't really fully have their arms around.

It's a difficult issue because, as you indicated, this is a trend of increasing energy efficiency already built into the forecast. There is some energy efficiency that's outside the forecast in

the capacity market. We are trying to address that as well, and it's a challenging issue.

Q. Okay. And do you know whether this change is intended to capture all energy efficiency that had not previously been incorporated into the load forecast?

A. That's part of it. It's trying to also take into account anything that might be causing the demand forecast to be low. And, as I indicated, one of the issues that is being dealt with by PJM and everybody else is we are missing a fifth of the economy.

So we want to be careful not to overly extrapolate recent trends because we have a period of time that only has such low GDP growth -- there hasn't been such low GDP growth since the 1930s over a seven-year period. So it's both, because it is just capturing any effect that they are concerned about.

Q. And do you know whether PJM's load forecasting methodology used for the 2014 load forecast would capture energy efficiency at levels required under Ohio's state energy efficiency standard?

A. I'm not sure. What I know is there is

something like on the order of a 4 percent number in terms of Ohio's energy efficiency. But I think one of the issues they are trying to deal with is what is each state doing, how do you measure what each state is doing, and how do you take into account that that may be already incorporated in the historical time series so you might be double counting, and how do you deal with the fact that your statistical sample has been affected by 1 percent per year real GDP growth over seven years when the long-term average is 3-1/2. So there are a lot of things going on, and I am aware that there are energy efficiency programs on the order of 4 percent here in Ohio.

Q. And to the extent that Ohio law requires energy efficiency at levels higher than historic levels, would that be captured in the PJM load forecast for 2014?

A. To the extent that that increase is related to and consistent with the historical trend, it might. I think that that's again a difficult issue. I don't have a full answer, and I don't think anyone does at this point.

Q. So I think you've testified you are familiar with the EPA's Clean Power Plan, so I'll skip that question. Are you aware that energy

efficiency is one option for compliance with the Clean Power Plan?

A. Yes, ma'am.

EXAMINER PRICE: Did someone object?

MR. RANDAZZO: There is no foundation for the "aware of that."

EXAMINER PRICE: Well, he already said yes, so it's moot.

Q. And does PJM's 2014 load forecast incorporate energy efficiency measures that might be used for compliance with the Clean Power Plan?

MR. RANDAZZO: I object.

EXAMINER PRICE: Grounds?

MR. RANDAZZO: What do you mean by energy efficiency measures?

MS. FLEISHER: Your Honor, if he is unclear, he can certainly say so.

EXAMINER PRICE: Yeah. I am reasonably clear. You can answer, if you know.

THE WITNESS: Can we have the question read back, please.

(Record read.)

A. It's possible. It's similar to the response I gave earlier, which is that to the extent that the increasing trend in energy efficiency is

related to the Clean Power Plan's incentives, as well as other incentives, it could be, but I don't think anyone knows really for sure.

Q. And when you say the increasing historic trend, can you quantify what role that plays in PJM's load forecast? Do you know -- or I guess withdraw that.

When you say increasing historic trend, do you know what level of energy efficiency PJM used in preparing its 2014 load forecast?

A. I don't have the exact numbers. What I am saying is there is a statistical analysis that's explaining what's happening in terms of demand growth. And there are many things that are occurring, and one of it is there is a trend of increasing efficiency over time, and that trend is then projected to increase. That's sort of the nature of statistical or econometric regression.

The question is what's driving that. Part of it is interest in environmental controls. And so that there is some -- there is some significant chance that it's already incorporated in their demand projection.

Furthermore, EPA itself has reduced in half its energy efficiency projection between what

was the energy efficiency projection that was in the proposed versus the final. And so I think that's consistent with a lot of -- the energy efficiency may already be incorporated in the statistical assessment that's already been made.

Q. But you can't offer any quantitative assessment of how much energy efficiency is incorporated in the 2014 PJM load forecast?

MR. ALEXANDER: Objection. Asked and answered.

MS. FLEISHER: I am just trying to get a clear answer to the question.

EXAMINER PRICE: Go ahead and answer the question.

A. I guess, as I indicated, I can't and I don't believe PJM can, which is why they have a short-term or interim solution. It is wrestling with a very difficult technical issue, and EPA itself had to walk back its overly aggressive energy efficiency assumptions as you went from the proposed to the final RIA.

Q. And do you know whether PJM's 2014 load forecast accounts for efficiency improvements achievable in FirstEnergy's service territory through the deployment of Volt/VAR technology?

A. No. I am not even sure what that technology is. I know what Volt/VAR is, but I don't know what that technology is.

Q. If I characterize it as voltage optimization technology, would that clarify, or do you still not know what I am talking about?

A. I would need more details. I'm sorry. I can't respond to that specific technology.

Q. Certainly. And if capacity or energy prices or both rise as you project, would this provide a greater incentive for energy efficiency measures than in the past?

A. What I would say is that we provide a greater incentive all else being equal since there would be sort of a well-priced elasticity response. Higher prices would lead to sort of greater incentives.

But we had very, very high prices in 2008 and 2007 and 2006 and 2005. We had prices that were close to $60 a megawatt-hour, I believe, during that period of time. It's that incentive for energy efficiency is built into the statistical work that was done. They sort of said let's look at the trend over time and demand which reflects in part energy efficiency which in part reflects that very large

incentive that was in place that's not in place; although, it will be a little bit more in place, but not as much as it was.

So I think it's more correct to say that everything else being equal, there is some greater incentive, but I think you have to be careful compared to what's greater than what was projected.

Q. Okay. I guess I am not clear. When you were describing -- were you saying that PJM's load forecast takes into account the level of energy prices and capacity prices as an incentive for energy efficiency?

A. What I am saying is they take into account energy -- electricity prices as a determinant of demand growth. So in that statistical sample, they know that there were years in which the prices were much higher than we are projecting or that have occurred.

So we had very, very high volatile prices in the 2000s, and, therefore, there was an incentive to lower demand and have energy efficiency in there. And the question is that statistical relationship was being projected forward and that incorporates a lot of various different factors. They are making some statistical adjustments.

One of the concerns I have is that trend may overstate the effect of energy efficiency. If you require 1000 megawatt-hours to do something and you have a 50 percent increase in efficiency, you only need 500 megawatt-hours.

If you have another 50 percent increase, you only need 250 megawatt-hours. If you have another 50 percent, it's only 125 megawatt-hours. So the difference is decreasing other time. So what I am concerned about is because a lot of this work is taking into account percentage changes, it's missing the fundamental math that there is a decreasing amount of energy savings for a given percent increase in efficiency.

And that's one of the unavoidable facts that is -- that can have a big effect on projecting forward what's happened in the past relative to the fact that you just get less and less megawatt hours of reduction if you follow that math.

MS. FLEISHER: I want to move to strike at some point there; although, I may have to have the answer read back to determine where. I was just looking for -- I was simply asking whether he is saying that PJM's load forecast does incorporate that issue, not whether he thinks that's a good idea or

not.

EXAMINER PRICE: Let's have the question and answer back, please.

(Record read.)

MS. FLEISHER: So I would move to strike starting with I think it's the first "One of the concerns I have." He may have used that term twice.

MR. ALEXANDER: Your Honor, if I may address the motion.

EXAMINER PRICE: You may.

MR. ALEXANDER: Two points, number one, counsel did preface the question with "I don't understand" or something along those lines, so that does open up a little bit of leeway for the witness to try to help counsel understand. If she didn't want that help, she shouldn't have prefaced the question that way.

The second point is, what the witness is doing is explaining how the model actually works, what it takes into account, which is percentage change, and that's where he goes in that second part of his answer. And, yeah, he does use the words "I am concerned," but he is talking about the percentage change and the flaw in that methodology. So I think the witness was attempting to be responsive.

MS. FLEISHER: I can respond to both those points.

EXAMINER PRICE: Sure.

MS. FLEISHER: My prefatory statement does not change the language of the question, which was asking whether this issue is accounted for in the PJM load forecast. And I would say that his opinion of what the load forecast should be is well beyond my question of what's actually in the load forecast.

EXAMINER PRICE: Okay. We are going to go ahead and grant the motion to strike beginning with the "I am concerned." I would ask the witness again to try to narrowly tailor your answers to the questions counsel is posing. But I kind of disagree with you that your prefatory statements don't set the context for your questions. So if you want me to grant more motions to strike, you probably need to ask more narrow questions and try to box him in a bit.

MS. FLEISHER: Certainly, your Honor.

Q. (By Ms. Fleisher) Does the PJM load forecast as prepared in 2014 take into account behind-the-meter generation?

A. I don't remember. But to the extent that there is some behind-the-meter generation in the

historical record, it would capture that to a degree. But I don't remember sitting here whether there is any explicitly included in the forecast as opposed to implicitly included in the statistical regression.

Q. Do you know whether that statistical forecast would take into account projects such as combined heat and power projects beyond the historical trend?

EXAMINER PRICE: Can I have the question back, please?

(Record read.)

A. I don't remember.

Q. Did you discuss with anyone from the companies your decision to rely on the 2014 PJM load forecast?

A. Are you asking me did I discuss it after I did the analysis or before I did the analysis? I'm sorry. I certainly know about what I was doing after I provided my report. I don't remember discussing it before I did my analysis.

Q. Okay. And does that include anyone from FirstEnergy Corp., including its subsidiaries, FirstEnergy Solutions and FirstEnergy Service Corp.?

A. As I indicated earlier, I did not and I still don't know all the corporate affiliations and

agency arrangements that exist at the company. My testimony is on behalf of the companies as it indicates in my contract.

Q. So you didn't talk to anyone from any FirstEnergy company in the process of preparing your forecast about your decision to rely on the 2014 PJM load forecast; is that correct?

A. I'm sorry. If that question could be read back to me.

EXAMINER PRICE: Certainly.

(Record read.)

A. I don't remember any such conversation. But what I remember is they wanted us to use our -- to make the forecast, but I don't remember any conversations at all on the demand reduction.

Q. Did you discuss your assumptions regarding energy efficiency generally with anyone at the companies?

A. I don't remember. But as I indicated in my deposition, we hardly discussed our assumptions at all. They just asked for us to opine as to what our -- to give forecasts and to make the decisions that are necessary to do the forecasts.

Q. Could we turn to your direct at page 4, line 21. And here you describe a development within

the last few years involving changes in environmental regulations which lowered SO-2 and NOx allowances, which in turn lowered electrical energy prices. On page 5, you explain this, among other trends, are not ex -- expected to continue; is that correct?

A. Yes, that's what it says.

Q. So you're suggesting that SO-2 and NOx allowance prices are expected to increase?

A. No, just that they won't continue to be lowered. And since they are close to zero, because the regulations that were put into place would demand control regulations, particularly the MATS regulations as opposed to marketized regulations. And the way the MATS was implemented, it caused the allowance prices to go close to zero. So that can't continue. It can't go negative. And so that's not a thing that will depress prices on a going-forward basis. That's what I meant.

Q. Thank you. And can you turn to your workpapers towards the end. You have a little chart on environmental assumptions, or a large chart. It's the page titled "Summary of Environmental Regulations - Assumptions." And there's two tables. One continues on to the following page.

A. Yes, ma'am.

Q. And how do these assumptions affect the input into your modeling?

A. I mean, it varies. In some cases, for example, we -- in the case of MATS, we assume that the -- it would be MATS compliance, and that affected the retirements. It affected the pollution control equipment that would be retrofitted on coal units. It would affect the variable costs. And so it varies.

And in the case of CO-2, we had a dollar-per-ton CO-2 price starting in 2020, but very, very low, and I don't want to get into the details of that because that's confidential. We can come back to it in the confidential session. So it varies.

Q. And you don't list the currently proposed ozone NAAQS here, correct?

A. That's correct.

Q. And that proposal would lower the ozone standard from 75 parts per billion to as proposed between 65 and 70 parts per billion; is that correct?

A. I can't remember the details of that sitting here.

Q. Okay. And are you aware that the EPA is under court order to finalize that ozone NAAQS by October 1 of this year?

A. No, I don't -- I don't know that.
Q. Okay.
A. I mean, it may be true. I just don't remember that.
Q. If I don't know, you can say you don't know.
A. All right. Thank you.
Q. And you don't list the currently proposed EPA steam electric affluent electric guidelines in this chart, correct?
A. Are you referring to the water affluent? I am not sure what you are referring to. We have 316(b). Are you referring to something else?
Q. Yes. I guess a foundation question, are you aware of the currently proposed steam electric affluent guidelines?
A. No, no, I am not. What I believe is that we have a reasonable characterization of likely future environmental regulations, and I don't see -- I don't believe there is any regulation that we're -- that's significant in its impact that we are missing.
MS. FLEISHER: Move to strike everything after "No."
EXAMINER PRICE: Sustained -- or granted.
Q. And for -- on the second page of the

table, you have a row above care for SO-2 and NOx. Does that assumption rest on compliance with the 1997 ozone NAAQS?

A. I don't remember.

Q. Do you know whether it rests on the assumption of compliance with the 2006 PM2.5 NAAQS?

A. No.

Q. Do you know generally whether it rests on compliance with more stringent NAAQS than in the row above care for SO-2 and NOx through 2017?

A. No. And I didn't focus on it because most of the plants are already controlled for SO-2 and NOx.

Q. And by "already controlled," you mean compliance with current law; is that correct?

A. And scrubbed and also having NOx controls.

Q. And going back to the previous page, for the CCR coal ash disposal entry, can you tell me what -- what year of state regulation this assumption reflects?

A. There was an announcement to have a relatively less -- the less stringent option was shown, and that's what we are assuming going forward.

Q. Okay. So this reflects the current final

rule regarding coal ash disposal?

A. Reflects to the more lenient of the two options announced by the EPA.

Q. And I want to talk about your carbon price projection force a minute, but just let me see if I am getting into anything in confidential, and I am happy to reserve it.

So your -- your carbon price projections represent the costs for plants to offset their carbon emissions down to whatever level is required under the Clean Power Plan, correct?

A. They are a projection of compliance on a -- a probability weighted basis of a program that has three -- is three -- we discussed a little bit earlier the way we handle CO-2. We have three possible outcomes: No CO-2 regulations, a program of going from 15 to 1,000 pounds per megawatt-hour, and a more stringent program. And each year there is a different probability associated with that.

In the case in which there is a probability for the program in which is going from 1,500 pounds per megawatt-hour down to 1,000, that has a shadow price or marginal cost of complying with that regulation. So the model is -- again, the model is producing a marginal cost. And that is the cost

necessary to achieve the compliance with that particular program.

As it turns out, although the specifics of the program are different, they are not different in a major way from the specifics that were proposed or that we anticipated; therefore, our current projection remains similar to the projection that's used here.

Q. So your carbon price projections could, for example, reflect or represent the costs of the purchase of a carbon allowance under a mass base plan; is that an accurate characterization?

A. It does reflect a mass cap or a cap and trade on a probability weighted basis, yes.

Q. So speaking about it in those terms, if a plant like Sammis were to retire, all else being equal, would the cost of carbon allowances in Ohio go down?

A. In a mass cap, which was one of the possible outcomes, but if you had a rate limit, I don't believe it changes the rate limit. You still have the same rate limit, so I would have to run that through the modeling to make sure that that's actually what happens. You still end up having the same rate limit even if the plant retires.

MS. FLEISHER: Just give me one minute. I just want to make sure I have covered everything.

Okay. I'm all set. Thank you.

EXAMINER PRICE: Thank you. Anybody care to go next?

Ms. Bojko would care to go next.

MR. ALEXANDER: Your Honor, before we get started, it's been about two hours.

EXAMINER PRICE: Sure. Let's take a 10-minute break. Let's go off the record.

(Recess taken.)

EXAMINER PRICE: Let's go back on the record.

Ms. Bojko.

MS. BOJKO: Thank you, your Honor.

- - -

CROSS-EXAMINATION

By Ms. Bojko:

Q. Good afternoon, Mr. Rose.

A. Good afternoon.

Q. My name is Kim Bojko, and I represent the Ohio Manufacturers' Association Energy Group. Just a few follow-up questions. Some of the discussions you've had today. Does your IPM model take into account distributed generation?

A. In this analysis, if it's -- only to the extent that it's reflected in the demand forecast.

Q. In the PJM demand forecast?

A. Or the other forecasts. We are modeling all of North America, so it's not just PJM; although PJM demand is the most important for the outcome.

Q. Okay. So nothing in addition to those forecasts that you used as inputs into your IPM model; is that correct?

A. Yes, that's correct.

Q. Okay. And I believe you stated earlier today, although, I know it's been a long day, that you are not opining as to whether the Commission should approve the purchase power arrangement or not; is that correct?

A. Yes.

Q. Okay. And isn't it true, sir, that you have not reviewed the term sheets or the purchase power agreement specifically; is that right?

A. Yes, that's correct.

Q. Okay. And you haven't seen an actual contract between the companies and FirstEnergy Solutions, have you?

MR. ALEXANDER: Objection. The witness has already stated she is not providing any opinion

on this issue. So I am not sure what's being gained by going through each of these subissues.

EXAMINER PRICE: He can answer if he knows.

THE WITNESS: I'm sorry. Could you repeat the question, please.

(Record read.)

A. No, I have not.

Q. On page 4 of your testimony, you listed unanticipated developments that you discussed today. You do not expect some of these developments to continue; is that correct?

A. I think a more precise, better way to say it is that I don't expect a once in 70-year recession to repeat itself or this seven-year low -- low economic growth to repeat itself. With respect to the fracking technology, I expect it to continue to improve, but the level of improvement is not going to be what it was over the last few years. And it's a relatively mature development in Marcellus now. There will be technological improvement. It is included in our forecast, but it will not be at the level that has been observed over the last few years.

With respect to the demand resources which, for example, had such a depressive effect on

the price that the transition auction went from 60 to 134, and we have seen all these other increases in capacity prices which I have already discussed.

The CP proposal as it addresses this issue of treating demand resources interruptible load saying that it is only required to interrupt at 60 hours a year only during the summer, something that's really problematic during a cold -- particularly a cold polar vortex, and by lowering the prices for capacity, that has already been dealt with, and we can see because there was almost no interruptible load that cleared in the -- as a CP product in the most recent base residual auction. So I don't expect that to continue to be depressing the prices. And, furthermore, the evidence is that it won't.

I do expect there to be warm winters, cold winters. I do expect there to be volatility, and the volatility manifests itself especially in natural gas price. Natural gas prices are the most volatile traded commodity, as I indicated, two and a half times more volatile than even the S&P 500.

I do expect that to continue to be the case. There will be volatility, and that's why we had very high prices for gas and for power in 2014, the last complete year for which we have data.

And as we discussed in terms of the environmental regulations, what we are expecting is that the final regulations on a probability weighted basis for CO-2 will cause a meaningful increase in prices.

Q. And whether those expectations come to fruition or not will have a great -- have an impact on the projections you provided in your forecast; is that true?

A. Yes. Prices could be lower or higher than we project. On average, we think we have the best available characterization. We use outstanding and unique modeling tools, and we give great consideration to all of the issues, but I do think that the fact that it could be higher or lower does cause me to conclude that due consideration should be given to hedge arrangements.

MS. BOJKO: Objection, your Honor. I move to strike everything after "could be higher or lower," and maybe there was another two words after that, "as I stated" or.

EXAMINER PRICE: We will grant the motion to strike.

MS. BOJKO: Thank you, your Honor.

Q. (By Ms. Bojko) And you talked a little

bit about the polar vortex earlier this morning. It's true that many units in PJM were unable to operate due to the cold temperatures; is that correct?

A. Yes. There were a number of factors that caused problems during the polar vortex. Sometimes it was unavailability of fuel. Sometimes it was physical outages at the power plants.

Q. And you would agree with me, sir, that unavailability of capacity in PJM due to mechanical issues at many of the plants is a serious problem; is that correct?

A. Yes, and it is part of the consequence of having these very low capacity prices. You get what you pay for and that's why I didn't feel it was sustainable to have a continuation of the regime in which the prices were being suppressed. And that's why we were willing to make forecasts that there would be a massive, massive increase in capacity prices even before the adoption of the CP. That capacity performance audit for PJM itself came out in August 20, 2014, saying they could not successfully operate the system in a repeat of the polar vortex.

MS. BOJKO: Your Honor, I would move to strike everything after the response of "Yes."

MR. ALEXANDER: Your Honor, he is entitled to give some explanation for his answer.

MS. BOJKO: Way beyond the scope of my question.

EXAMINER PRICE: Could you reread the previous question, please.

(Record read.)

EXAMINER PRICE: You have to narrow -- box him in better than that, Ms. Bojko. Motion to strike is denied.

Q. (By Ms. Bojko) You would agree with me, sir -- or strike that.

Isn't it true that there were several coal units as well as nuclear facilities offline during the polar vortex of 2014?

A. Yes. While it's true some of those units were offline there were other units offline as well.

MS. BOJKO: I have nothing further in the public session, your Honor. Thank you.

EXAMINER PRICE: Thank you.

Mr. Hays.

MR. HAYS: Not at this time, your Honor.

EXAMINER PRICE: Mr. O'Brien.

MR. O'BRIEN: No, your Honor. Thank you.

EXAMINER PRICE: Mr. Sauer.

MR. SAUER: Just a few questions, your Honor.

- - -

CROSS-EXAMINATION

By Mr. Sauer:

Q. Good afternoon, Mr. Rose. My name is Larry Sauer. I represent the office of the Ohio Consumers' Counsel.

A. Good afternoon.

Q. I have a few questions for you. There was some discussion this morning, I believe, from Mr. Fisk regarding a sensitivity analysis. Did you recommend a sensitivity analysis be performed to your client in this case?

A. No, I did not make the recommendation to do a sensitivity analysis. Sometimes we do it. Sometimes we don't. The most well-known study that we have out there doesn't have a sensitivity analysis in it. That's the RIA for the CPP.

Q. Have you done energy forecasts for FirstEnergy in the past?

A. Yes.

Q. And do those forecasts include sensitivity analysis as part of the work you were doing?

A. I can't remember.

Q. Turn to page 10, bottom of 10, top of 11, line 16 to line 2 of page 11. You state "Most hedges are short-term or medium term." Do you see that?

A. Yes, sir, I do see that.

Q. What do you mean in your testimony here by "short-term"?

A. So short term would be two years, for example. And if you look at the ratio of the short-term two-year gas hedges to the hedges that are contracted and transacted beyond, say, five years, the ratio is 617,000 to 1. So almost all of the hedges, for example, in gas are short-term and in the first two years.

Q. And what do you mean by medium term?

A. Medium term would be three, four, sometimes five, depends, and there is some -- I think it makes some sense to use forwards in that period of time, but it makes no sense to use it beyond that period of time. And our standard practice is to use the gas futures for the first two years because of the high degree of liquidity, which means it does reflect a lot of information about what market participants think. And when you actually go to transact it, you won't actually move the price. You

can actually use that as an estimate of what your likely outcome of your actual attempt to transact.

Q. And why are long-term hedges in the energy market not as prevalent?

A. I'm sorry. I didn't hear the last word.

Q. Why are the long-term hedges in energy markets not as prevalent?

A. Part of it is collateral problems, so that in order to enter into the hedges, it can be like buying stock at margin. You have to put up margin; but, in addition, the collateral that you have to put up is a function of the market prices. So it's mark-to-market collateral. So what happens is you have these long-term hedges, you have more volume that has to be collateralized, and that becomes burdensome even for large companies. So it's very unusual to have long-term hedges, in part because of the collateral. I would sort of say that's an important consideration.

Q. On page 23, you have a Figure 3 that shows spiking wholesale spot market prices. Do you see that?

A. Yes. Are you referring, sir, to Figure 3?

Q. Figure 3, yes. And that time period that

you are showing there is from December of 2013 through February of 2014; is that correct?

A. Yes, sir.

Q. If you were to look at that chart for the time period of December, 2014, through February of 2015, would you see the same spiking prices that you saw in the time period in your Figure 3?

MR. ALEXANDER: Could I have that question reread, please?

EXAMINER PRICE: You may.

(Record read.)

A. No. I don't believe so. I would have to take a look at the data, but it's like a coin toss. So sometimes that coin toss is resulting in very significant price increases, particularly on a delivered basis that we talk a lot about about Henry Hub's prices, but prices hit $120 a megawatt-hour that year. So that coin toss sometimes can really go against you.

Q. Do you know what the bandwidth would have been in that -- for wholesale spot electric prices in the time period December of 2014 through February of 2015?

A. No, not sitting here.

Q. Looking at your workpapers, you have a

schedule that's called "PJM Firm Retirements." I'm sorry. There is no page number. Maybe seven pages back.

A. Yes, sir.

Q. In 2015, you have some ATSI zone retirements of 885 megawatts, correct?

A. Yes, sir.

Q. And you forecast nothing in 2016 or 2017 for any ATSI retirements?

A. I would have to check. So what we are looking at is a table called "Firm Retirements."

Q. Okay.

A. So these are retirements that we consider firm, and the majority of the retirements are firm, so that these are things that have been announced that we think are likely to occur or very likely to occur. The model can also make decisions about retirements. And sitting here, I don't know what the model is doing for ATSI.

Q. To your knowledge, your model hasn't projected the retirement of Sammis or Davis-Besse in the ATSI zone?

A. I don't have that data, and I don't know.

Q. Typically from the date a plant would announce its retirement, at what point would you

start modeling or anticipate it would be included within your model?

A. Not long afterwards. We would have to have a reason why we think the announcement isn't likely to occur. That is an important feature what we call firm retirement.

MR. SAUER: Your Honor, I have no further questions.

EXAMINER PRICE: Thank you.

MR. SAUER: Thank you, Mr. Sauer.

Mr. Stinson.

MR. STINSON: No questions, your Honor.

EXAMINER PRICE: Mr. McNamee.

MR. McNAMEE: Well, maybe I won't need it.

- - -

CROSS-EXAMINATION

By Mr. McNamee:

Q. Mr. Rose, your IPM model utilizes a transmission case, doesn't it?

A. I'm not sure what you mean. It's a transmission base case that PJM puts forth, and we attempt to characterize that as carefully as possible. It affects our transmission limits in IPM, and it's characterized with even greater detail in

our GE MAPS modeling.

Q. As I understand it, your forecast extends beyond the period that PJM has a transmission case; is that correct?

A. Yes. Our GE MAPS modeling is for the first 10 years a typical transmission load flow, which incorporates the transmission assumptions that typically goes for 10 years. So there is a one-to-one mapping with our use of the MAPS model and the PJM or whatever RTO baseload flow case is. Those are -- those are sort of one-to-one.

We use IBM beyond ten years in part because there is no detailed load flow case beyond that, in part because of the uncertainty about the transmission past 10 years.

MR. McNAMEE: Thank you. That's all I have.

EXAMINER PRICE: Before we go on the confidential transcript, I just have a couple of questions.

In the area of discussion of probabilities, can you ascribe a percentage or a confidence interval in terms of the probability that your projection will come true?

THE WITNESS: No. And the reason for

that is it's methodological. I think it's worth talking about because I think it is an important issue. There are two ways to get confidence intervals for probabilities.

One is a technique of running all possible outcomes in the model. In the modeling that we are doing here, I calculate it would take 14 years to actually do enough of those cases to create a probability distribution. This is called Monte Carlo modeling

So the standard procedure in this type of, if you will, regulatory setting, and it's the procedure in -- for example, the EPA is using in its CO-2 CPP analysis, is you take an expected value for all the inputs and it is giving you what is believed to be an expected value.

And so there is no confidence around it, because it can't be done, and it takes -- for example, I have a model that's doing that. It's not projecting power prices. It's projecting something else. It takes 5,000 iterations. That's how you get to 14 years.

Even if I have 14 computers, it is still a year. And if it turns out that after the year we made a mistake, we find a mistake, we have to kill

ourselves. So we can't do that as a methodological matter.

Now, another thing that people have very familiar with, which I think is sort of you do a poll and who do you want for president, and it's plus or minus 3 percent. That is a characterization of how -- statistical characterization of how people feel today, but it's not telling you what they are going to be feeling like necessarily in the future.

And we don't have a statistical way to assess this. So what we have is procedures that allow for what we call an expected value. We do take into account probabilities. I think you have heard some of the conversation about when we look at CO-2, we are trying to do a probability way -- estimate what the input is so we can get an output, but I can't give a confidence interval around that.

And as we also discussed, that's why hedging is something that should be getting due consideration because there is uncertainty and there is no methodological way to ascribe a confidence interval because of the limitations I just discussed.

EXAMINER PRICE: So essentially you are asking the Commission to say that this is your best projection, and there is no -- you are 90 percent

certain, 80 percent certain this is your best projection.

THE WITNESS: This is our best projection, and we have a very -- it's our expected value projection. It's a probability weighted outcome, and we think that it's -- we are using -- putting huge amounts of effort into it. I mean ,we have no load pricing node by node. We do it over many years. We have very complicated models. We are modeling all of North America in one framework. The other one we are modeling the whole U.S. eastern interconnect, and we are giving -- we have a gas model. We have treatment -- we have a coal model.

Our modeling is -- it's not only being used for FirstEnergy, it is being used in the same manner by EPA, and I have been with my firm for 33 years. We have been working nonstop with EPA for 40 years. We work with environmental groups, commissions, consumers, individual end-use consumers.

So it's a very broad client base that supports a very sophisticated modeling effort, but I want to be clear about sort of what the strengths are and the limitations. And I do think the limitations are something that should lead to due consideration of hedges, but I do think that there is uncertainty,

but I can't quantify it like that.

EXAMINER PRICE: You are more bullish, if that's the right term, on gas prices than the Energy Information Administration?

THE WITNESS: I think the best way --

EXAMINER PRICE: EIA, you know who I am talking about?

THE WITNESS: Yes.

EXAMINER PRICE: Okay.

THE WITNESS: So if you take a look at our projections, you lay them side by side, I am talking about the long-term projections, say, thinking about 2015 to 2034 or something on that order, an average, it is not much higher than the prices we have recently observed, and it is extremely similar, albeit be a tad higher than the EIA or U.S. Department of Energy, Energy Information Administration, or the EPA, not in a significant way.

In our analysis, we include CO-2 regulations. And in the case of the Department of Energy, EIA, they assume no CO-2 regulations, which we know can't be true on an expected value basis. On a probability weighted basis, we know you have to take into account in some way the CO-2. And we know that CO-2 raises gas prices because there is less gas

emissions from gas. So you want to use it more.

So when you make that adjustment, I believe they would actually be higher on a long-term average than we are. So, in fact, there is an extremely high degree of similarity in our long-term forecasts. And to my -- and so it's not like we are ignoring everybody else. It's just the same result is coming out of our models, which is -- we have a -- we are expecting a big increase in demand.

The LNG, the pipes are being laid as we speak to Mexico. There is huge petrochemical complexes underway, and there is the likelihood of CO-2 which increases gas demands. All of that is increasing demand. And if there was something wrong fundamentally, we wouldn't have the lowest drilling numbers ever. We could have 30 years of Baker Hughes. We haven't seen such a low drilling number. What does that mean? That means this is not a sustainable outcome.

And so I think, you know, we are giving due consideration to both the supply and demand considerations, and it turns out our forecasts are very similar, particularly when you adjust for the fact that the DOE numbers don't include CO-2, and they need to. They do it for a particular reason.

But I think we are fairly similar.

EXAMINER PRICE: When you say your forecasts are a tad higher than EIA's, that can have a big impact on the ultimate outcome of how much the value to the consumers for the hedge offered by FirstEnergy can be, right? A small difference can make a big -- can make a big impact; is that right?

THE WITNESS: Yes. I mean, there is uncertainty there, and we are talking like, for example, in the long-term forecast, DOE might be, you know, 2 to 3, you know, percent lower in both of its 14 to 15 vintage forecast assuming no CO-2. So, in fact, it actually might be higher. It will be higher when you add CO-2. And it can be significantly higher, on the order of 5 to 10 percent higher. So they would actually be higher than ours. And is there -- again, I don't minimize the impact, like you said, how much it costs to people if you're higher or lower. That's the underlying thought behind a hedge is you are trying to limit that volatility since it's an uncertainty.

EXAMINER PRICE: I don't mean individual customers. I just mean in the aggregate. A small percentage difference can mean a huge swing in the aggregate as to how much customers may save or not

save under this hedge, under the proposed hedge.

THE WITNESS: Yes, because the dollars are large. And we are talking about -- you know, when you get into the power world, you start talking about, you know, it's not uncommon for consumers in the country to spend $400 million a year. You go out 15 years and you do the math, you are talking about a trillion dollars.

EXAMINER PRICE: Right.

THE WITNESS: Right. So there are big numbers involved. And we are, I think, as you can hear, doing a lot of the forecasting that's done in the country, and I am not saying we are a monopoly or anything like that. I am just saying we are doing it for the EPA. We are doing the exact same type of approach we are doing for FES energy. We have an expected value case for them and for us, and people don't seem to be complaining.

I don't see a lot of people saying, oh, you can't accept the RIA and you can't have the CPP because there is not enough sensitivity cases. They recognize the complexity of what we are doing, the magnitude of what we are doing, the complexity of the forecasting. And so -- but having said that, we are doing the best we can, and it's a -- there is

uncertainty out there.

EXAMINER PRICE: Okay. Thank you.

Go off the record.

(Discussion off the record.)

EXAMINER PRICE: At this time we will adjourn for the evening. We will reconvene then at 9 o'clock. Thank you all. We are off the record.

(Thereupon, at 4:57 p.m., the hearing was adjourned.)

- - -

CERTIFICATE

I do hereby certify that the foregoing is a true and correct transcript of the proceedings taken by me in this matter on Tuesday, September 8, 2015, and carefully compared with my original stenographic notes.

_____

Karen Sue Gibson, Registered Merit Reporter.

(KSG-6090)

- - -

Summary: Transcript In the Matter of the application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company hearing held on 09/08/15 - Volume VI electronically filed by Mr. Ken Spencer on behalf of Armstrong & Okey, Inc. and Gibson, Karen Sue Mrs.