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BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

DOCKET NO. 20170001-EI

FUEL AND PURCHASED POWER COST RECOVERY CLAUSE WITH GENERATING PERFORMANCE INCENTIVE FACTOR.
_____/

VOLUME 3
PAGES 442 through 579

PROCEEDINGS: HEARING

COMMISSIONERS PARTICIPATING: CHAIRMAN JULIE I. BROWN
COMMISSIONER ART GRAHAM
COMMISSIONER RONALD A. BRISÉ
COMMISSIONER DONALD J. POLMANN
COMMISSIONER GARY F. CLARK

DATE: Wednesday, October 25, 2017

TIME: Commenced at 2:00 p.m.
Concluded at 4:24 p.m.

PLACE: Betty Easley Conference Center
Room 148
4075 Esplanade Way
Tallahassee, Florida

REPORTED BY: ANDREA KOMARIDIS
Court Reporter

APPEARANCES: (As heretofore noted.)

PREMIER REPORTING
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TALLAHASSEE, FLORIDA
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I N D E X

WITNESSES

EXHIBITS

NUMBER:	ID	ADMITTED
28 through 36 (as identified on Comprehensive Exhibit List)		514
37 through 44 (as identified on Comprehensive Exhibit List)		575
100 - Low Fuel Cost	447	516
101 - FPL stipulation and settlement filed October 6th	447	516
102 - Oil and Gas Auction Announcement	447	
103 - Innovative Solar Systems' petition to intervene	447	516
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105 - FPL Solar Plant Operations Status Report for September 2017	447	516

P R O C E E D I N G S

(Transcript follows in sequence from Volume 2.)

CHAIRMAN BROWN: We're going to go back on the record now. Thank you for that small indulgence. We have a couple of documents in front of us. I would ask the witness to just turn them over. And for ease of reference, as Mr. Moyle goes through them, we can identify them at that time. We'll just wait.

MR. MOYLE: I was thinking maybe we could just mark them all now, so I --

CHAIRMAN BROWN: Do you want to do that now?

MR. MOYLE: Yeah, so -- could we do that?

CHAIRMAN BROWN: Okay. We're going to start at 100.

MR. MOYLE: Okay. And the one that I have is -- it starts -- it says "Low Fuel Cost" in ENV-1. If they got passed out in order, that should be the one that -- that you have --

CHAIRMAN BROWN: Yeah, that's the top one. So, we're going to -- and I would ask the witness to identify them, too; mark them on there as we go along. So, for ease of reference, we're going to go ahead and mark "Low Fuel Cost" as the

description for Exhibit 100.

Go ahead.

MR. MOYLE: That's a three-page document.

The next one is the -- is -- that I -- in my order is FPL stipulation and settlement, filed October 6th. That will be 101.

CHAIRMAN BROWN: I have the bid rule, but -- okay. I -- it's in there. It's not my next one, but we'll go ahead and put FPL's stipu- -- and settlement, 101.

Go ahead.

MR. MOYLE: And then, Oil and Gas Auction Announcement, 102.

CHAIRMAN BROWN: Okay. We will go ahead and write 102 as Oil and Gas Announcement.

MR. MOYLE: 103 is a copy of the Innovative Solar Systems' petition to intervene.

CHAIRMAN BROWN: Okay. We will go ahead and mark that as Exhibit 103, Innovative Solar Systems' petition to intervene.

MR. MOYLE: All right. 104 is the bid rule, a copy of the bid rule.

CHAIRMAN BROWN: We'll just mark that, for identification --

MR. MOYLE: Okay.

CHAIRMAN BROWN: -- as Exhibit 104.

MR. MOYLE: And 105 is the FPL Solar Plant Operations Status Report for September 2017.

CHAIRMAN BROWN: We will go ahead and mark that as 105. All right.

(Whereupon, Exhibit Nos. 100 through 105 were marked for identification.)

CHAIRMAN BROWN: Commissioner Graham.

COMMISSIONER GRAHAM: Mr. Moyle, you said you're going to use these same documents for both this witness and the next?

MR. MOYLE: Right.

COMMISSIONER GRAHAM: So, he should probably leave that up there when he --

MR. MOYLE: He could -- that would be great, yeah, if he would and...

CHAIRMAN BROWN: All right.

MR. MOYLE: We'll just -- we'll just refer to them as the numbers that have been given to them, Exhibits 100 through 105.

CHAIRMAN BROWN: Yes.

MR. MOYLE: Okay.

CHAIRMAN BROWN: And my understanding is that Public Counsel and Retail Federation do not have cross-examination, as you have taken no position on

these issues, for this witness as well as the next witness; is that correct?

MR. SAYLER: Yes, ma'am, that is correct.

MR. WRIGHT: That is correct, Madam Chair. Thank you.

CHAIRMAN BROWN: You -- if you would like, you could, you know, take a -- you can be excused for the rest of this 01 docket.

MR. SAYLER: Thank you.

MR. WRIGHT: That's very kind. I may take you up on it; however, this is very interesting. So, I'm going to stick around for at least a little while.

(Laughter.)

CHAIRMAN BROWN: Okay.

MR. WRIGHT: Thank you.

CHAIRMAN BROWN: I'm not trying to kick you out, but -- it was in my script that you had -- that you wanted to speak, but --

MR. WRIGHT: Thanks. I'm not going to slow you down, in any event. Thanks.

CHAIRMAN BROWN: Okay.

MR. MOYLE: I -- I appreciate the "very interesting" comment that Mr. Wright makes.

Anyway --

CHAIRMAN BROWN: Mr. Moyle, you have the floor.

MR. MOYLE: Thank you, ma'am.

EXAMINATION

BY MR. MOYLE:

Q Good -- good afternoon.

A Good afternoon.

Q You have an electrical engineering degree; isn't that right?

A Yes, I do.

Q Okay. And -- and oftentimes, in these proceedings, we say, you know, are you testifying as an expert. Are you testifying as an expert today?

A Yes, I am.

Q Okay. In -- in what areas?

A Well, in all areas related to the resource planning, rel- -- reliability analysis, economic analysis.

Q Resource planning, economic analysis -- and what was the last one?

A Reliability analysis.

Q Reliability? Great.

And you're the -- you're the manager of integrated analysis in the resource assessment and planning department, correct?

A Yes, I am.

Q Is -- I saw Mr. Sim here, Steve Sim. Is he part of that department as well? Is he --

A Yes, he is.

Q Is he a direct report? Tell -- tell me the relationship between you and Mr. Sim.

A We -- I do not report to Mr. Sim and Dr. -- Dr. Sim, and Dr. Sim does not report to me. We all report, ultimately, to Bob Barrett, who is the vice president of finance -- of -- of finance for FPL.

Q I'm sorry. Who was that?

A Robert Barrett.

Q Oh, Mr. Barrett.

A Yes.

Q Okay. Bar- -- yeah. Thank you.

So -- so, explain to me what -- what you -- what that -- what the department does, the -- the resource assessment and planning department.

A Well, in the resource assessment and planning department, we look at the reliability of our generation system. We determine what additional resources are required for reliability purposes. We also look at different projects for purpose of economics; such as unit -- unit upgrades, solar projects such as this, and so on.

So, we basically look at economic analysis re- -- all economic analysis related to the performance of a power plant.

Q And tell me what your understanding of a -- of a SoBRA is.

A My understanding of the SoBRA is that the rate-case settlement was agreed, and that FPL could construct up to 300 megawatts of solar photo- -- solar capacity every year for the next four years, subject to two tests; meeting a capital threshold and meeting an economic analysis test, meaning that it would result in the reduction in the cumulative present value of revenue requirements to our customers.

Q Okay. And what role, if any, did you play in coming up with the concept of a -- of a SoBRA? And that stands for Solar-Based Rate Adjustment, right?

A That's right. I had no part of development of the stipulation or the concept of SoBRA.

Q Yeah. Do you know who did?

A I don't know for a fact who did. I can speculate, executives of the company.

Q Okay. Do you know if any other utilities in any other jurisdictions have a -- have a SoBRA-type mechanism?

A Yes, I understand both Duke and TECO have

SoBRA mechanisms.

Q Right. And I -- that wasn't a very good question. In terms of any of other Public Service Commissions, have any other Public Service Commissions, do you know, authorized any kind of settlement that allows for solar to come in the way it's -- it's proposed to come in --

A Not to my knowledge; although, I haven't checked.

Q Okay. So -- so, in -- you're aware that the PSC has a rule that -- that talks about a 15-percent reserve margins; is that right?

A Well, I'm aware that FPL uses a 20-percent reserve-margin criteria as -- as well as two other generation criteria that's been used since -- I forget when -- quite a few years, accepted as part of the stipulation for the --

Q So --

A Accepted by the Commission.

Q So -- so, you use a 20- -- FPL uses a 20-percent reserve margin --

A FPL uses three --

Q -- plant capacity?

A FPL uses three criteria: It uses a 20-percent reserve margin; it uses what we call a 10-percent

generation on the reserve margin; and then it uses a loss-of-load probability criteria.

Q The LLP, is that what the --

A LLOP -- sorry. Excuse me. LOLP.

Q Okay. And the 20-percent reserve margin has been approved in an order of the Commission, right?

A That's my understanding, yes.

Q Okay. But the 10-percent generation-only has not; is that also your understanding?

A We have used the 10-percent GRM since 2014, but I don't know if the Commission have voted either for or against. I don't think it's been an issue in any of the -- the proceedings over the last few years.

Q You -- you just don't know the answer to that question, I guess; is that fair -- whether -- whether the Commission has approved it or not?

A I don't think the Commission has either approved or disapproved it.

Q When you -- as part of your regular, routine planning responsibilities, you look and make appropriate steps to try to make sure you stay above that 20-percent reserve margin; isn't that correct?

A That's right.

Q Okay. And hyp- -- hypothetically, given your areas of expertise, if a -- if a solar project was

proposed by -- by FPL, and you were at, hypothetically, 22-percent reserve margin, and a solar project was proposed pursuant to a SoBRA, how would you handle that?

MR. COX: Chairman Brown, FPL enters an objection. He -- he is clearly going to an issue that's not part of this proceeding. I've let it go on for a little bit, but he's going to resource need. That is not one of the issues that was identified in this proceeding. He waived it as of not having it an issue, as of the pre-hearing.

And so, I -- I question how it's going to one of the issues that's enumerated, which is really whether these projects are cost-effective. That's the issue before you today.

MR. MOYLE: Well, but -- I mean, I think it's -- it's part and parcel of -- of it, with respect to cost-effectiveness. I mean, you -- you should not be able to make a finding of something being cost-effective, as there's no need for it. I mean, you know, it's just -- it's like the car example. You know, if there's no -- if there's no need for it, how can it be cost-effective?

CHAIRMAN BROWN: I was waiting for an objection because you had been going on the resource need for a while. If you can, kind of

wrap up that line of questions and move on to the issues before us. Thank you -- and the prefiled testimony.

BY MR. MOYLE:

Q Okay. Well -- well, let -- let me cut right to the heart of it. Is it -- is it your -- is it your testimony that the reserve margin doesn't matter with the SoBRA; that you just don't worry about any reserve margins with the -- with the SoBRA; that, because it's part of an agreement, whether it's needed or not, you've got a green light to -- to go in and -- and build -- build the solar that's set forth in the reserve margin?

A No, my testimony is that, even though the tests, as spelled out, under a settlement agreement -- specifically a capital-cost threshold and an economic threshold -- these projects do provide and meet the reserve need. So, it's not proper to say that they are not providing reliability or a need requirement.

If you look at the response that we provided to staff discovery -- I believe it's No. 65. Staff asked us to update the analysis we have performed using a couple of dated assumptions. One was the inclusion of the St. Johns River Power Park exit, which was recently approved by the Commission, as well as the Dania Beach Energy Center.

If you go to 65, you will see that there is a need for capacity that's partly met by these projects in 2018.

In addition to that, even in -- in all of the analyses, these projects do meet a later capacity need. But as seen in 65, we do have a capacity need, which is only partly met in 2018 by these projects, and the rest will be met by short-term power purchases in the market.

Q Is that -- is that true for all the -- the future years in the -- in the SoBRA; that the SoBRA is going to be effective; that you have a need for it?

A I have not recently looked at the need of the later SoBRA in terms of reserve margins. So, I really can't say. We will be updating the analysis towards the end of this year when we are in a new load forecast, but at this point, I don't know if those projects will meet a need or not --

Q So, you reference --

A -- in the year they come into service. They always meet a need later on. But in the year of service, I couldn't tell you at this moment.

Q They -- they always meet a need later on, if your system continues to grow, correct?

A That's right.

Q Right. If your system doesn't grow, then --

then it -- it may not meet a need.

A No, but these projects do give us the -- the -- the ability to take other actions. For example, we may decide it's economic to retire other units or upgrade units.

So, you know, in -- in a hypothetical, it's hard to say whether it would be a need or not in the future.

Q Okay. Let me -- let me refer you to a -- an interrogatory that is in evidence. It's staff's third set of interrogatories, Interrogatory No. -- No. 19.

CHAIRMAN BROWN: Mr. Moyle, can you identify that on the exhibit list? Or can staff? Either one.

MS. BROWNLESS: Hold on a minute. It's Interrogatory No. 19. I think that would be in third set of interrogatories, Nos. 11 through 23. That's Comprehensive Exhibit No. 84.

CHAIRMAN BROWN: Okay. Thank you.

BY MR. MOYLE:

Q I -- I wanted to tell your counsel where -- where it is. And I -- I can -- I can just read it to you, if you -- do you have a copy of it?

A I do have a copy of it, yes.

Q Okay. All right. So -- so, the question is:

Please detail if the planned 2017-2018 solar generation is intended to meet reliability, reserve margin, or other concern.

And your answer -- your answer was: The primary purpose of the '17 and '18 universal solar centers is to provide customers cost-effective, clean, renewable energy and that these projects will diversify FPL's fuel mix and also provide firm capacity in the summer and, therefore, help -- help meet FPL's future capacity to satisfy generation system reliability requirements.

I -- I read that and -- and the question -- direct question asked whether it's intended to meet reliability and I -- I was unclear whether it was or it was not. I took your answer to be, no, that it's not primarily intended to meet reliability because you said the primary purpose is to provide clean, renewable energy.

Is -- is my assumption right, that the primary purpose is not to meet reliability?

A The primary purpose of these projects is to meet the cost-effectiveness standard and to show these projects make sense, economic sense, to our customers. That is our primary purpose, but they do meet a reliability need.

At the time, this interrogatory, 19, was based on the original analysis. As I described earlier, if -- when we revised our reliability -- our -- our reserve margins, based on the current assumptions, recently approved of test year PRP retirement, and also Dania Beach Energy Center -- which FPL filed a petition for need, I believe, Friday -- if you include that -- if you go to my Exhibit 65, and you go to a first table, you would see that there is a need without the projects of approximately -- slightly over 900 megawatts of capacity need in 2018.

Q Okay. So -- so, did you help respond to this interrogatory question? Are you -- you're familiar with it? You have it in a book up there. I assume --

A Sorry?

Q -- you are.

A Which one?

Q Interrogatory No. 19, the one I just read and -- read the question and the answer.

A Yes, sir, I prepared that answer.

Q Okay.

CHAIRMAN BROWN: Mr. Moyle, my apologies. You may continue with your questions regarding resource planning based on -- and the reserve margins. I know I tried to cut you off a little bit earlier,

but looking at this interrogatory, I think you have latitude here.

MR. MOYLE: Thank -- thank you. I appreciate that.

BY MR. MOYLE:

Q Now, did you change your answer to the interrogatory response?

A No, sir. The interrogatory response, I think, is -- is factually correct. It's based on our analysis. We do have the reliability need, the later years. The primary purpose, cost-effectiveness. I am answering your question in response to -- a later analysis was done. We showed that there is a need for capacity in 2018.

Q Okay. So, if I ask you the question live, today, is the primary purpose of the solar generation to meet reserve margin?

A No, sir. The primary purpose is still cost-effectiveness, which is the standard by which the SoBRA stipulation was based on. So, it's still the purpose and it is still our purpose to bring the projects to our customers that are cost-effective.

And it's also a false premise to say that we should only bring projects that only -- when they are needed. We bring projects to the Commission when they

provide significant cost-effectiveness benefits to our customers.

So, it's -- we do not agree that you have to pro- -- have a need requirement. We have to have a -- we provide -- pro- -- propose projects because they make economic sense, for whatever reason. We may upgrade units because they provide com- -- end up with a more-efficient system and the -- and the fuel savings pay for themselves. That's not a need requirement. It's an economic requirement. We have brought cases like that to the Commission in the past.

So, need is not the sole requirement when we bring a project to the Commission. If there is a need requirement, we would bring the project and, of course, we look at the most-economic way of meeting that need.

Q It -- did -- with respect to cost-effectiveness, did you look at how these solar projects would compare to combined cycle? Did you -- did you compare them against combined cycle?

A No, I -- there's -- it's not a practical comparison because, first of all, combined cycles will not be built in -- in this time frame. So, you could not build a combined cycle this quickly.

Q Yeah. So, back to the hypothetical where I said, assume, you know, given your expertise in

planning -- if you -- if you assume a 22-percent reserve margin and you have a SoBRA project that -- that is being proposed -- and just assume it's worth 1 percent. So, if you do the SoBRA project, it takes you to 23; if you don't, you stay at 22. All right. How -- how would you handle that?

A Well, I'm -- let me -- let me answer your way -- if -- if that's the case and if that's economic, we would proceed with that project. If a project is economic, even though it increases reserve margin, we would go ahead and do it.

Q And -- and if -- the same hypothetical, if you were at a 28-percent reserve margin, would the answer be the same?

A If the project makes economic sense -- and we have to look at specific cases -- if the project makes economic sense, we would bring it forward.

Q Is there any point in time when a reserve margin -- a reserve margin would persuade you to say, you know what, we -- we're chock-full of power. We don't need to put any more solar or anything else in because we're at, you know, 30-percent reserve margin. The Commission has a 20-percent reserve margin. They might find we're not prudent. Would that -- would that ever occur, in your expert opinion?

A We -- we have no set standard that we limit our -- let's say, our projects to a certain -- to a certain margin. Obviously, the reasonableness -- reasonableness -- reasonableness test, it has to be cost-effective. It has to make sense. Okay.

But the point I'm making is that we do not stop doing projects just because they increase reserve margin. If they increase reserve margin in a cost-effective way, we bring it to the Commission.

Q Do you have an understanding about why -- why there is a reserve margin; why the Commission has a rule on a reserve margin and -- and why -- why that's used in your planning criteria?

A Of course, because -- make sure that we have adequate and reliable service to our customers.

Q Isn't it also to -- to make sure that -- that utilities don't overbuild and charge customers for plant that's not needed?

A Yes, Mr. Moyle, but that's in a situation where adding reserve margin, additional capacity, would increase cost to the customer. So, that protects the customers from unnecessary projects just to meet a higher reserve margin.

But that's not the case here. We're talking about increasing the reserve margin in a cost-effective

way.

Q So -- so, I -- I'm -- I'll try one more time but I -- I'm not sure I understand how you would balance -- how you balance cost-effectiveness with reserve margin. If there's something that's cost-effective, but you're making a decision in the context of a 25-percent reserve margin, how -- how do you -- how do you decide which one carries the day?

A The ultimate test is what results in the lowest cost to our customers.

Q Let me refer you to Exhibit 100, if I could, please.

CHAIRMAN BROWN: Got it?

THE WITNESS: Yes, I do.

BY MR. MOYLE:

Q Okay. So, a couple of things. Let me -- let me just make sure I understand what's going on with this exhibit. Where it says generation capital, at the very top of the exhibit, on the first column on the left, what -- what is that figure? If you would, read the figure and tell me what it represents.

A Yes, it's 969.5 million. And those are the cumulative present value of the cap- -- the current charges associated with the cost of the solar projects.

Q You said that includes the carrying charges?

A Well, that's a present value of the revenue requirements of -- that we obtain from our customers.

Q So -- so, that's not just the cost of the solar panels and the wires and the labor. You have -- you have carrying costs built into that number.

A That's right.

Q Okay.

MR. COX: Chair- -- Chairman Brown, could we just clarify with Counsel -- is this taken from Mr. Enjamio's testimony or interrogatory responses that he sponsored?

CHAIRMAN BROWN: Mr. Moyle?

MR. MOYLE: This -- this is an excerpt from Staff Exhibit 84.

CHAIRMAN BROWN: Okay.

MR. MOYLE: It's already been -- it's already in evidence.

CHAIRMAN BROWN: It's in the record, yeah.

MR. MOYLE: Yeah.

CHAIRMAN BROWN: Thank you.

MR. COX: But just -- just so it's identified, this was something that was in the interrogatory response; is that right?

MR. MOYLE: It's part of -- it's a staff exhibit. I got it from staff.

MR. COX: Right, but what --

MR. MOYLE: It was a staff exhibit, so I --

MR. COX: I just wanted some clarification on what it was, exactly.

CHAIRMAN BROWN: It -- because I just pulled it up.

What is the title, Mr. Moyle, that it -- this was responded to?

Hold on. I'll tell you. I see it. It -- it was a response to a third -- an interrogatory, third interrogatory.

MR. COX: Okay.

CHAIRMAN BROWN: Or one of those interrogatories -- hold on.

Staff, any help would be grateful.

MS. BROWNLESS: (Inaudible) -- I'm sorry -- that what Mr. Moyle said was this was in response to staff's third set of interrogatories, No. 19.

CHAIRMAN BROWN: So, I -- I'm looking at -- yeah, it looks like it -- what comes up is it's staff third interrogatory, No. 11B.

MR. COX: Okay. So, it's part -- part of that one. Okay. Thank you.

CHAIRMAN BROWN: Was there a question?

MR. MOYLE: I was trying to understand what

the generation capital number was.

CHAIRMAN BROWN: Okay. You want to repeat it or rephrase it?

BY MR. MOYLE:

Q Yeah, I mean, at the end of the day, I want to know -- I mean, how much -- how much -- if I said, is FPL in here today asking this Commission to approve nearly a billion dollars in expenditure for those solar projects, would the answer be yes?

A Yes, FPL is asking the Commission to approve these projects that have a cost of approximately $900 million. And I can look that up.

Q It's 970 in this number, right?

A Well, that's not the -- well, that's the cumulative present value revenue requirements. That's not the capital cost of the projects, which is typically when we talk about the capital costs of a project or the dollar per kW, the figure used.

Q All right. So, what -- let me ask it this way: What's the all-in dollar number that you're asking the Commission to approve FPL spending that the ratepayers are going to have to finance -- or pay rates for, if the Commission approves it?

A The total capital cost is $893 million. That was in the original, if my -- if I may, that's in the --

based on the March analysis. Then we updated the figure used -- due to a fact that FPL, in its procurement process, was able to reduce the costs by roughly $31 million. So, the -- the corrected or the updated number is $862 million.

Q Okay. And -- and that's in -- I think, a different answer to my question. My question was: Give me the all-in number; not only capital costs, but anything else that FPL is going to be looking to ratepayers to pay for.

A There are two components to the costs. There's the capital costs and the O & M. I don't have an up-front O & M cost. It's an ongoing cost over the years, which we -- we do show in this exhibit, if you look at the second column from the left. That's present value of those annual O & M expenses, which is $45 million, but that's the present value.

Q Okay. And -- and in this document, what -- the number to the right that I circled, 127 million -- right -- .3?

A Yes.

Q That -- that represents how much ratepayers would have to pay if fuel was in a low scenario and if -- if the cost of carbon remained as it is today; is that correct?

A That is correct, but that's only one of the many scenarios that we looked in that response. For example, that response we looked at -- we looked at nine scenarios. We looked at three fuel forecasts and we looked at three different CO2 forecasts. And in the original March testimony with the lower -- the higher capital costs, six of the nine were cost-effective.

When we re-updated the analysis in August, eight of the nine were cost-effective. So, the majority of those scenarios show this project is cost-effective.

Q Yeah, and -- and -- but with respect to -- it's all based on the assumption you make, correct?

A We make assumptions for higher costs that were higher-cost assumptions or lower-cost assumptions. We -- we made a high CO2 forecast --

Q Right.

A -- a low CO2 forecast, a high gas price, a low gas price.

Q Right. But do you -- are you the best witness to ask about -- about the cost of carbon now? Or should I ask -- is it Brennan or Brannen? How do I --

A No, go ahead and if -- I'll try to answer your question.

Q Okay. I -- you know, if you're uncomfortable, you know, let me know.

A No, I think I'm the best -- the best witness for it.

Q Okay. All right. Well, isn't is true that -- that -- that, to date, there's been no cost of carbon for FPL? Period.

A That is right, other than some mon- -- monitoring insignificant -- rather-insignificant costs, yeah. That's right.

Q Okay. And -- and are you aware of the Trump administration's position with respect to a carbon tax?

A Yes, sir, and that's -- that's built into our forecast for CO2.

Q Okay. And what is the Trump administration position with respect to the cost of carbon?

A Well, the -- the Trump administration pulled out of the -- the Paris Accords, as we know, and apparently is pulling out of the Clean Power Plant Agreement, but that was built into our analysis. That's why our CO2 costs start -- or -- of our mid-band analysis, starting the year 2028 at a very low cost, approximately three, $4.

Our mid-band analysis that we based it on is a probability-weighted average of three scenarios; one, there is no CO2 cost; second one, there is a CO2 cost; and the third one is delayed CO2 cost.

The timing is based on our -- the fact that there was a -- an administration had been elected, was -- if I could say hostile to CO2-type costs, but that can be reversed with -- with the next election. So, our -- we -- our consultant, which is ICF -- our consultant assigned a probability of these scenarios, but pointing out that our CO2 costs start in 20- -- 2028 at a very low level.

And I also like to point out that, of the three scenarios, three CO2 scenarios in our August analyses, two of them are cost-effective, both the high and the -- and the mid-band, but it -- it was not cost-effective when you combined that CO2 with low fuel costs.

Q Right. All right. You -- you gave me a lot in that answer. The Commission has a practice of trying to say yes or no and then explain. You've, I think, done a good job of saying yes or no, but a lot of that other stuff -- I know you want to talk about the other scenarios, but I -- I don't really want to go there yet with you. I want to focus on the -- on the low -- the low environmental costs.

And the next question is: So, would you agree that the likelihood of -- in the next three years, give or take, until the next election, that the likelihood of

a carbon tax is slim and none?

A If you could, explain. Do you mean a CO2 tax in those years or -- or legislation passed in those years?

Q In -- in those years. In those years -- I'll ask it that way -- and then of legislation passing in those years.

A Well, there is no -- we don't expect CO2 costs in the next few years, and that's reflected in our analysis.

Q Okay. And -- and you -- the person who is doing the analysis -- they didn't provide testimony in this case, did they -- the CO2 analysis?

A By CO2 analysis, you mean the --

Q The cost of carbon, the carbon tax.

A No, that was developed by a consultant called ICF, which we used for quite a few years, the most-respected consultant in the field.

Q Yeah.

A And we've been using them on this since 2014.

Q And -- and --

A Actually much longer than that. 2009, I believe.

Q Yeah. So, how do they go about making judgments that, you know, there's going to be a new

president, a new administration in "X" number of years, and we think, well, a carbon tax will come, and we think, you know, Congress won't be held by Republicans, and a tax like that is going to be appealing -- tell me -- tell me how that judgment gets made and -- and whether you're asking the Commission to rely on those type of judgments today.

A Commissioner -- if I may, Commissioners, all -- all projections are based on the judgment and analysis of -- of experts. ICF is the -- recognized as the expert in the field. They have best -- best tools. They do the analysis for EPA, been used in many -- as I said, many proceedings here, since at least 2009. So, they're recognized experts.

The same question can be asked of any consultant. They are the experts on the field. They have the best position to -- to make those judgments.

Q Are they political consultants?

A No, sir, they're economic consultants. They are emission consultants. They are quite aware of the -- and part of -- quite aware of the political ramifications that go into forecasting CO2 prices.

Q And -- and they didn't -- their -- their report is not part of any -- of the record in this case either, is it?

A Not the report. We provided, in response to staff, the annual CO2 prices under the three scenarios.

Q You didn't give them the report of the -- of the third party.

A No, sir, and nobody requested it.

Q And you understand that you have the burden of proof in this case, correct?

A Yes, sir.

Q All right. Let's look -- flip -- flip to the next page. Now, this is what you wanted to talk about, I think, before. And the bracketed numbers are savings and the un-bracketed numbers are costs to consumers; is that right?

A The bracketed numbers represent savings to our customers. And the positive numbers show an increase -- increase cost to our customers.

Q Okay. And just to be clear, all of this is projected over how many years?

A Over 30 years.

Q Okay. And did you run your analysis using 30 years, your -- your economic analysis?

A Actually, I -- I believe we went through the year 2050, which is 33 years.

Q But the life of these projects is only 30 years, right?

A That's right.

Q So, why did you -- why did you tack on an extra three years? Did that help with the economics?

A It does help with economics, but you know, it's standard practice to keep projects beyond their book -- their useful life. We don't retire projects just because you re- -- you reach the end of a useful life.

Q Yeah, I -- I would think for an economic analysis, you would use the same -- same life you're projecting for the unit to run an economic analysis as compared to tacking on additional -- additional years. Do you tack on additional years typically when doing an economic analysis?

A We usually round off to a -- if it's 30 years, 31 years, we round off to, you know, 2045, 2050 analysis, a date.

Q But you deviated from that in this case?

A No, we did not.

Q Well, you say you did 33 years as compared to 30.

A Well, 33 years to -- to -- so we could end up in the analysis that ended in the year 2050. So, we chose the year 2050 as the end of analysis.

Q Okay.

A So, when I'm referring to rounding, I was meant to say, we ended up with the year 2050.

Q Okay. All right. And opted -- you opted to settle on -- there -- there's nine assumptions that can be made, and you opted to settle on the medium fuel cost assumption and the -- and the middle-of-the-road for the environmental costs; is that right?

A That's right. It's standard practice to use the most-likely assumption as the most-likely result.

Q Yeah. All right. Flip -- flip to the -- to the next page, if -- if you would. What -- what -- what is this document?

A This is a table of reserve margin in the format requested by the staff.

Q Okay. And -- and I did some -- some math. How many megawatts are you requesting this Commission to approve for 2017?

A Well, we're requesting a nameplate capacity of 596 megawatts.

Q I'm -- I'm sorry. For 217 [sic] is half of that, isn't it?

A What's 217?

CHAIRMAN BROWN: 2017.

MR. MOYLE: I'm sorry.

CHAIRMAN BROWN: Did you say --

THE WITNESS: Oh, 2017.

CHAIRMAN BROWN: -- 2017?

MR. MOYLE: Yeah.

THE WITNESS: Excuse me.

It's 298 nameplate, but that's not the firm capacity value. That goes in the reserve margin. For reserve-margin purposes, we compute the firm capacity value, which is the amount of output we can count at time of summer peak, so -- which is 54 percent of that.

BY MR. MOYLE:

Q All right. And I'm going to ask you about capacity a little bit later on, but I -- I want to focus on -- on this table and -- and the solar.

So, for 2017, you're showing -- where the little arrow is -- that's my handwritten arrow. The total reserve margin after maintenance -- it shows 21.2 percent; is that correct?

A Yes, sir.

Q Okay. And according to my math, if you took 298 -- does this have the -- the 298 of solar in this number or not in this number?

A I have to go look at the question posed by staff. I cannot tell from here.

Q Could you do that for me, please?

A Yes, sir.

CHAIRMAN BROWN: Staff, could you direct him to the interrogatory?

MS. BROWNLESS: It's the (inaudible).

CHAIRMAN BROWN: If you could, put the -- so we could hear it.

MS. BROWNLESS: It's --

CHAIRMAN BROWN: Microphone.

MS. BROWNLESS: It's the third set of interrogatories, No. 19.

CHAIRMAN BROWN: You've got that, sir?

THE WITNESS: No. 19?

CHAIRMAN BROWN: Yes.

MS. BROWNLESS: Yeah.

THE WITNESS: No, I don't think that's the right one.

MR. COX: It doesn't appear to be the right number.

CHAIRMAN BROWN: It's not.

MS. BROWNLESS: Sorry. They're telling me now it's 11, perhaps; third set of interrogatories, No. 11.

CHAIRMAN BROWN: Okay.

THE WITNESS: 11, yes. That makes sense.

CHAIRMAN BROWN: You getting there?

THE WITNESS: I don't see it in 11. So, it may not -- may be different --

CHAIRMAN BROWN: Do you want to maybe --

MS. BROWNLESS: Now they're telling me 12.

CHAIRMAN BROWN: Oh, my goodness.

THE WITNESS: 12? Oh, it is 12. I found it.

MS. BROWNLESS: I'm sorry.

CHAIRMAN BROWN: Bad.

MS. BROWNLESS: I apologize, Your Honor.

CHAIRMAN BROWN: Non-lawyers.

THE WITNESS: Yes, as look- -- after looking at the question, it does include the solar projects in it.

BY MR. MOYLE:

Q So, that -- that number includes the so- -- the solar.

A Yes.

Q So, I -- according to my math, if I back out 298 megawatts, I'm still -- the reserve margin is still above 20 percent.

A Yes, sir.

Q And the same -- the same with respect to the next year, 18 -- that shows -- that shows a little higher reserve margin, 21.5. And you're seeking the same amount of solar in '18, correct?

A Yes.

Q 298? So, you -- you still will be above a 20-percent reserve margin, even if you didn't do the solar project, correct?

A That's right.

Q And then in '19, your reserve margin is up at 25.8 percent, right?

A That's correct.

Q And --

A Which is an -- a fact that comes from the -- how we add units. We add units that are much larger than the actual need in the year they come into service, which is the economic thing to do. So, you will see reserve margins that exceed 20 when units come in. And we added -- in that year, we added the -- we add -- 2019, we add the Okeechobee unit.

Q But -- but you -- your -- you think also that the solar is needed, even though you're going to be at, you know, 24-percent reserve margin without the solar.

A Well, I -- I think I answered that, Mr. Moyle. It's -- first of all, it's needed for economic reasons, which has nothing to do with the reserve margin, but I also answered that, when the analysis was updated to reflect the most-current assumptions, there is a significant need in '17 and '18.

So, we do have a real need for capacity. And if we don't build this project by 2- -- in 2018, we have to go in the market and buy additional short-term capacity.

Q Do you think ratepayers should have to pay for -- for capital expenditures at, you know, 800 million, 900 million for units that are above the 20-percent reserve margin?

MR. COX: Objection. He's asked and answered the same question in probably four different versions, but the same question over and over and over.

MR. MOYLE: That's a yes or no. He can just answer it yes or no.

CHAIRMAN BROWN: Mr. Moyle, but don't you find it a little repetitious?

MR. MOYLE: I'm not sure he's answered it yes, no, as to whether ratepayers should have to pay for power plants that are above the --

CHAIRMAN BROWN: I'll allow the --

MR. MOYLE: -- 20-percent reserve margin.

CHAIRMAN BROWN: -- witness to answer it, if he can, in a yes-no format. If he can't, then that's fine as well.

THE WITNESS: Yes, if it results in economic

savings to them. Yes.

BY MR. MOYLE:

Q Do you guys go and true-up? Do you report to this Commission and say, look, here the -- the economic analysis we provided to you, and we made an assumption about carbon costs that were going to do this or natural gas that was going to do this; we were wrong, and we're very sorry, but the ratepayers are going to lose -- lose money on this deal.

Is there any mechanism for true-ups related to how these things actually play out, based on the assumptions?

A I'm not sure what -- specific what you're asking that -- to be trued up. If you could, explain.

Q Or just information. Do you provide information to the Commission?

A We -- we provide information to the Commission several -- in many ways. Specifically, for solar projects, we provide historical actual performance of those historical projects.

Q Let's look at -- let's look at the information that you -- you provide for your existing solar reports. This is 105.

A Yes, sir. I have it.

Q Is this what you were referencing?

A Yes.

Q Are you going to provide similar information to the Commission and -- and parties with respect to these SoBRA projects such as -- as the information you're providing here?

A I don't know if that information has been requested. I don't know if there is any decision to provide it. So, I cannot answer your question.

Q Would you have any objection to providing it if the Commission or the parties asked for it?

A I do not.

Q I'm sorry?

A I do not.

Q But you're not sure about the company?

A No, I'm simply saying that I don't know if it's a requirement to provide information. If the Commission asked for it, of course we'll provide it.

Q Yeah. You're aware that the requirement is in the other settlement agreements that have been filed, to provide information like this?

A No, I was not.

Q You're not aware of that?

A No.

Q All right. Let's go to -- to the last -- the last page.

CHAIRMAN BROWN: Of the same exhibit?

MR. MOYLE: Same exhibit, yeah. It says Page 3 of 3 on it.

BY MR. MOYLE:

Q And it says for -- this is for the period of January to September 2017. Are you with me?

A Yes.

Q So, you had mentioned capacity factors. What is the capacity factor for the units that you're asking the Commission to approve?

A The capacity factor in year one is approximately 27 percent.

Q 27?

A 27 percent, yes.

Q And what does capac- -- what does that mean? What does capacity factor, when you use it in that way, mean?

A It's simply -- it's a measure of the actual energy produced by a project or a -- a unit, divided by the maximum capacity it could provide based on multiplying the number of hours in a period -- let's say, 87, 60, times the nameplate capacity of the project.

Q Okay. You also use a figure of 54 percent, right?

A That's right.

Q And what is the 54 percent?

A 54 percent is the firm capacity value. That is simply the amount of energy we can count at time of summer peak, which is determined by the specific profile of a -- of a project. Each project has specific profile with respect to energy output by hour based on the -- the special -- a special design, the layout, the type of panels that are used.

So, we looked at the profiles projected for these projects that we are proposing. And on average, they produce 54 percent of their nameplate output at time of summer peak.

Q And then, how do you reconcile that with the 27-percent average?

A Well, there's no reconciliation. These are two totally different numbers that cannot be compared together. One measures total energy over the year and one measures -- which includes the night hours, for example, while the other pro- -- provides the expected output at time of summer peak, which is the hot August date. So, they cannot be compared --

Q Okay. The second one --

A -- in any meaningful way.

Q The second one -- because it measures peak

only; is that right?

A That's correct.

Q Okay. All right. The -- the last set of -- of boxes of information there -- so, this has your O & M costs, the carrying costs, the capital, the other, the fuel costs, and then total cost of generation, right?

A Right.

Q So, the total there -- the total carrying costs is 38 -- I mean, nearly 37 -- $39 million, right?

A Yes.

Q And that compares to the total cost of generation of 52 million?

A Well, I think the 52 million is the sum of all these values.

Q Right. I mean, this column is a total of everything that shows your -- your total for three projects that you have, correct?

A Yes.

Q And it also has a total cost of generation and a dollar value --

A Right.

Q -- which says 52,172,479, correct?

A Yes, it does.

Q Do you expect there to be similar costs with respect to the SoBRA projects that you're asking this

Commission to approve today?

A I'm not sure I understand your question, but I'll -- I'll try to answer it this way: We provided our expectation of annual costs of our projects. You cannot compare to the results of these projects. They're totally different projects. In fact, these projects, when they were proposed, they were clearly not cost-effective, but --

Q They were cost-effective?

A They were not cost-effective at the time, but we have provided the actual results by year of what we expect the cost and benefits of all these projects to be.

Q Okay. Well, let me -- let me just, like -- let me just try to talk at a high level on this. These -- these numbers, to me, representing consumers say, well, wait a minute, it's a $52-million cost for -- for these megawatts and nearly 40 million is carrying costs. That doesn't seem like a very -- very-attractive deal with respect to the solar.

And I'm curious as to, if you can ballpark it, what the carrying costs are going to be on this solar. Is it going to -- is it going to be similar to this or, absolutely not, Mr. Moyle; you don't have to worry because the carrying costs are going to be a lot less?

Just give me a big -- big-picture answer, if you can.

A Well, first of all, I think we already went through those numbers when we were looking at one of your earlier questions, when we went over the present value of those results. But once again, to point out that when these projects were built -- and I remember because I did the economic analysis -- those projects were passed as part of a special act with the legislation.

And at the time, those projects were definitely not cost-effective, but they were proposed for different reasons so we could get -- basically understand and start to develop a base of knowledge and practice on solar projects. So, these projects were never expected to be cost-effective.

The projects we're proposing are cost-effective, or at least, as we -- we show and we pro- -- I actually provide -- and we went through the results on a -- in a present-value basis. I also provide in discovery the annual results. So, you can see the actual number that -- whichever number you would like to see, but they're all provided, all our projections.

Q Do --

A And what they would show is that, over the

first few years, if you look at the annual results -- over the first few years -- let's say the first seven years or so, the -- those projects result in a higher cost to our customers, but after that, they result in a lower bill to our customers, and, by the time the project is completed, obviously, are cost-effective by the amounts we discussed before.

Q The first seven years will have higher costs. And then that's when you're hoping the assumptions, with respect to the carbon, kick in, would -- would lower the costs.

A No, sir, the -- the -- I think that the assumptions start after that. So, those -- that switch to cost-effectives are driven by -- by the CO2 coming in.

Q Do you know -- I'm -- how these numbers on this sheet compare to the 1750 number that is part of your -- your SoBRA?

A I'm sorry. Which figures?

Q So, these total cost of generation -- they're broken down into millions of dollars. And I was curious, do you -- do you break them down into cost-per-kilowatt basis?

A My mem- -- if my memory is right -- it's been many years. These projects cost over $6,000 per kW,

which is four times, let's say, the cost of the projects we're proposing now -- and by -- also by -- the new projects are significantly more cost-effect- -- more efficient and, therefore, produce more energy per kW.

Q Okay. So, let's talk for a minute about the price per kW. Your prices that are coming in are around 1500 per kW?

A It's on average about $1445 per kW.

Q I think you have an exhibit that --

CHAIRMAN BROWN: Is it JE-1?

MR. MOYLE: Yeah, it's JE-1. Right. Thank you.

BY MR. MOYLE:

Q J- -- JE-1, my copy says that the capital costs, dollars per kW is 1498; is that --

A But --

Q Is that what your JE-1 says?

A Yes, sir, but we later filed testimony -- both -- I filed testimony showing the results of reduction -- approximately $31 million in costs. So, the revised number is $1445 per kW.

Q And -- and then, given your expertise, what do you see that number doing as we go forward? I mean, your -- your settlement number is 17- -- 1750, right?

A Yes.

Q Okay. And -- and do you know that Duke's is 1650?

A I -- I believe I remember that, yes.

Q And do you know that TECO's is at 1500?

A I do not recall the TECO number, but I'll accept your number.

Q And you're -- you're telling me your number is now 14- -- what was it?

A 1445.

Q Do you think that that price trend downward will continue as time goes forward?

A I think our -- our expectations, over the long- term, prices will continue to decline. However, that may not -- in the short-term, there will be spikes on the price. So, I cannot say that in '19 or '20 or '21, the prices will be lower. The long-term -- we expect the long-term trend to decline over time.

Q And why is that?

A Well, first of all, because it's based -- the historical -- we've seen the rapidly-declining prices. I think I mentioned our earlier projects were in the order of $6,000 kW, and we're at 1445. And we expect that trend to continue as more production comes into line and so on.

And our second witness, Mr. Brannen, can

probably speak to that in more detail than I can, but the expectation is that the long-term costs will continue to come down. But within the long-term, the way we spike, due to different reasons -- supply and demand, tariffs coming into -- into place -- so, we cannot assume that there will be -- or, let's say, over the next three, four, five years, they'll continue at this rate.

Q Where -- where do you get your solar panels today?

A The solar projects panels come from a company called Hanwa. And they are --

Q What's the name of it?

A Hanwa. That's H-a-n-w-a.

Q Where are they based out of?

A South Korea.

Q Do you have a long-term relationship with them or contract with them?

A Not to my understanding, but that's a question, once again, that you would direct to Mr. Brannen.

Q Okay. And then, I -- I believe there's been discussion about a tariff being placed on solar panels. Are you familiar with that?

A Yes.

Q And -- and what information do you have about that?

A Well, there's a potential for tariffs being implemented -- I don't recall the date, but before the end of the year. However, all our -- my understanding is that all our panels are either in the -- in the country or will be shortly, before any tariff would take place. So, the tariff, if -- if passed, would not affect any of those projects.

Q Okay. And I'm little unclear what you're asking the Commission for today. Could -- could you explain? Are you asking for a green light for 298 megawatts for 2017? Are you asking for a green light for another 298 in '18? I know the agreement says up to 300 per year, but I'm not -- I'm not real clear as to exactly what you're asking.

A Well, I think it's -- it should be clear in my -- in my testimony and Mr. Brannen's testimony. We're asking for recovery of total of 596; 298 in 2017 and 2- -- and 298 in 2018.

And the reason we come here asking for that at the same time is just the -- the way the schedule -- the Commission's schedule worked out and -- and since the settlement took place -- we couldn't have come here and ask for a separate -- have a separate request for 2017

and a separate request for 2018.

Q So, when we have the clause proceeding next year, you don't anticipate filing testimony and asking for more solar recovery?

A We do expect to continue and build another 300 in 2019 -- or 298, to be precise. And we expect to come back and ask for another 3- -- 298 in 2020, assuming that we can show that their -- the projects are cost-effective.

Q Okay. So, we were talking about the tariff, and you said, well, I'm not sure we have to worry about it because it may not affect us in 2017. If the Commission is having to make a judgment about 2018 in pricing, the tariff could affect them in 2018, couldn't it?

A No, sir, as I mentioned before the -- the panels for all these projects, both the 2017 and 2018, are either all in the country and -- or, let's say, cleared customs, or about to do so shortly. So, the tariff will not affect neither the 2017 nor the 2018 project.

Q It would affect them starting in '18 -- in '19?

A It may -- if there is a tariff, it may affect projects that come in after 2019.

Q Okay.

A After 2018, excuse me.

MR. MOYLE: Can have I second, please?

CHAIRMAN BROWN: Sure.

BY MR. MOYLE:

Q With respect to the -- the Oil and Gas Auction Announcement, who would be best to talk to about that, you or Mr. Brannen?

A Well, neither Mr. Brannen or I are experts on fuel markets, but I'll do my best to answer your question.

Q Okay. Do you have a reaction to how much one four one, 141 trillion cubic feet of natural gas represents? And just for the record, I'm referencing Exhibit 102, now.

CHAIRMAN BROWN: Okay. Thank you.

A If you're asking how much that represents on, let's say, a total national market or something, no, I do not.

Q Does a Department of Interior announcement that the Department is proposing the largest oil and gas lease ever held in the U.S. affect your views with respect to the future of natural gas prices?

A Well, first, I'm not an expert in the market, but I would say that that would depend on whether the

market anticipated this or not. But once again, I'm not an expert on fuel markets.

Q Okay. And then, the secretary of the interior is quoted as saying: In today's low-price energy environment.

Do you agree that, today, we're in a low-price energy environment?

A I think it's a fair thing to say, yes.

Q With respect to fielding inquiries by other people who want to provide you solar energy or solar plants -- you or Mr. Brannen?

A Go ahead and ask me. I'll do my best to answer.

Q I -- I want to save some for him.

(Laughter.)

Q And -- and both of you are familiar with the -- the bid rule?

A I am.

Q Okay. Let's talk -- let's talk -- talk for a minute -- I, as a matter of convenience, have provided a copy of the bid rule. It's been marked as 104. And it probably won't be admitted into evidence, given that it's a rule, but I wanted -- wanted you to have it.

Why -- why did you decide to size these projects at 74.9 megawatts?

A There are several reasons. One is to -- not to have to go through a Power Plant Siting Act and get the projects in service quicker. And we have reasons why we wanted to do that.

The other reasons -- when we reach a size close to 74.5 megawatts, we basically reach the maximum value or economies of scale. So, larger projects do not reduce the unit cost.

And also, there is value of distributing the projects geographically. There is a big concern of viability of solar production from minute to minute. So, the -- the more projects we have where we're spread over a wider area -- we think there's great benefit to that and something we're monitoring in future. So, there is value to that.

But specifically, going to the back the first point, part of the reason in this case is that we did want to get our projects in quicker for two reasons. The first reason was that we were seeing very low costs in the market at the time for solar panels, resulting in historically-low -- dramatically-low prices, I think, compared to what we're seeing a year ago -- or a couple of years ago. Excuse me.

But also, that we were concerned with what I call political risk. There was a new administration.

We were afraid of investment tax credits being removed, of tariffs being imposed. So, we wanted to get these projects in before that would happen.

And if we went through a bid rule, we extend the process, I would say, a minimum of six to nine months. So, it po- -- potentially -- as -- as it turned out, potentially brings us into a situation that the panels -- some of the panels would be subject to tariffs.

Okay. The other reason is that it turned out to be -- it wasn't the main purpose of this, but now there is -- if we had gone out for bids, these projects would not be available, most likely, at least total, in 2018 and we would have to go -- gone out to the market to buy short- term capacity to -- to make up for the fact.

So, we're very concerned, as I said, of political risk, primarily, but also, our ability to take advantage of the markets at the time.

Q Notwithstanding the investment tax credits -- and I understand that's something that is out there, but the -- the trend in solar energy has been that the prices have -- have been declining, over time, pretty significantly, correct?

A That's right.

Q And -- and you had said that you wouldn't have to go through the -- the bid rule. Have you been in conversations with people about -- about giving you proposals to build the solar facilitates for you and then sell you the energy out of them or sell you the facilities themselves? Or is this, no, we're -- we're kind of doing it, you know, our -- our way and don't need to have those conversations?

A Well, one of the reasons, we should have added, why we decided to build these projects that size -- in part to not have to go through the Power Plant Siting Act -- was the fact that we -- in essence, we have gone through a very-thorough, competitive bidding process of every aspect of this project, just about, or 90 percent of the costs are very -- could be competitively bid, so that we should get the benefits of, in essence, a competitive process. And Mr. Brannen can definitely ans- -- answer more-detailed questions in that area.

So, there are benefits of time and there are benefits of costs to our customers. If we had deferred, the more-likely outcome would have been that we'd have to be paying for higher panel prices because of the tariffs.

Q The carrying costs on your projects aren't --

aren't over 10 percent?

A I'm not sure what --

Q When you sponsored an answer, you said, 90 percent of the costs are -- are --

A No --

Q -- are done. And I thought the carrying costs -- I know that exhibit we looked at, they were -- carrying costs were 70 percent or -- so, I'm -- I'm -- I was just unsure what you were referencing with respect to your 90-percent comment.

A I'm referring to the total cost of the project -- something like 90 percent of the total cost is -- is gone through a very-competitive bidding process.

Q Have you -- have you ruled out using a bidding process or a request-for-proposal process for any solar projects?

A We have not made a decision long-term of how to proceed with future projects of what the size is and whether those projects would qualify for the Power Plant Siting Act.

Q Are you familiar with the -- with the SoBRA document, the agreement, itself?

A I've looked at the resettlement document, yes.

Q Okay. And -- and just for clarity, is it your

understanding that, with respect to meeting that cap -- that 1750 cap, that each and every project, on a stand-alone basis has to -- has to meet that 1750 cap?

A I think, yes, that's a fair understanding. Yes.

Q And do you know -- and maybe I should defer this, but are there -- are there any costs for the solar project that are not part of what you're requesting today?

A The costs we're requesting today include all the costs associated with these projects, which is all the equipment, solar panels, land, interconnections. So, total costs of the projects are -- I think one project -- I don't recall which one -- we already own the land, so there is no land cost associated with that one. But all the other total costs of all the other projects are included. We're requesting the base of the -- cost basis for our analysis.

MR. MOYLE: If I could have a minute, please.

CHAIRMAN BROWN: Sure.

MR. MOYLE: (Examining document.)

CHAIRMAN BROWN: Minute's up.

MR. MOYLE: I'll save you five, if --

CHAIRMAN BROWN: Okay.

MR. MOYLE: Or more.

BY MR. MOYLE:

Q All right. A few -- a few more -- a few more questions. Deferral -- deferring a unit typically adds benefits for ratepayers, correct?

A Typically, yes.

Q And -- and why is that?

A I'd say typically -- or really, I should say, it depends on the situation. When you defer a project, you defer a large capital -- an expensive -- let's say, an expensive -- and you defer that capital expenditure, you, in essence, reduce the present value's current charges associated with the capital. So, that's an economic benefit. That -- but that may also be offset by the fact -- depending on the price deferred, that project may have savings associated with it in terms of fuel.

So, I really can't answer gen- -- in -- in every case, but often, deferring a -- a project brings capacity value, which happen -- brings economic value, which happening in this particular analysis with these different projects.

Q When you're doing your economic analysis, did you look at -- at -- at deferral and what -- what -- what those benefits to the ratepayers would be when you were running your economic analysis?

A Yes.

Q And so, let's say 2025 rolls along -- or 2023 -- whenever you have the 25-percent reserve margin, and this Commission said, you know, you guys are doing solar and you've got a lot of solar, and we don't have a lot of growth -- if they were to defer future solar projects, all other things being equal, that would be beneficial to ratepayers?

A I'm not sure I understood your question, Mr. Moyle.

Q I just am trying to ask the -- I asked you the broad question about deferral and it being beneficial to ratepayers because you don't have to deal with capital costs, presently.

Would that same logic hold true in a future year, here, if the Commission were asked to consider deferring a solar project; that -- that there would be benefits to the ratepayers of deferral the same way as you just answered, with respect to solar? All other things being equal.

A The answer is specific -- as I mentioned, some cases, deferral results in costs to the customers. So, if a project -- the fact that the capital costs is deferred and is an advantage, maybe offset by the fuel savings -- that seems to be the case; the fact that the

solar operation or economics seems to indicate that the fuel savings offset the capital costs. So, it's unlikely that deferring a solar project would result in economic benefit to our customers.

Q Yeah. I think you had said -- your lawyer maybe said in the opening that -- that there's air-emissions issues associated with solar. Do you -- do you know -- Florida does not have problems with clean air like other states, like California. Do you know that?

A Well, I don't know. We have fewer problems than other states, yes.

Q Right, and then there's a term called "attainment" and "non-attainment" and -- you're familiar with that?

A That's really a -- environmental issues are really beyond my area of expertise.

Q Do you know if Florida has any non- -- non-attainment areas?

A Not to my understanding, but once again, that's not my area of expertise.

Q Yeah, and I'm not looking to delve into it, but -- the model that you use for your gas forecast and pricing -- same question with respect to the -- the carbon-cost model. The person who did the model -- they

didn't file testimony in this proceeding, did they?

A The ICF consultants did not file the testimony.

Q Okay. And you haven't filed the -- the -- the modeling or the work that was done as an exhibit in this record, with respect to the -- to the gas modeling, correct?

A If you're referring to the ICF report --

Q Right.

A -- we did not -- we provided the results of the -- ICF's analysis.

Q But you didn't give the report in, right?

A No, and it wasn't asked for.

Q Yeah. Now, you talk on Page 6, Line 18 of your testimony about the displacement of oil and coal.

A Yes, sir.

Q And -- and I was unclear, from your testimony, whether you're using that testimony as -- as illustrative to say, here's what this represents, with respect to oil and coal, or this is actually oil and coal that would be displaced on FPL's system. Can you clarify that for me, please?

A These numbers are based on our projections of what solar, adding this level, amount of solar, including these projects -- the amount of gas and oil

and coal that would be, in essence, eliminated as a result of the solar output of these projects. So, it is a projection of what we expect will happen, as a result of -- result of adding these projects.

Q Right. And I'm unclear as to whether you're saying that's -- that this is going to eliminate FPL's use of 14,600 barrels of oil because I thought you weren't using much oil.

A Well, we're still using some oil. This is a very -- a readily small amount.

The real savings or -- if I may rephrase that, most of the fuel -- fossil fuel displaced is gas. The majority of our generation going forward is -- fossil generation is gas. And most of the generation displaced by solar is gas, but there's some small amount of -- that is still oil and there's some small amount of coal that's been displaced.

Q Right. And you're in the system planning resource. I know Cedar Bay has been retired and your facility in Okeechobee is scheduled for retirement, and you're just about coal-free, aren't you?

A No, we still have the Scherer units, the Scherer 4 unit, which is a readily large coal unit.

Q And -- and will -- will the solar projects affect your use of the energy coming from Scherer?

A Yes, a small reduction, as shown here, yes.

Q Do you know what -- what authority -- you know, this is a clause hearing and, you know, we've had some other clause proceedings before here. Do you know what authority exists for the SoBRA mechanism?

A No, I do not know what authority. I'm not sure what the -- the question is. I know that --

MR. COX: Objection. This is calling for a legal conclusion. He's not an attorney. He's already testified he's an engineer.

CHAIRMAN BROWN: Objection sustained.

MR. MOYLE: Just trying to get his understanding of -- of it.

I think that's -- just give me one -- one minute, if I could.

Okay. That's all I have for this witness. Thank you.

CHAIRMAN BROWN: All right. Staff.

MS. BROWNLESS: No questions. Thank you.

CHAIRMAN BROWN: Commissioners -- Commissioner Graham.

COMMISSIONER GRAHAM: Quick question.

How are you doing this afternoon?

THE WITNESS: Good.

COMMISSIONER GRAHAM: Do you know off the top

of your head what your summer peak is?

THE WITNESS: I will tell you what our 2017 summer peak is, if that would help. That actual summer peak was 23,373 megawatts.

COMMISSIONER GRAHAM: And do you know roughly the hour range, the hour that that was?

THE WITNESS: That --

COMMISSIONER GRAHAM: Was that 3:00 in the afternoon?

THE WITNESS: That usually happens between 4:00 and 5:00 in the afternoon.

COMMISSIONER GRAHAM: Between 4:00 and 5:00?

THE WITNESS: Yes, sir.

COMMISSIONER GRAHAM: And what's your winter peak?

THE WITNESS: Our winter peak is 17- -- our -- this actual 2017 peak was 17,074 megawatts.

COMMISSIONER GRAHAM: And do you know when the -- that time frame is?

THE WITNESS: Yes, it -- well, that usually happens very early in the morning, where there is essentially no solar output. So, when we value the firm-capacity value of solar projects, we're strict- -- strictly looking at the summer-peak value. We know it -- basically, little if no value

at time of winter peak, but because our reserves -- we have basically an issue at summer peak and winter peak. That's not an issue now.

Eventually, if a lot of more solar is added, we will -- we'll, of course, have to pay more attention to it.

COMMISSIONER GRAHAM: But what's the time for winter peak?

THE WITNESS: Oh, I'm sorry. It's roughly 7:00 or 8:00 in the morning, so --

COMMISSIONER GRAHAM: Okay. Actually, you answered my next question already. Thanks.

CHAIRMAN BROWN: All right. Any other questions, Commissioners?

Commissioner Clark.

COMMISSIONER CLARK: Yes, Madam Chair.

Which is growing at the faster rate: Your summer peak or your winter peak?

THE WITNESS: I would say summer peak, for sure, yes.

COMMISSIONER CLARK: Okay.

CHAIRMAN BROWN: Okay. Any other questions, Commissioners?

Redirect.

MR. COX: Thank you. Just a few questions.

EXAMINATION

BY MR. COX:

Q Mr. Enjamio, you were just discussing with Mr. Moyle some questions about cost-effectiveness of the solar projects?

A Yes.

Q You recall those questions?

A Yes, sir.

Q What impact does the addition of these cost-effective solar facilities have on FPL's fuel diversity?

A They will definitely improve our fuel mix. These particular projects increase our solar -- the percent of solar energy by roughly 1 percent, so -- and reduce mostly gas, accordingly.

When -- if we were to build all the -- the 1200 megawatts of SoBRA that we're considering, the 600 projects under -- under discussion today and the '19 and '20 projects, that number will basically go up to, like, 3, 4 percent.

Q And did -- did the question that you were just asked about on Page 6 of your testimony regarding reduced use of fossil fuels -- did that address fuel diversity?

A Yes.

Q Thank you.

In terms of cost-effective, just so -- so it's clear for the record, what does the rate settlement agreement require as far as cost-effectiveness for the four solar energy centers that FPL proposed for the 2017 project?

A The settlement --

MR. MOYLE: I think the document speaks for itself.

CHAIRMAN BROWN: Objection overruled.

MR. MOYLE: He's not -- he's not a lawyer.

CHAIRMAN BROWN: You've asked the questions that I've allowed on the settlement agreement. So, I'm going to allow it.

You may continue. You can answer it.

THE WITNESS: Yes, the settlement agreement requires a -- a test that the projects reduce our cumulative present value revenue request -- revenue requirement to our customers, which is another way of saying reduce bills to our customers.

BY MR. COX:

Q Okay. And what does it require for the same, for the 2018 project?

A Same requirement.

Q What -- what is the projected in-service date for the 2017 SoBRA project?

A December 31st.

Q Would -- would -- by coming into service on that date, would it have any effect on FPL's 2017 summer reserve margin?

A No, it would not.

Q And you were asked a few more questions about reserve margin I wanted to -- so, you -- you recall some questions that Mr. Moyle asked about reserve margin being above 20 percent in certain years. Do you recall --

A Yes.

Q -- those questions?

A Yes, I recall.

Q If FPL brings one of these projects into service in a year when the reserve margin is already predicted as being above 20 percent, do these projects serve any value in terms of deferring capacity value?

A Yes, they do. They would defer capacity -- first of all -- if you could repeat your question, Mr. Cox -- if you don't mind.

Q Basically, the question is: Even in a year where the reserve margin is exceeding 20 percent, do these -- these projects still serve -- assuming, again, as you said, they were cost-effective, do they defer any capacity, have capacity value for FPL?

A Yes, they do. I mean, as I said, these projects do defer capacity later on. And in the year we're at it -- of course, they increase the reliability of the system. So, they have value in the year they are placed into service, and -- and they have value over the -- let's say the -- the term of the analysis by deferring capacity in later years.

Q Do you recall when Mr. Moyle was asking you some questions, again, about cost-effectiveness and he turned you to his exhibit that he had marked as Exhibit -- was marked as Exhibit 100 today -- and --

A Yes, sir.

Q -- the second page, which provided the cost-effectiveness analysis under different assumptions or assumption scenarios?

A Yes, I have it here.

Q Okay. Did FPL provide an update to this analysis?

A Yes, we did. Together with our in- -- included -- or base- -- I should say, based on our August analysis, we provided -- we update this analysis at request of staff. And that showed that eight of the nine project -- eight of the nine scenarios were cost-effective.

The sole scenario was not cost-effective was a

low-fuel in a low -- no -- no-CO2 cost scenario.

Q Do you recall if that was Interrogatory Response 57, which was Exhibit 86?

A (Examining document.) Yes, it is.

Q And what -- what was the cost savings for the medium fuel costs, medium environmental scenario that is the base case?

A It was $106-million benefit to our customers.

Q And did -- did you provide that in your August 2nd supplemental testimony?

A Yes, I did.

MR. COX: No further questions. Thank you.

CHAIRMAN BROWN: Okay. Let's deal with exhibits. This witness has Exhibit Nos. 28 through 36 attached to his prefiled testimony.

MR. COX: Yes, FPL would move admission of Exhibits 28 through 36.

CHAIRMAN BROWN: Any objection, Mr. Moyle?

MR. MOYLE: No objection.

CHAIRMAN BROWN: Seeing no objection, we'll move 28 through 36 into the record.

(Whereupon, Exhibit Nos. 28 through 36 were admitted into evidence.)

CHAIRMAN BROWN: Mr. Moyle, you have Exhibits 100 through 105, but you did indicate that

you wanted to cross Mr. Brannen --

MR. MOYLE: Yeah, if -- if FPL --

CHAIRMAN BROWN: You want to hold off?

MR. MOYLE: -- doesn't have any objection, I would just as soon move them in, the -- all of them except 104, which was the bid rule. I don't think we need to --

CHAIRMAN BROWN: And 101 is already -- I thought 101 was already in -- or sorry -- 100.

MR. MOYLE: I think it's --

MR. COX: 100 is already part of --

CHAIRMAN BROWN: Yeah, 1- --

MR. MOYLE: It's an excerpt. I would ask, as just an administrative convenience, if we're in a brief citing it, that you would allow it in again so we can cite it here and not have to dig it up.

CHAIRMAN BROWN: Mr. Cox, do you have a problem --

MR. COX: No objections to that, but we -- we do have an objection to Exhibit --

CHAIRMAN BROWN: 10- --

MR. COX: -- 102.

CHAIRMAN BROWN: -- 2 -- I figured you would. Would you like to delineate your objection?

MR. COX: Yeah, there's been no foundation

laid for this exhibit or our witnesses having any knowledge of the information in it. It's an article in the Washington Examiner by an author that I don't think Mr. Enjamio is familiar with.

So, you know, it being entered into the record with no foundation and no ability to question, we -- we would object.

CHAIRMAN BROWN: Mr. Moyle, would you like to hold off on that one until Mr. Brannen comes up?

MR. MOYLE: I -- I can. I have a good speech prepared to -- to --

CHAIRMAN BROWN: I can't wait to hear it. I can't wait.

We're going to go ahead, seeing -- on 100, 101, 103, and 105, if there's no objection from FPL, we'll move those in. No objection?

MR. COX: No objection.

(Whereupon, Exhibit Nos. 100, 101, 103, and 105 were admitted into evidence.)

CHAIRMAN BROWN: All right. Everybody's getting antsy in here. I can hear everybody.

MR. MOYLE: Can we take five before the next witness, please?

CHAIRMAN BROWN: Yes, but I -- would you like your witness excused?

MR. COX: Yes, may Mr. Enjamio be excused?

CHAIRMAN BROWN: You may be excused.

And I know you guys are all -- for the 07 docket are all getting anxious to get that going -- Mr. Moyle.

So, we have one more witness.

(Laughter.)

CHAIRMAN BROWN: Mr. Moyle, they're all looking at you.

MR. MOYLE: I know. I know. I feel the -- the stares.

CHAIRMAN BROWN: Feel the stares? I see them -- if their eyes are open.

All right. Let's just take a short three-minute break in between.

MR. MOYLE: All right. Thank you.

CHAIRMAN BROWN: All right. Thanks.

(Brief recess.)

CHAIRMAN BROWN: We are going to get started. We have one last witness. And again, acknowledging that there are some stipulations in the 07 document and folks are lingering around, just -- let's be cognizant of that.

All right. So, FPL, would you like to call your next witness?

MS. MONCADA: Yes, Madam Chair. If we're all ready to proceed, FPL calls Mr. William Brannen.

CHAIRMAN BROWN: And it's Mr. Brannen, not Brennan?

THE WITNESS: It's Brannen.

CHAIRMAN BROWN: Brannen. Thank you. Okay. Mr. Brannen has been sworn in.

MS. MONCADA: He has been sworn in, yes.

EXAMINATION

BY MS. MONCADA:

Q Could you please state your full name and business address for the record.

A Yes. My name is William F. Brannen. And my business address is 700 Universe Boulevard, Juno Beach, Florida.

Q Thank you. By whom are you employed and in what role?

A I am employed by NextEra Energy Resources, LLC. And I am the senior director for project engineering and due diligence.

Q Have you prepared and caused to be filed 14 pages of direct testimony in this proceeding on March 1st, 2017?

A Yes.

Q Do you have any changes to that testimony?

A No.

Q If I asked you the same questions that were posed in your prepared testimony, today, would your answers be the same?

A Yes.

MS. MONCADA: Madam Chair, I would ask that Mr. Brannen's March 1 direct testimony be inserted into the record as though read.

CHAIRMAN BROWN: We will go ahead and enter into the record Mr. Brannen's March 1 prefiled direct testimony.

MS. MONCADA: Thank you.

(Prefiled direct testimony inserted into the record as though read.)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

TESTIMONY OF WILLIAM F. BRANNEN

DOCKET NO. 170001-EI

MARCH 1, 2017

Q. Please state your name and business address.

A. My name is William F. Brannen. My business address is NextEra Energy Resources, LLC ("NEER"), 700 Universe Boulevard, Juno Beach, Florida, 33408.

Q. By whom are you employed and what is your position?

A. I am employed by NEER as a Senior Director for Project Engineering and Due Diligence.

Q. Please describe your duties and responsibilities in that position.

A. I manage the development and implementation of engineering, technology selection, and execution strategies for universal solar and distributed generation projects for NextEra Energy, Inc., the parent of Florida Power & Light Company ("FPL") and NEER. I am responsible for coordinating the activities of project team members to optimize the value of projects by leveraging technology advances, market dynamics, and supplier relationships during the early stage due diligence, permitting, engineering, and execution phases of solar projects. My goal is to ensure that development projects meet

or exceed reliability and performance requirements while maintaining reasonable costs.

Q. Please describe your education and professional experience.

A. I earned both a Bachelor and Master of Science in Civil Engineering from the University of New Hampshire. Additionally, I hold a Master of Business Administration from Nova Southeastern University. I have been a licensed professional engineer in the State of Florida since 1981. I have worked for FPL and NEER since 1979. During that time, I have worked in a variety of technical, operational, commercial, and management positions in areas related to power generation, engineering, and construction. I have experience in a wide range of power generation technologies including nuclear, combined cycle, wind, photovoltaic ("PV"), and concentrated solar thermal. Since 2009, I have been responsible for key aspects of the design and construction of all six of FPL's universal solar energy centers. The total capacity of these centers is approximately 333 MW, which is made up of a 74.5 MW solar thermal facility and just over 258 MW of PV facilities. In addition, I have served the same function for 350 MW of universal solar thermal projects in California and Spain, as well as more than 1,900 MW of universal solar PV projects throughout North America outside of Florida.

Q. What is the purpose of your testimony?

A. The purpose of my direct testimony is three-fold. First, I discuss FPL's experience designing, building, and operating universal solar generating units. Second, I describe the universal solar energy centers being constructed by

FPL, which are expected to begin commercial operation by December 31, 2017, and March 1, 2018. I provide a description of the centers, the technology, engineering design parameters, construction, operating characteristics, and overall costs and schedules. Third, I demonstrate that the cost of the components, engineering, and construction estimated for the proposed solar generation is reasonable and does not exceed $1,750 per kilowatt alternating current ("kW_{ac}"), the cost cap reflected in the Stipulation and Settlement approved by the Commission in Order No. PSC-16-0560-AS-EI.

Q. Please summarize your testimony.

A. My testimony demonstrates that the estimated cost to build the proposed solar generation is reasonable and is less than $1,750 per $kW_{ac.}$ Additionally, I testify that the solar energy centers will deliver high levels of efficiency and reliability to serve FPL customers.

Q. Are you sponsoring any exhibits in this case?

A. Yes. I am sponsoring Exhibits WFB-1 through WFB-7. The titles to each exhibit are shown below, and they are all attached to my direct testimony.

Exhibit WFB-1	Typical Solar Facility Block Diagram
Exhibit WFB-2	List of FPL Universal Solar Energy Centers in Service
Exhibit WFB-3	Maps, Property Delineations, and Aerial Photos of Proposed Solar Energy Centers
Exhibit WFB-4	Renderings of Proposed Solar Energy Centers
Exhibit WFB-5	Specifications for Proposed Solar Energy Centers

Exhibit WFB-6 Construction Schedule for Proposed Solar Energy Centers

Exhibit WFB-7 Construction Cost Components for Proposed Solar Energy Centers

Q. Please describe the solar PV generation technology that will be used.

A. The proposed solar generation will utilize solar PV panels that use a semiconductor material to convert sunlight to direct current ("DC") electricity. These panels will be tied together electrically in groups and connected to an electronic device called an inverter that transforms the DC electricity produced by the PV panels into alternating current ("AC") electricity. The voltage of AC electricity coming out of the inverter is increased by a series of transformers to match the transmission interconnection voltage. It should be noted that the inverters will be mounted in pairs with a medium voltage transformer on an equipment skid called a Power Conversion Unit ("PCU"). Exhibit WFB-1 provides a typical block diagram depicting the basic layout of major equipment components that will be used.

Q. What level of operating efficiency is anticipated for the proposed solar generation?

A. The panels utilized at the solar energy centers will convert sunlight into DC electricity at a conversion efficiency greater than 17.3%. Due to recent technology and manufacturing advances, this conversion efficiency is significantly higher than the 16% conversion efficiency of panels more commonly available in the U.S. market for universal solar applications. Also,

the inverters convert DC to AC electricity at a high efficiency. The average California Energy Commission efficiency rating (the industry recognized standard applied to solar inverters) for the proposed inverters is greater than 98.4%. The expected long-term availability will be 99.5%. Due to inverter design improvements and upgrades to control systems hardware, the number of PCUs required for each center has been reduced from 40 to 35. This reduction is an improvement over the number of PCUs installed in FPL's 2016 solar energy centers. These improvements help lower cost and reduce the footprint of the solar facilities. The combination of quality equipment and high availability from these state of the art solar energy centers will benefit customers.

Q. Are there other operational advantages for the solar energy centers?

A. In addition to the operating efficiencies I have discussed, there are a number of other operational advantages such as (i) the use of highly efficient panels and inverters reduces the size of the facility footprint thus minimizing land disturbances and lowering construction costs, (ii) generating electricity using PV technology does not require any fuel other than sunlight and thereby eliminates any air emissions, and (iii) the PV equipment used in universal solar facilities does not require any plant outages to perform maintenance, which contributes to the high availability of the proposed solar generation. Later in my testimony, I discuss a number of other benefits that will result from the construction of these centers.

Q. Does FPL have experience in designing and building universal solar facilities?

A. Yes. FPL has extensive experience in designing and building universal solar generation facilities. FPL has completed universal solar generation facilities at six centers totaling approximately 333 MW_{ac} since 2009. The existing FPL universal solar facilities range in size from 10 MW_{ac} to 74.5 MW_{ac}. Exhibit WFB-2 provides a list of the FPL universal solar centers in service.

Q. Please describe the history of FPL operating universal solar facilities.

A. FPL has been operating universal solar generation facilities since 2009. The FPL operations team has successfully handled the challenges presented by a wide range of environmental conditions, such as high-wind forces from hurricanes, extended periods of high temperatures and humidity, and significant potential for lightning and extreme rain. The FPL team has leveraged this broad range of experiences to develop cost-effective designs and a very robust and industry-leading operations plan.

Q. Please describe FPL's track record in building and operating universal solar PV.

A. FPL has completed five universal solar PV facilities at five centers since 2009. These facilities were completed an average of 28 days early, at a total cost of $660 million - 5.2% below the cumulative budget. In addition, each center was completed below budget. The universal solar PV centers built and operated by FPL are meeting or exceeding performance expectations.

Q. Please describe how FPL monitors the operational performance and reliability of its power plants.

A. FPL uses advanced monitoring technology and performance analysis tools to optimize plant operations, gain process efficiencies, and deploy technical skills as demand for services increases. For example, the Company's Fleet Performance and Diagnostics Center ("FPDC") in Juno Beach, Florida, provides FPL with the capability to monitor every plant in its system. The FPDC uses advanced technology to identify problems, often before they arise, and allows the operating teams the opportunity to prevent or mitigate the effects of failures. FPL compares the performance of like components on similar generating units and determines how to make improvements, which often avoids problems before they occur and improves service reliability for FPL customers. Live video links can be established between the FPDC and plant control centers to immediately discuss challenges that may arise, thus enabling FPL to prevent, mitigate, or solve problems.

Q. Please identify the solar energy centers that will be placed in service by the end of 2017.

A. Four centers are scheduled to be placed into service by December 31, 2017. These are Coral Farms in Putnam County, Wildflower in DeSoto County, Horizon, which spans Putnam and Alachua Counties, and Indian River in Indian River County. Each center is more fully detailed in Exhibits WFB-1, WFB-3, WFB-4, and WFB-5.

Q. Please identify the solar energy centers that will be placed in service in 2018.

A. Another four solar centers will be placed in service by March 1, 2018. These are Loggerhead in St. Lucie County, Barefoot Bay in Brevard County, Hammock in Hendry County, and Blue Cypress in Indian River County. Each center is more fully described in Exhibits WFB-1, WFB-3, WFB-4, and WFB-5.

Q. Please describe the design of the proposed solar generation.

A. The proposed solar energy centers will each have a nameplate capacity of 74.5 MW_{ac}, and each will have a separate point of interconnection. The proposed solar generation will require the installation of 280 PCUs and more than 2,600,000 PV panels. The panels will be supported by a fixed-tilt structural system. Exhibit WFB-5 provides more details regarding the design specifications.

Q. How will the solar energy centers be interconnected to FPL's transmission network?

A. As noted earlier, each of the eight centers has an individual point of interconnection to the FPL transmission system. The transmission interconnection schemes to be implemented at each center are similar. Options were considered and the most cost-effective alternatives were selected. New collection substations with step-up power transformers will be constructed for each of the centers. The step-up power transformers increase the AC voltage from 34.5 kV to the voltages at the transmission point of

interconnect. Interconnection voltages range from 115 kV to 230 kV depending on the center. Each of the new collection substations will be connected to the bulk transmission system at the corresponding point of interconnection by generation tie lines that vary in length from 500 feet to five miles. Seven of the tie lines are less than three-quarters of a mile in length. Each center will require a different scheme to facilitate its connection to the bulk transmission system. These range from expanding existing substations to accommodate the interconnection to the construction of new transmission substations. The estimated capital construction cost for each of the centers includes the cost for its individual interconnection configuration. It is important to note that no upgrades to the existing FPL transmission system are required to accommodate the proposed solar energy centers.

Q. What is the proposed construction schedule?

A. As I mentioned earlier in my testimony, four of the centers will be placed in service in late 2017 and another four will be placed in service by early 2018. Engineering, permitting, procuring equipment, engaging contractors, construction and commissioning will exceed twelve months. This construction period includes the time necessary to prepare the sites for each of the centers, construct roads and drainage systems, install solar generating equipment and fencing, and build the interconnection facilities. The construction schedules support the proposed commercial in-service dates. Exhibit WFB-6 provides more details regarding the construction schedules.

Q. As of March 1, 2017, what is the status of the certifications and permits required to begin construction for the centers that will be placed in service in 2017?

A. Applications for the required environmental permits have been submitted, and all four required environmental permits have been issued. Also, applications for the required zoning and special exceptions have been submitted. Three of the four zoning changes and special exceptions have been granted, and the remaining one is expected to be granted well in advance of the date required to support the construction schedule.

Q. As of March 1, 2017, what is the status of the certifications and permits required to begin construction for the centers that will be placed in service in 2018?

A. Applications for the required environmental permits have been submitted. Three of the four required environmental permits have been issued, and the remaining permit is expected to be issued well in advance of the date required to support the construction schedule. Also, applications for the required zoning, special exceptions, and comprehensive plan amendments, which are required for two of the centers, have been submitted.

Q. What is FPL's estimated cost for the proposed solar generation?

A. As shown in Exhibit WFB-7, FPL estimates the cost of the centers that will be placed in service in 2017 will be $435 million, or $1,461/$kW_{ac}$, and the cost of the centers that will be placed in service in 2018 will be $457 million, or $1,534/$kW_{ac}$. FPL has already secured fixed pricing for the supply of all the

required equipment and materials, as well as fixed pricing for engineering and construction of the solar facilities and is in the final stages of securing fixed pricing for the interconnection facilities.

Q. Can you explain why the capital costs to construct the centers scheduled to be placed in service in 2018 are higher than the capital costs for those that will be placed in service in 2017?

A. Yes. There are two major factors that contribute to higher capital costs. The first is that the land costs are higher. The second is that there are higher engineering and construction costs due to site specific development and construction requirements.

Q. Are the costs for equipment, engineering, and construction for the proposed solar generation reasonable and prudent?

A**.** Yes.

Q. What is the basis for your conclusion?

A. In late 2016, FPL solicited proposals for the supply of the PV panels, PCUs, and step-up power transformers as well as the engineering, procurement, and construction services required to complete the proposed solar energy centers. The scope of services for the engineering, procurement, and construction solicitations included the supply of the balance of equipment and materials.

For panel supply, FPL requested proposals from eight large, industry-leading suppliers. All of the bids that were submitted satisfied the requirements of the request for proposals, and accordingly, all were evaluated. FPL was able to

secure all of the panels from the lowest cost evaluated bidder. In addition to offering the lowest cost and highest efficiency, this supplier demonstrated that it has among the highest product quality programs in the industry and an extremely strong financial security package offering in the form of letters of credit supplemented with a parent guarantee from a highly rated entity.

FPL solicited proposals from nine PCU suppliers. All but one of the proposals met the requirements of the request for proposals. This bid was eliminated from further evaluation, and the eight remaining bids were evaluated. FPL was able to secure the supply of all required PCUs from the lowest cost evaluated bidder.

FPL solicited proposals from ten industry-leading manufacturers of step-up power transformers. One of the bids did not satisfy the requirements of the request for proposals. The nine remaining proposals were evaluated. FPL secured the supply of all the required transformers with the lowest cost evaluated bidder.

Engineering, procurement, and construction ("EPC") proposals for the centers were solicited from thirteen industry-recognized contractors. Three of the bids did not meet the requirements of the request for proposals. Accordingly, the remaining ten proposals were evaluated. Based on the results of the bid evaluation, one contractor was selected for the generation with a 2017 in-

service date, and a second contractor was selected for those with a 2018 in-service date. Each contractor was determined to be the lowest cost evaluated bidder. Competitive solicitations for the construction of the interconnection facilities are in process and will be finalized in the near future.

The bids from the PV panel, PCU, and step-up power transformer suppliers, as well as those received from the EPC contractors, were high quality and extremely competitive. The competitive bidding process has provided assurance that costs for equipment, engineering, and construction for the proposed solar generation are reasonable.

Q. What other benefits are associated with the solar energy centers?

A. There are a number of other benefits associated with the solar energy centers. For example, building the centers will create about 1,600 construction-related jobs, which will in turn provide an economic boost to local businesses. The contractors building the solar energy centers are required to exercise reasonable efforts to use local labor and resources. The PV equipment does not create any emissions and does not consume any water, and the site configurations create minimal, if any, visual impacts. Lastly, the only source of noise during the course of operation is from the inverters and transformers. These pieces of equipment produce a minimal level of sound, all of which is well within the limits of applicable regulations.

Q. Are FPL's projected costs and construction schedules reasonable and below the cost cap of $1,750/kW$_{ac}$?

A. Yes. The projected costs and construction schedules are reasonable, and the projected costs for each center are below the prescribed cost cap.

Q. Does this conclude your testimony?

A. Yes.

BY MS. MONCADA:

Q Mr. Brannen, did you have WFB-1 through WFB-7 attached to your direct testimony?

A Yes.

Q And on June 14th, did you file an updated WFB-4, which includes a rendering of the Wildflower Center?

A Yes.

Q Were these prepared under your direction or supervision?

A Yes, they were.

MS. MONCADA: Thank you.

Madam Chair, I would note that these have been identified on staff's list as Exhibits 37 through 43.

CHAIRMAN BROWN: Thank you for noting that.

BY MS. MONCADA:

Q Mr. Brannen, did you also cause to be filed three pages of direct testimony on August 2nd, 2017?

A Yes.

Q Do you have any changes to that testimony?

A I do not.

Q If I asked you the same questions that were posed in that testimony, today, would your answers be the same?

A Yes.

MS. MONCADA: Madam Chair, I would also ask that his August 2nd testimony be entered into the record as though read.

CHAIRMAN BROWN: We will go ahead and enter Mr. Brannen's prefiled August 2nd testimony into the record as though read.

MS. MONCADA: Thank you.

(Prefiled testimony inserted into the record as though read.)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

TESTIMONY OF WILLIAM F. BRANNEN

DOCKET NO. 20170001-EI

AUGUST 2, 2017

Q. Please state your name and business address.

A. My name is William F. Brannen. My business address is NextEra Energy Resources, LLC ("NEER"), 700 Universe Boulevard, Juno Beach, Florida, 33408.

Q. By whom are you employed and what is your position?

A. I am employed by NEER as a Senior Director for Project Engineering and Due Diligence.

Q. Did you previously submit direct testimony in this proceeding?

A. Yes, I submitted direct testimony in this proceeding on March 1, 2017, which included Exhibits WFB-1 through WFB-7.

Q. Are you sponsoring any additional exhibits?

A. Yes, I am sponsoring the following additional exhibit, which is attached to this testimony:

Exhibit WFB-8 Updated Construction Costs for Proposed 2017 and 2018 Projects

Q. What is the purpose of your testimony?

A. The purpose of my direct testimony is to provide updated construction costs

for the solar energy centers expected to begin commercial operation by December 31, 2017 ("2017 Project"), and the solar energy centers expected to begin commercial operation by March 1, 2018 ("2018 Project"). My direct testimony will also demonstrate that the updated cost estimates continue to be reasonable and do not exceed $1,750 per kilowatt alternating current ("kW_{ac}").

Q. Please explain why you are providing updated costs.

A. As described by FPL witness Juan Enjamio, the Florida Legislature recently enacted property tax exemptions for qualifying solar facilities, which resulted in a change to the assumptions included in FPL's cost-effectiveness analysis. That change prompted FPL to evaluate the status of its projected construction costs for the 2017 and 2018 Projects. Since the time of my March 1 testimony, the competitive solicitations for the construction of the interconnection facilities and the detailed design for the 2017 and 2018 Projects have been completed. FPL was able to secure lower than anticipated pricing for the interconnection facilities. Additionally, during the detailed design for the solar energy centers, FPL was able to incorporate cost-effective alternatives and eliminate certain construction risks, which further reduced the projected construction costs.

Q. What is the reduction of the projected cost resulting from the factors described above?

A. The completion of the detailed design and competitive solicitations for the construction of the interconnection facilities for the solar energy centers

reduced the projected construction cost by $16 million for the 2017 Project and $14 million for the 2018 Project.

Q. Please provide FPL's updated estimated costs for 2017 and 2018 Projects.

A. As shown in Exhibit WFB-8, the cost for the solar energy centers that will be placed in service in 2017 is now projected to be $419 million, or $1,405/$kW_{ac}$, and the cost for the solar energy centers that will be placed in service in 2018 is now projected to be $443 million, or $1,485/$kW_{ac}$. Additionally, the capital cost for each solar energy center will be less than or equal to the values in Exhibit WFB-7 to the March 1, 2017 testimony.

Q. Are FPL's updated cost estimates for the proposed solar energy centers reasonable?

A. Yes. The updated cost estimates strengthen my original conclusion that FPL has a robust cost-control process that identified and allowed FPL to act upon opportunities to achieve savings on construction costs for the proposed solar energy centers. FPL's efforts have resulted in costs that are projected to be well below the $1,750/$kW_{ac}$ cap prescribed in the Stipulation and Settlement approved by the Commission in Order No. 16-1560-AS-EI.

Q. Does this conclude your testimony?

A. Yes.

BY MS. MONCADA:

Q And Mr. Brannen, did that include -- did that testimony include along with it WFB-8?

A It did.

MS. MONCADA: And I would note that this exhibit, Madam Chair, is identified on staff's list as No. 44.

CHAIRMAN BROWN: Thank you for noting that.

BY MS. MONCADA:

Q Mr. Brannen, could you please provide an oral summary of your testimony to the Commission.

A Yes.

Good afternoon, Chairman Brown and Commissioners. FPL has substantial experience designing, building, and operating universal photovoltaic solar-generating units, which includes the successful construction and operations of five centers, totaling about 258 megawatts between 2009 and 2016.

FPL has leveraged its broad range of experience to develop cost-effective designs and an industry-leading operations plan for the 2017 and 2018 solar projects.

My testimony lays out the resulting details of these projects, including technology, construction schedule, and cost. The quality and dependability of

the equipment being stalled -- installed at each of the centers will deliver high levels of efficiency and reliability to FPL's customers.

The competitive bid process FPL used to select equipment suppliers as well as engineering and construction contractors assures that -- reasonable costs for each of the projects.

Additionally, the cost for each project, as well as the cost for each individual site, is significantly below $1,750-kilowatt -- per kilowatt. The cost cap approved by the Commission is part of FPL's 2016 rate-case settlement.

Thank you very much.

MS. MONCADA: Thank you, Mr. Brannen.

Madam Chair, he's available for cross.

CHAIRMAN BROWN: Thank you. And welcome.

THE WITNESS: Thank you.

CHAIRMAN BROWN: Mr. Moyle.

MR. MOYLE: Thank you.

CHAIRMAN BROWN: You're up.

MR. MOYLE: Thank you. And thank you for the -- for the break.

EXAMINATION

BY MR. MOYLE:

Q Good afternoon, sir.

A Good afternoon.
Q Are you testifying as an expert?
A Yes.
Q In what areas?
A Construction, construction costs, performance, and technology of the solar units -- solar projects.
Q Okay. You have familiarity with other -- other types of power plants as well, do you not?
A I do.
Q Including -- including gas -- gas units?
A Yes.
Q And you're employed by NextEra Energy Resources?
A Yes. I work in a -- in a group that's a shared resource between FPL and NextEra Energy Resources.
Q Okay. And -- and does -- you call it "NEER;" is that -- is that what you refer it to?
A That works, yes.
Q Okay. Do they -- are they doing solar projects in other jurisdictions besides Florida?
A Yes.
Q Where -- where?
A California, Arizona, Nevada, Georgia, Ari- -- Alabama. We're pursuing projects in the northeast,

Texas, Minnesota, New York, to name a few.

Q How many -- how many megawatts of solar does NEER have installed as of today?

A Including -- well, there's two types of solar that NEER owns and operates. There's the solar thermal and photovoltaic. And there's about 1900 megawatts of photovoltaic solar that's in operation in the --

Q And the thermal is just the one unit at Martin?

A No. No. No. That's -- that's FPL. NextEra has solar thermal units in California and in Spain.

Q And you are familiar with and work on all of the -- these units on behalf of -- of NEER?

A Yes, I've had the opportunity to work on all of NextEra's solar projects, both FPL and NEER.

Q Okay. And -- and in -- what is exactly is your role in -- in the F- -- FPL's solar projects?

A My role in the FPL solar projects is essentially the same as it is in the NEER projects. And I manage the development and implementation of technology selection, engineering, and execution strategies for universal solar, and distributing generation projects, as I said, for companies to ensure those projects meet or exceed performance requirements and reliability requirements and -- while maintaining

reasonable costs.

Q And -- and there are, I guess, a lot of choices that have to be made when doing a -- a solar project with respect to technology; is that fair?

A Yes.

Q And you've seen solar panels become more and more efficient over time, correct?

A Yes, since I first got involved with solar in 2007, I've seen very significant improvements in the technology, not just for the modules, but for other components as well.

Q Okay. I -- I'm told -- and I'm not an expert in -- in many things, but -- with respect to solar, I'm surely not, but I heard -- I understand there's -- there's two types of solar panels. There's what they called a fixed tilt, and then there's also a tracking. Are there more than those two?

A Within the category of tracking, there's at least two types. There's a single-axis tracker where, basically, the trackers rotate from east to west as the sun comes up and travels across the sky.

And then there's what's called a two-axis tracker where -- it -- the panel is always pointing at the sun, wherever it is in the sky.

Q Okay. And -- and what are the -- what's the

project- -- the proposed technology that is being used on the FPL SoBRA projects?

A For the 2017 and 2018 projects, the technology is fixed tilt.

Q And the main difference there is that the fixed tilt do not give you as much energy because they don't follow the sun. They're set in a static position; is that -- is that fair?

A It's -- it -- it depends. Yes and no. The choice of the kind of support technology, whether it's fixed or tracked or -- is dependent on a couple of different variables, the big one being the cost of the modules.

As module costs go down and you can install -- and I'm going to make a little bit of a left-hand turn here and -- and talk about watts DC because we're -- I think we're all used to talking about the capacity of a plant in watts -- or megawatts AC, but solar panels produce DC electricity. And everything is sold in the metric that is used as installed watts DC. And you always in store -- install more watts DC than the AC nameplate capacity.

So, what happens is, as module prices go down, when we run the economic analysis of the cost analysis, you tend more towards using fixed tilt because you can

make up for the energy-production gain you would typically get with a tracker by just installing more DC.

And we basically run iterations to figure out whether it makes more sense to have a tracker with a lower-installed DC capacity or a fixed tilt with higher-installed DC capacity to yield the most value.

Q Okay.

A Hopefully that makes sense.

Q I -- I think so. Just to -- just to make sure I understand, essentially, it's a run-the-numbers type of proposition and -- and it's more economical, you -- you believe, to go with fixed tilt as compared to the -- the tracking kind because you can add some more to make up for the capacity --

A Yes.

Q -- as compared to the increased capital costs?

A Yeah, based -- based on the -- the costs that we had for the various components for the '17 and '18 projects, that was the answer that we ended up with.

Q Okay.

A And keep in mind, that could be different, given a different cost structure.

Q All right. Do you think that is changing? Do you have any information to suggest that maybe -- maybe -- maybe that's changing as things move forward?

MS. MONCADA: Maybe what's changing? I'm sorry. I don't understand the question.

CHAIRMAN BROWN: Mr. Moyle --

MR. MOYLE: That --

CHAIRMAN BROWN: -- can you re- -- rephrase it?

MR. MOYLE: That -- sure.

BY MR. MOYLE:

Q That -- that was referenced to the -- to the fixed tilt versus the tracking types of solar. You know, I understood your answer to express a preference, largely economical in fixed tilt, as compared to tracking. I was just curious as to whether that -- you could foresee that changing at some point in the future.

A I think it's possible that it could change, but I'm -- it's very hard to predict the future. Again, one of the big variables is the cost of the panels. Another variable is the irradiance, the amount of sunshine, solar energy that's available at a site, so -- it's a -- it's an it-depends answer.

Q Okay. And you keep up -- you keep up with -- with energy developments in the industry, not only renewable, but -- but other developments; do you not?

A Yes, generally.

Q Okay. And -- and did you -- do you have

information about the Department of Interior making an announcement yesterday with respect to planning an additional oil and gas lease that would include Texas, Louisiana, Mississippi, Alabama, and Florida?

A Yes, only to the extent that you brought it up earlier.

(Laughter.)

Q I'll take that.

Okay. Do you -- is that something that you all track? I mean, do you all take into consideration what is out there with respect to potential supply?

A Not with respect to coming up with the -- what the lowest cost, best layout, best design would be for a solar facility.

I think Mr. -- Witness Enjamio talked about how future gas prices are included in the analysis FPL performs.

Q Yeah, just with respect to -- to your employer, NEER -- you know, the fact that there's going to be a -- if you -- if you believe what you read in the newspaper -- 141 trillion cubic feet of natural gas made available, would -- would that be something that you would consider in business decisions with respect to your operations?

A No. That's not something that I would

consider, but that is something that is evaluated by others within the company.

Q Okay. And what's the -- when we do this pricing, it's -- 1750 per kW AC is in the SoBRA agreement, right?

A Yes.

Q Okay. So, what -- you -- you talked a little bit about the -- the DC-AC distinction. And I thought you said that -- that when you described it in AC, alternating current, you have to make a conversion to -- to DC; is that right?

A Yes.

Q All right. So -- so, what would be the -- the factor -- how would you convert -- if I said, I don't really care about AC; I want to -- I want to do a common currency; what's the -- what's the monetary amount per kilowatt DC -- how would you -- how would you do that?

A You would -- okay. I just need to think about this for a second, make sure I get it going the right direction. So, the -- you would divide the AC costs per kilowatt by what's called the DC-AC ratio. The DC-AC ratio is watts DC installed, divided by the AC capacity of the plant.

Q Can you provide just a -- kind of a rough thumbnail with respect to what -- what -- if you convert

it to DC, does the cost go up or down?

A It goes down.

Q It -- it goes down.

And -- and -- the use of the AC -- that's common in the industry? They don't convert it when they're talking about costs?

A The -- so, the only -- that's correct. The only reason that we talk about DC at all is that the module suppliers are basically selling a device that produces DC power. And that's how they value it. But as far as a plant operator, such as FPL, is concerned, we live in the world of AC.

Q Okay. Have -- what's -- what's the lowest-cost project that you've brought in to date? Solar project.

A The lowest-cost projects to date are the ones that were being considered for the 2017 and 2018 solar projects for FPL.

Q So, all of your -- your NEER projects -- they were all above that -- that number?

A Yes.

Q And -- and you -- you tracked the cost closely with respect to solar and for those projects, correct?

A That's correct.

Q And your -- your -- I -- I viewed your

testimony and kind of -- I know it was -- is that you're the person responsible for bringing the projects in and online and getting them functioning; is that fair?

A That's fair.

Q Okay. And -- and are there any costs that are not part of what you're requesting this Commission to approve?

A There are no costs --

Q Okay.

A -- that were -- that are not included in the request.

Q All right. And do you expect that, at some other point, that somebody may come back in and say, oh, we didn't -- you know, we didn't include "X" or "Y;" we -- we omitted this and we would like to get those -- get those now? Is that something that could be expected or no?

A That's not going to happen.

Q Okay. And with respect to land, did you go out and buy new land? I say, new land -- land that you didn't already have in inventory for all these projects?

A So, the -- the -- yes, the parcels for each of the eight sites were purchased after a process of going through and identifying what locations would be suitable and meet all of the screening criteria that have been

established for siting solar facilities.

And we -- once we had identified those locations -- within those locations, we identified candidate parcels, preferably for the one owned by one landowner to reduce the administrative costs, to go and acquire the land with an adequate fit for what ultimately the plant -- however the plant may be designed in the future.

Q When you acquired land, did you have appraisals performed on the land to help determine the value?

A Yes, appraisals are performed.

Q And you sited your facility -- some in your service territory and others outside of your service territory?

A No, they are all in the service territory.

Q They are?

A Uh-huh.

Q Is there anything that prevents you from siting it outside of the service territory?

A There's none that I'm aware of, but then again, that wouldn't be where I would have expertise.

Q Okay. I -- I was unclear -- on Page 4 of your testimony, Line 20 --

A You're referring to my March 1st testimony?

Q That's right.

A Okay.

Q And -- and you touched on it a little bit, but you're talking about converting sunlight into DC energy, you know, 19-20. And you used a conversion efficiency greater than 17.3 percent. I was unclear, is that 17.3 percent -- of what?

A Okay. That's a -- that's a good question. Let me try and explain. So, the conversion efficiency for solar modules is basically a measure of how much of the solar energy that's striking the surface of the panel is being converted to DC electricity.

So, for example -- and -- and the standard that's used in the industry is solar energy at a thousand watts per meter squared. The way that they test modules is they have a device that actually flashes a light -- much like a camera flash bulb -- generates a thousand watts per meter squared. They measure the DC output. And what this means is that, for that panel, it's converting 17.3 percent of the available solar energy to DC electricity.

Q And -- and I mean, that doesn't sound very efficient to a layman like me. Is it?

A In the world of solar panels, it is. And it's a lot more efficient than the panels, say, four or five

years ago when a conversion efficiency of 14 percent was considered good.

Q Okay. And -- and then -- then, I was trying to understand that vis-a-vis your -- your reference to, I think, a California energy-efficiency commission -- that's over on the next page -- with respect to a 99.5 or a 98.4.

What -- what is -- what is the California energy-efficiency rating? How does that relate, if it does, to the -- to the 17.3-percent figure?

A Okay.

Q Or maybe it doesn't.

A So -- well, it -- not directly. The 17 -- 17.3-percent efficiency is a measure of the effectiveness of the module, itself.

The 98.4 California Energy Commission efficiency, which happens to be an industry standard, is basically the efficiency with which a device called an inverter converts the DC electricity to AC electricity. So, there are some losses when that conversion is made.

Q Okay. You made comments about op- -- the history of FPL operating universal solar facilities. What's the -- what's the use of the term "universal"? You made it in your opening comments. What does "universal" designate?

A "Universal" is a term that's used in the industry to denote it's a facility that is tying into the transmission system. It's not behind the meter, so to speak. It's typically large-scale ground-mounted; typically more than 20 megawatts, but not necessarily, as opposed to distributed generation, which is typically behind the meter and much smaller in scale and could be rooftop or carports, but could also be ground-mounted.

Q And you're involved in both?

A I am.

Q Distributed and -- and the other?

A I am.

Q And -- and you had provided some testimony that said, when you all are doing maintenance on your solar fields, that you can continue to operate them and run them; is that right?

A That's correct. Solar facilities -- universal solar facilities are very modular. For example, each one of the sites will have 35 power conversion units, which include the inverters that transform the DC to AC electricity.

So, at any one -- and there are two inverters within each power conversion unit. So, at any one time, if maintenance is needed, you can actually isolate it down to the 1/70th of the plant output. And typically

that kind of work would be done at night when the plant wasn't required to produce electricity.

Q Now, on a -- in a -- in a related matter, can -- can you also isolate distributed renewable generation as well with a switch?

A That would -- yes and no. That would depend on the actual configuration and size. Sometimes yes, sometimes no.

Q And it's an engineering issue?

A It's an engineering and a size issue.

Q Okay. You -- you -- you've said that it is a challenge to operate in high temperatures and humidity, as I read your testimony. I mean, that's -- that's no surprise to people living in Florida. We have high temperatures and high humidity, right?

A That's correct.

Q Why -- why does that present challenges for you?

A There's a challenge -- there's challenges with -- for example, there's a lot of steel out in the plant; so, selecting the right coatings for the steel to avoid corrosion in a high-hum- -- high-humidity environment.

High temperatures cause degradation of components; so, again, selecting and specifying the

right materials for the components so that they're not affected by the high temperatures, as opposed to other locations such as the northeast or the northern tier states where there's a different set of challenges.

Q Yeah. You had some comments in your testimony about video links that you had back in -- in Juno; is that right? This is Page 7, Line 13.

A Yes.

Q All right. Do you all have video links on the solar fields or were you talking in general terms with respect to video links?

A We do have video links that we can scan, pan, and get views, not -- not necessarily up-close to an individual module, but also, if we do have personnel in the field, we have video links. So, if they're out troubleshooting a problem, they can access the technical expertise that's sitting in Juno.

Q When you say "module," is that the same as panel?

A Yes, I'm sorry. I'll -- I'll use "panels."

Q You can use "module." I just wanted to make -- make sure the record was clear that they're the same thing.

All right. If you would, just give me a minute. I think I've covered -- covered most of the

topics -- oh, how did -- how did all of your panels fare with respect to Hurricane Irma?

A Okay. So, we had almost a million -- just under a million of the modules, panels, installed at the time. There were approximately 4,000 -- just a few more than 4,000 that were damaged. That was primarily because these sites are still under construction -- I'm assuming you're referring to the 2017 and 2018 projects?

Q That's right.

A They're still in -- they weren't necessarily complete. The vast majority of the modules that were damaged were damaged because not all the connecting clips were installed yet. And so, they -- some of them broke loose.

I believe a better indication of how our plants would perform under those circumstances is with the existing units, where we have over a million modules that were installed and there were 41 that were damaged.

Q And -- and what are they rated to, when you install? I mean, are they rated to a hundred? 120? Do you know?

A I do know. And it's -- it's a -- it's a -- it's a difficult question to answer, maybe, because of the way that engineers apply the wind loads. First of all, each site has a different wind load because of its

location. It's -- it's got a different wind-load requirement.

And if I remember correctly, the wind -- the equivalent wind velocities that are used in the structural design range from, I believe, 115 to 185 miles per hour, depending on the location.

I would like to caution, however, that that has no correlation to the wind velocities that most people are used to associated with the Saffir-Simpson Scale. It's a different criteria.

Q Do you know -- do you know how?

A Do I know how -- I'm sorry.

Q I mean, I would think wind is wind. And if it's blowing 120, you know, it's -- it's coming hard, regardless of --

CHAIRMAN BROWN: Wind is not just wind.

Q -- the scale.

A Yeah, hence a little bit of my hesitation when you first asked the question. The Saffir-Simpson Scale was developed a number of years ago as a risk-assessment tool. And that talks about sustain- -- sustained wind velocities in structural design.

And at one time in my life, in a prior life, I was a structural engineer. So, you'll have to suffer through with me because I get excited about this stuff,

but -- but in structural design, we have to account for wind gusts. We have to account for shape factors. We have to account for a number of things.

It's all converted to a -- an equivalent wind velocity, as I said, that has no correlation to what you see on the Saffir-Simpson Scale.

Q Okay. So, it's a separate -- it's a separate, metric, if you will, with respect to wind and then how it impacts solar --

A Yes. Yes, it is. It's an industry standard. And the American Society of Civil Engineers actually has a process that structural engineers all throughout the country use for determining what wind loads need to -- would be applied for various kinds of structures.

Q How much do land costs go up in '18 compared to '17? If you had to -- just in terms of percent, if you know.

A I don't know, offhand, the dollars per acre, since each of the -- I know what the total land costs were, but I don't know the dollars per acre. So, I -- I don't think I can give you a fair answer to that question.

Q Yeah, and I just -- just to circle back -- your '18 costs are higher than your '17 costs. And you said --

A They are.

Q -- two reasons, land costs and -- and higher engineering construction costs?

A Yes, there were certain features associated with some of the '18 sites that resulted in a little bit higher unit costs for installation as compared to the '17 sites.

Q And same question with respect to engineering and construction costs. What do those go up by, percentage-wise?

A If you will, bear with me one minute, please (examining document). One more second, please.

It appears to be about 2.5 percent.

Q Two-and-a-half. Is that consistent with what you're seeing in your other projects around the country?

A The reason -- that was not so much driven by -- or actually, it was not driven by equipment costs. It was more driven by the layouts. And so, it had to do with the location of wetlands that we needed to work around on the '18 sites, easements that we were dealing with. So, it had more to do with layout than it did with the -- it had nothing to do with the cost of the equipment.

Q Yeah, so -- so, on -- like, for example, this is on your WFB-3, Page 4 of 9 -- this is the Indian

River facility, 695 acres. You see it?

A I'm almost there. Yes.

Q So, it looks to me like approximately half -- a little less than half of the property is used; is that fair?

A So, I think -- yes, if you refer to Interrogatories -- I think it's 61 and 71. There's an explanation of the -- what's on the property and what's -- what was used.

Q Why -- why would you not put panels on the remainder?

A Okay. So --

Q And again, this is referencing WFB-3.

A Uh-huh. If you bear -- I just want to refresh my memory. If you would, bear with me just a minute (examining document).

So, that -- as -- as Mr. Enjamio stated earlier, we had determined that the most-expedient schedule -- and schedule was important -- was that we were going to build a 74-and-a-half megawatt site. And it just so happens that, at Indian River, there's a natural boundary. There's a road easement right at the south side of that site.

And the one figure that you had -- that you just referred to is a little bit misleading. That is

the -- it looks like probably 60 percent of the site is being used and, then, the remainder of the site is bisected by some drainage structures that would have made any additional construction, even if we were to go larger, less cost-effective.

Q So, flip the next page to DeSoto County, 721 acres. It looks like there's a lot of additional room on that tract as well; would you agree?

A I -- just -- give me just a second, please. Which page did you say?

Q This is -- this is WFB-3, Page 5 of 9, from your March testimony.

A This is the Wildflower site?

Q Yes.

A Okay. So, one of the things that you can't see in that aerial is that the -- the land where the solar panels weren't installed has islands and fingers of wetlands breaking the site up into somewhat of a patchwork quilt that would make it inefficient to build there.

Q Are -- are they all like that? I mean, there -- or is this part of the 74-point --

A No --

Q -- you know, five?

A Actually, when you go through each one of the

sites and you look at the land that wasn't used -- some to a greater extent, some to a lesser extent -- they all have features, either easements or wetlands or other things that -- that break the sites up that make them not a prime candidate for efficient construction and efficient layout.

Q If you had improved pastureland and there were no wetlands and -- and other issues, would you go ahead and put solar on just about the whole property, if there were no restrictions?

A But for the -- but for the strategy of -- of limiting the size of the sites to 74-and-a-half megawatts so that we could save six to eight months on the schedule, you could do that.

Q Have you looked at -- at dividing, subdividing the property into two pieces of property and putting them in different names or anything?

A Well, as I -- as I said, for the 74-and-a-half megawatt layouts, for each of the sites, we were able to come up with efficient layouts. To use the rest of the land -- and each -- each site has its own story that goes along with it, why they're not necessarily efficient -- that -- that aren't -- they're not conducive to efficient layouts.

So, to -- to go back and consider using that

land for additional solar installations, there's either not enough land there to accrue the economies of scale, which is most of the cases, or there will be other sites that will yield a more-efficient, more-cost-effective layout.

Q Okay. It's more -- more cost-effective to still build natural gas combined cycle power than it is solar power, isn't it?

MS. MONCADA: Object to the question. That's outside the scope of Mr. Brannen's testimony. He does not compare technologies and their cost.

CHAIRMAN BROWN: Mr. Moyle.

MR. MOYLE: Well, I think that we were asking cost-effectiveness questions. I don't know if he has information on that or --

MS. MONCADA: He does not.

CHAIRMAN BROWN: Objection -- I don't -- I haven't seen it in the prefiled testimony. And that was the last witness is -- so, objection sustained.

MR. MOYLE: Okay.

BY MR. MOYLE:

Q On Page 11, you're asked: Are the costs -- of your testimony, you're asked: Are the costs for equipment and engineering and construction for the

proposed solar generation reasonable and prudent? And you answered yes.

You see that?

A Yes.

Q All right. Are "reasonable" and "prudent" synonymous terms, in your mind?

A I believe -- in my mind, no, they're not the same.

Q So, tell me the difference, in your mind.

A "Prudent" would mean that it's a wise choice. "Reasonable" means it's probably one of several that a reasonable person would find acceptable.

Q Do you have any responsibility for reserve margins?

A I do not.

Q So, if I asked you whether you thought it was wise to keep building solar if you were already way over your reserve margin, you probably wouldn't be able to answer it?

A That's correct.

Q All right. And then, on Page 12, you spent a lot of time going through about how, in procurement, you guys went with the lowest-cost-evaluated bidder in a whole bunch of areas, right?

A Yes.

Q Okay. And -- and that includes PCU. What does "PCU" stand for?

A PCU is a power conversion unit. And that basically is made up of two inverters that convert the DC electricity to AC electricity and a medium-voltage transformer that steps the voltage up to 34 five KV. And it's all mounted on a skid. It's a big, green box.

Q Is -- is that an FPL policy or a NEER policy to go with the lowest-cost-evaluated bidder -- who was otherwise qualified? I know you disqualified --

A Yes -- I mean, we wouldn't -- if we had concerns -- yes, the answer to your question is yes. And as you were alluding to, all bidders have to be qualified before we go out to them so that we know what quality requirements they can satisfy and to make sure that the equipment is going to be durable and robust enough to deliver the availability, reliability, and performance requirements.

Q Yeah, given that -- your answer, with respect to that policy, did you give any consideration or, as you're looking forward, you know, in -- and in 2021, in future years -- about seeking a competitive RFP-type process or proposal for third parties who could build the solar fields or sell you solar power?

A So, third parties are going to go out and

solicit the same kind of bids that we did, in many cases, from some of the same suppliers. There are not many, if any, third parties that have the leverage that FPL has because of the volume of business that we can bring to the table. These -- the 2017 and 2018 solar projects, understand, in the industry are considered very large and gives FPL great leverage.

In addition, a third party is still going to have to recover their profit and -- so, they're going to add costs to it. So, we are very confident that we've got favorable pricing in all the areas that we've identified here and that there wasn't a third party that would be able to deliver the energy at a lower cost.

Q And that -- that's based on assumptions that you're making, right? I mean, you haven't gone out and verified that through actually asking people to submit proposals?

A No, bearing in mind that, again, one of the things we were concerned about at the time was schedule and getting these projects completed before events could have occurred that would have increased the cost to the customers.

Q Right. And my question is designed to not focus on so much your schedule -- because you've got, you know, four years of this under the agreement. If --

if -- you know, and you do ten-year site plans. So, utilities plan on a long-term basis.

And I just was curious, given your policy, the FPL policy of receiving competitive proposals, whether -- whether, in your opinion, your expert opinion, whether seeking competitive proposals with respect to -- to solar would -- would be something that would be worth doing.

I mean, the ratepayers -- I've said in my opening, we don't care if FPL builds it or somebody else builds it. We would just like it to be the least expensive. I mean, it seems like, given your practice, that that might be a reasonable thing to do.

A Well, no. And you mentioned my expert opinion, and based on where I sit and what I've seen, I don't really see that FPL would be any better off seeking third-party proposals for this.

Q Based on -- based on --

A Based on my expert opinion, based on what I've seen in the industry, based on the fact that I work for the largest renewable company in the world, based on we are one of the largest, if not the largest, owner-operator of solar facilities in North America.

Q Yeah, but you don't have --

A So, I've seen quite a bit.

Q You don't have access to other people's pricing -- other -- other utilities? I mean, you're in California, PG&E -- they're not -- you don't have their pricing information, do you?

A From time to time, we are privy to a pricing information through project acquisitions.

Q Okay.

A "We" being NextEra Energy Resources, by the way.

MR. MOYLE: Okay. I would like to have one -- one minute. I think I'm done.

CHAIRMAN BROWN: One minute it is.

MR. MOYLE: That's all I have. Thank you.

CHAIRMAN BROWN: Thank you, Mr. Moyle.

All right. Staff?

MS. BROWNLESS: No, ma'am.

CHAIRMAN BROWN: Commissioners.

Commissioner Graham.

COMMISSIONER GRAHAM: Thank you, Madam Chair.

Good afternoon.

THE WITNESS: Good afternoon.

COMMISSIONER GRAHAM: A couple of quick questions for you. You said that you've been dealing -- dealing with solar since 2007.

THE WITNESS: Late --

COMMISSIONER GRAHAM: About ten years?

THE WITNESS: Late 2007, yes, sir.

COMMISSIONER GRAHAM: So, this same project, ten years ago, in 2007, would be -- five times more than it is now? Three times more? Rough numbers. I'm not going to hold you to it.

THE WITNESS: More than $6,000 per installed kW. So, about four -- four-and-a-half times more.

COMMISSIONER GRAHAM: Four-and-a-half times.

What about five years ago?

THE WITNESS: Five years ago, probably would have been -- but my gue- -- best recollection is probably, like, three times.

COMMISSIONER GRAHAM: And last year?

THE WITNESS: Last year, the same projects, if I recall correctly, were $1835 per installed kW.

COMMISSIONER GRAHAM: So, about one-and-a-half times?

THE WITNESS: So, about a third more.

COMMISSIONER GRAHAM: Third more.

Okay. How about as far as the efficiencies of the panels; how the technology has come along in the last ten years?

THE WITNESS: So, when I -- when I first started working, the kind of modules that we used

at -- we're using for the 2017 and 2018 solar projects probably had a conversion efficiency of 13 percent compared to 17.3 percent for these projects, which is -- the absolute value of the number may not sound like a lot, but that's -- that has a -- that brings tremendous value to the projects.

COMMISSIONER GRAHAM: And five years ago?

THE WITNESS: There -- they were probably 15-percent efficient.

COMMISSIONER GRAHAM: That's funny. Rough numbers, we usually use about 20, but that's just so I won't get into an argument with somebody about efficiency.

Back to some of the questions that Mr. Moyle was asking you about land acquisition and purchase. Have we thought -- have you thought about doing any joint products -- projects -- like here, at the airport in Tallahassee, they're going to put in solar panels -- because you have all that land out there that you can't build on, and so, it's land that you can probably not nec- -- not necessarily buy, but lease pretty inexpensively. Or I was just in Indianapolis last weekend, and there's several solar farms out there.

Have you looked into those sort of projects so you're not actually going out buying land and then have to put it on there?

THE WITNESS: I wouldn't be the one that's necessarily initiating those kinds of conversations. That would be the development organization within FPL that would do that. And I'm not aware that they have or have not done that. I wouldn't be surprised if they had.

COMMISSIONER GRAHAM: Now, the life span of these things are 25 years?

THE WITNESS: Of a solar plant?

COMMISSIONER GRAHAM: The solar panels.

THE WITNESS: The solar panels? The -- I would say that best -- based on what we know today, best knowledge available, is probably more than 30 years. There are some installations out there that are 30 or more years old and still performing very well.

COMMISSIONER GRAHAM: So, you could probably get by with getting a 30-, 40-year lease, and it would be there the life of the panel -- even a 50-year lease?

THE WITNESS: I think that's conceivable.

COMMISSIONER GRAHAM: And you said you do not

know if somebody else is doing that now?

THE WITNESS: I -- I don't have firsthand knowledge, no.

COMMISSIONER GRAHAM: Okay. Thank you.

THE WITNESS: You're welcome.

CHAIRMAN BROWN: Commissioners, any other questions?

All right. Redirect.

MS. MONCADA: I'll be very -- very brief. I saw the stares in the back of the room as well.

CHAIRMAN BROWN: Not up here, though.

FURTHER EXAMINATION

BY MS. MONCADA:

Q Mr. Moyle asked you whether FPL went out and bought land for each of the sites and you said yes?

A Yes.

Q Did you have to go out and buy land for Wildflower?

A Wildflower was previously purchased, but yes.

Q Okay. In your discussions with Mr. Moyle, you talked about the schedule being important. Can you explain why?

A Yes. The -- as Witness Enjamio mentioned that, at the time we were making decisions how to proceed with the projects, there was a lot of concern

that, because of the political climate, things could happen, the longer the projects went on, that would result in increased costs.

And we developed a strategy to go through the local permitting process, which, as Witness Enjamio said, was six to eight months shorter. And at the end of the day, it turns out, it was bene- -- it was good that FPL did that because, had we gone with the longer schedule, the costs for each of the projects would have been at least $20 million more per project because of events that have occurred since then.

And the projects still would have met the threshold of the -- $1,750 per kilowatt would still well -- be well below that, but the customers would have been exposed to higher costs.

MS. MONCADA: No further redirect.

CHAIRMAN BROWN: Thank you.

All right. Let's get to exhibits. This witness has Exhibits 37 through 44. Would you like those --

MS. MONCADA: Yes, FPL would like to move 37 through 44 into the record.

CHAIRMAN BROWN: Any objection, Mr. Moyle, on those?

MR. MOYLE: No -- no objection.

CHAIRMAN BROWN: We'll go ahead and move into the record Exhibits 37 through 44.

(Whereupon, Exhibit Nos. 37 through 44 were admitted into evidence.)

CHAIRMAN BROWN: Mr. Moyle, you have two outstanding exhibits.

MR. MOYLE: I know I have 102.

CHAIRMAN BROWN: Oh, 102, and the other -- oh, bid rule. Sorry. 102.

MR. MOYLE: Right.

MS. MONCADA: FPL does have an objection to 102. Mr. Brannen made clear he had no knowledge about the Department of the Interior, other than Mr. Moyle has mentioned it a few times today.

CHAIRMAN BROWN: You want to use it so badly.

MR. MOYLE: So -- so, here -- I -- I've been waiting to make this argument.

CHAIRMAN BROWN: Let's hear it.

MR. MOYLE: We -- we have admitted news stories previously. And as -- as the Florida Supreme Court has said, in the case of FIPUG vs. the PSC, these are informal proceedings to which the evidence rule does not strictly apply.

CHAIRMAN BROWN: They're enjoying that.

(Laughter.)

MS. MONCADA: Yes, I will say that the Florida Supreme Court did not say the Commission couldn't use its best judgment.

MR. MOYLE: So -- so, given that it's an -- it's an administrative proceeding and that it's probably appropriate to give it the weight that it's due, we -- we would -- we would ask that -- that it be admitted.

CHAIRMAN BROWN: That being said, we could let anything, if that were the case, and give it the weight it's due.

I don't think there was a proper predicate set. And the -- the witness specifically said he did not have knowledge, and he did not rely on it for any reasons, during the cross-examination.

And for those reasons, I would say that it -- we shouldn't admit it, given the potential for prejudice, and it's irrelevant. So, we won't let that in.

Would you like the witness excused?

MS. MONCADA: Please, yes.

CHAIRMAN BROWN: All right. Have a good day.

THE WITNESS: Thank you.

CHAIRMAN BROWN: So, here we are on -- staff, where are we on other matters?

MS. BROWNLESS: Yes, ma'am. My understanding is that Mr. Moyle would like to brief these issues; is that correct?

MR. MOYLE: That's right.

MS. BROWNLESS: Okay. The briefs are due in this case on November 13th. The word limit for the parties' post-hearing brief summary of position is 75 words. The page limit for the briefs is 40 pages.

CHAIRMAN BROWN: Which is more than enough.

MS. BROWNLESS: Yes, ma'am.

CHAIRMAN BROWN: Do any of the parties have any other matters that they wish to address at this time before we adjourn?

MS. MONCADA: FPL has none.

CHAIRMAN BROWN: Mr. Moyle?

MR. MOYLE: Nor -- nor does FIPUG.

CHAIRMAN BROWN: You guys are still around. I thought you were going to go.

MR. SAYLER: Thank you. No, we don't. Thank you.

CHAIRMAN BROWN: All right. So, that being said, we will go ahead and adjourn the 01 docket.

And before we open the 07 -- because there's going to be a lot of shuffling around, we'll just

take a five-minute break and let the court reporter take a rest. Thanks.

CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF LEON)

I, ANDREA KOMARIDIS, Court Reporter, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that I stenographically reported the said proceedings; that the same has been transcribed under my direct supervision; and that this transcript constitutes a true transcription of my notes of said proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 2nd day of November, 2017.

ANDREA KOMARIDIS
NOTARY PUBLIC
COMMISSION #GG060963
EXPIRES February 9, 2021