

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

**DOCKET NO. 130009-EI
FLORIDA POWER & LIGHT COMPANY**

**IN RE: NUCLEAR POWER PLANT COST RECOVERY AMOUNT
FOR THE YEAR 2014**

REBUTTAL TESTIMONY & EXHIBITS OF:

STEVEN R. SIM

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1 and should not be given serious consideration by the Florida Public Service
2 Commission (FPSC).

3 **Q. How is your rebuttal testimony organized?**

4 A. My rebuttal testimony is organized into three sections. Section I takes a look
5 back at the completed EPU project and briefly discusses how it was proposed
6 and approved, the results of the feasibility analyses of the project from 2007
7 on, and the fact that Dr. Jacobs has not disputed the consistent results of those
8 analyses which project that FPL's customers will benefit from completing the
9 overall EPU project. Section II takes a critical look at Dr. Jacobs'
10 recommendation to impose a penalty on FPL. Section III then addresses a
11 number of problematic statements made by Dr. Jacobs in his testimony that
12 are not discussed in the prior two sections.

13 **Q. Please summarize your rebuttal testimony.**

14 A. The EPU project has now been completed and the additional 522 MW of
15 nuclear capacity it has delivered is already benefiting FPL's customers. This
16 additional nuclear capacity will continue to benefit FPL's customers for
17 decades to come. In regard to the amount of additional nuclear capacity, the
18 EPU project impressively overachieved by delivering approximately 120
19 MW, or approximately 30%, more capacity than was projected early in the
20 project.

21

22 The EPU project was proposed to the FPSC as a single integrated project
23 consisting of four nuclear units and two sites. The FPSC approved the project

1 on that basis. From the EPU need filing in 2007 through 2012, the last year
2 before completion of the project, FPL's annual feasibility analyses have
3 evaluated the EPU project as a single integrated project. The FPSC has relied
4 upon these analyses of the EPU as a single integrated project in making their
5 annual decisions regarding the feasibility of completing the project.

6
7 Each of these annual feasibility analyses of the EPU project showed that its
8 completion was projected to be cost-effective in either 6 of 7, or in 7 of 7,
9 scenarios of fuel cost forecasts and environmental compliance cost forecasts.
10 Over this time period, the OPC, through Dr. Jacobs' testimonies, has not
11 disputed the findings from any of the annual feasibility analyses, all of which
12 indicated that the overall EPU project, as proposed by FPL and approved by
13 the FPSC, was projected to be cost-effective for FPL's customers. Even now,
14 in his 2013 testimony, Dr. Jacobs takes no issue regarding the cost-
15 effectiveness of what the completed, integrated EPU project has delivered.

16
17 But now in 2013, in hindsight after the EPU project has been completed,
18 OPC's witness Dr. Jacobs recommends that the FPSC impose a \$200 million
19 penalty on FPL. He bases such a penalty on his belief that a subset of the
20 completed EPU, the portion of the EPU at the Turkey Point site, is "*clearly*
21 *uneconomic*". By making such an absolute statement, Dr. Jacobs is indirectly
22 claiming that there are no possible future fuel costs, environmental
23 compliance costs, operating lives of the nuclear units, regulations, legislation,

1 etc. by which the Turkey Point subset of the EPU project could possibly prove
2 to be cost-effective. Dr. Jacobs' belief in his ability to predict future costs and
3 circumstances with absolute accuracy decades into the future is, of course,
4 nonsensical. Dr. Jacobs made a similar absolute statement of "*uneconomic*"
5 last year in this testimony.

6
7 In his 2013 testimony, Dr. Jacobs attempts a new 'analysis' by which he
8 hopes to justify his claim that this subset of the EPU can never be cost-
9 effective. However, the key assumption in his attempt this year is that
10 projected benefits from a different nuclear project (Turkey Point 6 & 7), that
11 are presented in terms of breakeven costs for that specific project, are
12 automatically applicable and transferable as breakeven costs for his selected
13 subset of the recently completed EPU project. This is a fundamentally flawed
14 assumption. The new nuclear project, and Dr. Jacobs' selected subset of the
15 EPU project, share the title "nuclear", but that is about all they share. They
16 have in-service dates that are 10 years apart, are of different capacity sizes,
17 etc. In short, these are unrelated and separate projects. Consequently, results
18 from the analysis of one project will not be applicable or automatically
19 transferable to the other project.

20
21 This critical look at Dr. Jacobs' implied gift of prophecy regarding future fuel
22 costs, environmental costs, legislation, etc., coupled with his fundamentally
23 flawed assumption of 'one cost value fits all' in regard to nuclear projects that

1 he attempted to build his analysis around, result in completely discrediting his
2 claim that the Turkey Point subset of the EPU project cannot, under any future
3 circumstances, be cost-effective. Consequently, Dr. Jacobs' rationale for
4 recommending a penalty for FPL has collapsed.

5
6 Dr. Jacobs' testimony also includes a number of statements that are incorrect
7 and/or misleading. One of these is his attempt to portray FPL's exclusion of
8 sunk costs in the feasibility analyses as something FPL concocted for the
9 nuclear analyses. The reality is that excluding sunk costs is standard practice
10 in economic analyses. The FPSC recognized this in providing direction that
11 the costs to be used in the feasibility analyses are the costs to complete the
12 project; i.e., costs that are separate from sunk costs. Furthermore, a co-
13 panelist of Dr. Jacobs in a recent Georgia Power nuclear docket, and an author
14 whose article on sunk costs Dr. Jacobs uses as a reference source in his 2013
15 testimony, both agree with FPL and the FPSC that sunk costs are properly
16 excluded in economic analyses.

17
18 Dr. Jacobs' testimonies in 2012 and again in 2013 also tend to blur the
19 distinctions between, and the meanings of, the commonly used terms
20 'overnight costs' and 'installed costs'. This has led to some confusing and/or
21 misleading statements in his testimonies.

22

1 Dr. Jacobs also discusses the fact that at the time of the 2012 NCRC hearing,
2 FPL had a more recent projection of EPU costs. He states that if this
3 projection, that was not used in FPL's 2012 feasibility analyses, had been
4 discussed at the 2012 hearing, then the FPSC "*may have*" reached a different
5 decision in 2012. His selected projection showed that a large amount of
6 expenditures had been made by the time of the 2012 hearing. However, what
7 Dr. Jacobs fails to recognize is that FPL's 2012 feasibility analyses were
8 based on a projection of expenditures from January 1, 2012 through December
9 31, 2012 as costs to complete the EPU project. If the 2012 feasibility analyses
10 had been updated at the time of the 2012 hearing to recognize the
11 expenditures that had already been spent in 2012 up to that point, then these
12 expenditures would fall into the category of sunk costs and would have
13 properly been excluded from the analyses. Consequently, the completion of
14 EPU would have been projected to be even more cost-effective for FPL's
15 customers in any updated analysis than it was in the "original" 2012 feasibility
16 analyses.

17
18 Based on this summary of the many problems throughout Dr. Jacobs'
19 testimony, I conclude that Dr. Jacobs' recommendation that a significant
20 financial penalty be imposed upon FPL, and numerous other statements
21 presented in his testimony, should be rejected by the FPSC in this docket.
22
23

1 **Section I: A Look Back at the Completed EPU Project**

2

3 **Q. From a resource planner’s perspective, how do you view the completed**
4 **EPU project?**

5 A. The EPU project is delivering approximately 522 MW of additional nuclear
6 capacity that is currently benefiting FPL’s customers and which will continue
7 to benefit FPL’s customers for at least several more decades. These
8 incremental 522 MW for FPL’s customers include approximately 120 MW, or
9 approximately 30%, more capacity than what was projected in the early years
10 of the project. (Note that the 522 MW value is also 10 MW more than was
11 projected in FPL’s May 2013 direct testimony. These additional 10 MW all
12 come from the Turkey Point site.)

13

14 This incremental capacity of 522 MW already being delivered by the project
15 has the following characteristics:

- 16 - firm capacity;
- 17 - baseload capacity with capacity factors of 90% or higher;
- 18 - produces energy with zero emissions of sulfur dioxide (SO₂), nitrogen
19 oxides (NO_x), and carbon dioxide (CO₂);
- 20 - produces energy using no fossil fuel, thus significantly contributing to
21 fuel diversity for the FPL system;
- 22 - produces energy at very low costs due to the very low costs of nuclear
23 fuel;

- 1 - the portion of the 522 MW of incremental capacity that is located at
2 the Turkey Point site helps maintain a balance between growing
3 electrical load in the Southeastern Florida region (Miami-Dade and
4 Broward Counties) and generation located in that region; and,
5 - provides a valuable hedge against future increases in fossil fuel costs
6 and increasing environmental compliance costs.

7
8 This combination of characteristics can only be provided by additional nuclear
9 capacity and these characteristics are valuable to FPL's customers who are
10 already benefiting from the project.

11 **Q. Was the EPU project proposed to the FPSC in the 2007 Need filing as a**
12 **single integrated project encompassing four nuclear units and two sites?**

13 A. Yes.

14 **Q. Did the FPSC approve the project as a single integrated project?**

15 A. Yes.

16 **Q. In all of the feasibility analyses of the EPU project that were presented to**
17 **the FPSC since the 2007 Need filing, was the project always evaluated as**
18 **a single integrated project?**

19 A. Yes.

20 **Q. Did the FPSC utilize these annual feasibility analyses of a single**
21 **integrated EPU project as the basis for their annual decisions regarding**
22 **EPU?**

23 A. Yes.

1 **Q. What were the results in all of these feasibility analyses presented to the**
2 **FPSC annually since 2007 for the EPU project?**

3 A. Completing the integrated EPU project was projected to be cost-effective for
4 FPL's customers in each annual feasibility analysis in either 6 of 7, or in 7 of
5 7, scenarios of fuel cost forecasts and environmental compliance cost
6 forecasts. (In those annual analyses in which completion of EPU was
7 projected to be not cost-effective in a single scenario, that scenario always
8 assumed low fuel costs and low environmental compliance costs would occur
9 every year for several decades.)

10 **Q. In his testimony, does Dr. Jacobs dispute the results of any of the annual**
11 **EPU feasibility analyses since 2007 that consistently projected that**
12 **completing the full integrated EPU project was cost-effective?**

13 A. No.

14

15 **Section II: A Critical Look at Dr. Jacobs' Recommendation**

16

17 **Q. Dr. Jacobs recommends that FPL be penalized by not being able to**
18 **recover \$200 million in EPU project expenditures. What do you**
19 **understand the basis is for his recommendation?**

20 A. The economic basis for his recommendation of a penalty is Dr. Jacobs'
21 contention that the Turkey Point subset of the EPU project cannot be cost-
22 effective. His testimony states this in the following passage: "*...the extremely*
23 *expensive cost of the Turkey Point EPU capacity will be uneconomic to*

1 *ratepayers. Therefore, I recommend that the Commission act to disallow*
2 *some of these excessive and unreasonable costs.”* (page 13, lines 1-3, from his
3 direct testimony). However, I note that in his testimony, Dr. Jacobs does not
4 explain which specific costs are ‘excessive’ or ‘unreasonable’, nor does he
5 claim that any specific costs were imprudently incurred.

6 **Q. How would you summarize the issue posed by Dr. Jacobs’ testimony?**

7 A. Dr. Jacobs is looking back at a project that: (i) has already been completed;
8 (ii) is delivering approximately 30% more capacity than was originally
9 estimated; (iii) is already benefiting FPL’s customers; and (iv) whose overall
10 project cost-effectiveness he has not challenged, but he nonetheless wants
11 FPL penalized \$200 million because he believes a subset of the project may
12 not be cost-effective.

13 **Q. What does Dr. Jacobs’ testimony state regarding the economics of the**
14 **Turkey Point subset of the overall EPU project?**

15 A. In addition to the statement provided above, Dr. Jacobs’ perception of the
16 economics of this subset of the overall EPU project is perhaps best summed
17 up by the following two statements:

18 - *“The Turkey Point EPU...is clearly uneconomic for FPL’s customers.”*

19 (page 18, line 11); and,

20 - *“...on a stand-alone basis the Turkey Point EPU project is clearly*
21 *uneconomic and harmful to FPL customers.”* (page 27, lines 7 and 8)

22

1 Based on these statements, Dr. Jacobs is essentially claiming that he knows
2 with certainty that this subset of the overall EPU project cannot, under any
3 possible future circumstances, be cost-effective. He makes this claim even
4 though it is obvious that the actual benefits realized by the EPU will not be
5 known for decades.

6 **Q. What is your reaction to such a claim?**

7 A. Frankly, I am amazed that anyone who has been involved, even on the
8 periphery, of the electric utility industry as long as Dr. Jacobs' résumé
9 indicates he has been involved, would be willing to indicate, even indirectly,
10 that he/she knows with absolute certainty what future fuel costs,
11 environmental costs, operating lives of nuclear units, regulation, legislation,
12 etc. will be over the next several decades. Yet one would have to be making
13 just that claim if one is stating (repeatedly) that a subset of a project is
14 "*clearly uneconomic*" when the future outcomes of all of the items listed
15 above will determine the actual benefits that the EPU project will provide to
16 FPL's customers.

17
18 Even a quick review of the fuel cost and environmental compliance cost
19 forecasts used in the annual feasibility analyses presented to the FPSC from
20 2007 to the present would show changes, with some of the changes being
21 significant changes, in these forecasts from year-to-year. In addition, the
22 FPSC expects forecasts of these costs to continually change and thus
23 instructed the utilities to update these forecasts each year in their feasibility

1 analyses. Furthermore, FPL's annual feasibility analyses recognize that there
2 is great uncertainty in these future costs and addresses that uncertainty by
3 using multiple scenarios of fuel cost forecasts and environmental compliance
4 costs forecasts in its feasibility analyses. Thus uncertainty regarding future
5 fuel costs, future environmental compliance costs, etc. is recognized by the
6 FPSC and FPL.

7
8 However, Dr. Jacobs must believe that he knows what these future costs will
9 be with such certainty that it is clear to him (and likely only to him) exactly
10 what the benefits of a subset of the overall EPU project will be over these
11 decades. Such a belief is obviously nonsensical.

12 **Q. Despite Dr. Jacobs' belief that he can predict the future with certainty,**
13 **has FPL examined what certain changes in some of these key forecasts or**
14 **assumptions would mean in regard to additional benefits for the EPU**
15 **project?**

16 A. Yes. Dr. Jacobs made similar absolute 'can't be economic' claims in his
17 testimony last year (thus clearly indicating this year that he has an ongoing
18 belief in his psychic abilities – despite the fact that the 2012 fuel cost forecast
19 that was the basis for the 2012 projection of EPU fuel cost benefits has
20 changed in 2013). FPL pointed out last year in rebuttal testimony that no one
21 can possibly predict future fuel costs, environmental compliance costs,
22 operating licenses of nuclear units, regulation, legislation, etc. over the next

1 several decades accurately enough to make such definitive statements as Dr.
2 Jacobs is making.

3
4 In order to demonstrate how much the projected benefits for the EPU project
5 could change, my 2012 rebuttal testimony made the following points
6 regarding how the projected benefits for EPU could quickly and dramatically
7 change:

- 8
- 9 - changing the 2012 fuel cost forecast to the fuel cost forecast used in
10 feasibility analyses just two years earlier increased the EPU's
11 projected fuel savings by \$430 million CPVRR;
 - 12 - changing the 2012 environmental compliance cost forecast to a
13 forecast used in feasibility analyses just one year earlier increased the
14 EPU's projected environmental compliance cost savings by \$250
15 million CPVRR;
 - 16 - if the operating licenses for the four nuclear units were extended for 20
17 more years, the increase in just the projected fuel cost and
18 environmental compliance cost savings alone for EPU, compared to
19 that presented in the 2012 feasibility analyses, would be \$1,200
20 million CPVRR; and,
 - 21 - if a Clean Energy Standard is imposed which has a 'nuclear neutral'
22 provision, the net savings in renewable energy costs that would

1 otherwise be incurred without the incremental EPU capacity were
2 projected to be \$192 million CPVRR.

3
4 Therefore, what is truly clear is that not only do forecasts of fuel costs,
5 environmental costs, etc. continually change, but that these changes can have
6 significant impacts on the projected benefits of the EPU project. And, because
7 the most recent forecasted values for fuel costs and environmental compliance
8 costs are at the low end of costs forecasted since the NCRC dockets began, I
9 believe that any significant changes in these costs which occur in the future
10 are likely to be in the direction of higher costs; i.e., towards higher benefits for
11 EPU.

12 **Q. Did Dr. Jacobs perform any rigorous feasibility analysis of his own to**
13 **demonstrate his claim that the Turkey Point subset of the EPU project**
14 **could never be economic and present the results of that analysis in his**
15 **testimony?**

16 A. No.

17 **Q. What did he attempt to do to support his claim?**

18 A. I believe the following four statements provide a good summary of what Dr.
19 Jacobs is attempting to use as a justification for his claim that the Turkey
20 Point subset of the completed EPU can never be economic under any future
21 circumstance:

22 - *“This is what he calls the nuclear ‘breakeven cost’.”* (page 15, line 5)

- 1 - *“If, as Dr. Sim contends, his breakeven calculation quantifies the*
2 *maximum installed cost of new nuclear capacity that is cost-effective,*
3 *then it follows that Turkey Point uprate capacity must cost less than*
4 *the breakeven value to be cost-effective.”* (page 13, lines 22 and 23,
5 and page 14, lines 1 and 2)
- 6 - *“The cost of the EPU capacity, which was completed in early 2013, is*
7 *expressed in current 2013 dollars. Dr. Sim’s “breakeven costs” are*
8 *also expressed in 2013 dollars, so the numbers are “apples to apples.”*
9 (i.e., page 16, lines 19-21)
- 10 - *“The St. Lucie EPU project, at \$3,800/kW is well below all the*
11 *breakeven cost scenarios and thus, using Dr. Sim’s logic, is*
12 *economic.”* (page 17, lines 9-11)

13

14 From these statements, it is clear that what Dr. Jacobs is attempting to do is to
15 take the benefits calculation results from one project, let’s call it Project A
16 (i.e., Turkey Point 6 & 7), and apply those results to Project B (the Turkey
17 Point subset of EPU).

18 **Q. Does this approach make sense?**

19 A. No. Let’s examine the first of his statements quoted above: *“This is what he*
20 *calls the nuclear ‘breakeven cost’.*” (The “he” in this statement is me.) Dr.
21 Jacobs is referring to a projected breakeven cost calculated specifically for the
22 Turkey Point 6 & 7 project. That breakeven cost is consistently labeled and
23 referred to in my direct testimony as a value calculated for the Turkey Point

1 6 & 7 project. It is never portrayed as a universally applicable value for all
2 nuclear projects.

3
4 However, Dr. Jacobs appears to assume that because both projects have the
5 word “nuclear” in their title, then the numeric results of a calculation for one
6 nuclear project are automatically applicable and transferable to any other
7 nuclear project. He uses the highest projected breakeven cost value
8 (\$6,640/kw) in 2013\$ for Project A (Turkey Point 6 & 7) and claims that if the
9 cost for Project B (a subset of the already completed EPU) exceeds that value,
10 then Project B cannot be economic. (Contrary to Dr. Jacobs’ characterization
11 of this approach as “...using Dr. Sim’s logic...”, this illogical approach is
12 entirely Dr. Jacobs’ creation. And as far as the ‘logic’ part of his description
13 goes, the best description of his approach is ‘tortured’ logic.)

14
15 His lack of understanding of how resource planning analyses should actually
16 be performed to provide meaningful results is perhaps understandable. In his
17 testimony, Dr. Jacobs describes his activities since 1986 on page 3, lines 3-5,
18 as participating in “...rate case and litigation support activities related to
19 power plant construction, operation and decommissioning.” Noticeably
20 absent from his description of his work experience is anything remotely
21 associated with electric utility resource planning. If he really does not have a
22 significant amount of resource planning knowledge and experience, then it is

1 understandable why his attempt at applying this 'analysis' approach is so
2 misguided.

3
4 Economic analyses of different projects or resource options simply don't have
5 automatically applicable or transferable results in the manner Dr. Jacobs
6 believes they do. In previous NCRC dockets, FPL has explained that a
7 comparison of resource options on a \$/kwh basis, or on a \$/kw basis (as Dr.
8 Jacobs attempts to do), is meaningless in regard to making a final decision
9 about resource options unless the resource options in question are identical, or
10 nearly identical, in each of a number of characteristics.

11
12 The two resource options in question, Turkey Point 6 & 7 and a subset of
13 EPU, are not even close to being identical in regard to several of these key
14 characteristics including in-service dates and capacity (MW). Differences in
15 these key characteristics mean that the impacts the two resource options will
16 have on the FPL system will be significantly different. Therefore, the
17 economics of these two resource options cannot be meaningfully evaluated
18 based on a \$/kw comparison and the results from an economic analysis of one
19 resource option are not applicable or automatically transferable to the other
20 resource option.

21
22 For example, consider the fact that the in-service date of Project A is a decade
23 later than the already in-service Project B. This means that Project B's

1 impacts for the first 10 years will be on an FPL system (i.e., the fleet of
2 generating units, power purchases, DSM, etc.) that is markedly different than
3 the FPL system that Project A will impact when it begins service 10 years
4 later. In addition, the 10-year difference in in-service dates means that the
5 discounting of benefits will have different impacts on determining breakeven
6 costs for Project A and Project B.

7
8 Consequently, his misguided assumption that the \$6,640/kw breakeven cost in
9 2013\$ for Turkey Point 6 & 7 with an in-service date of 2022/2023 is
10 applicable and automatically transferable to EPU which is already in-service
11 is fundamentally flawed.

12 **Q. Would you please provide a simple example showing that the numeric**
13 **results from economic analyses of two resource options or projects that**
14 **are dissimilar in even one of the key characteristics are not automatically**
15 **transferable?**

16 A. Yes. The simple example is provided in Exhibit SRS – 10. In order to keep
17 the example as simple as possible, the example looks at only one hypothetical
18 project with two different in-service years: 2013 and 2022. For simplicity's
19 sake, we will also assume that the project cost and project benefits all occur in
20 a single year (the in-service year). We further assume that the cost of the
21 project will be incurred in one day so that there is no difference between
22 overnight costs and installed costs. We use the same discount rate of 7.45%

1 that was used in FPL's 2013 feasibility analyses. Two different scenarios are
2 examined.

3
4 In both scenarios, we start by looking at the project with a 2013 in-service
5 date. If we assume that the total benefits of the project are, for example,
6 \$1,000,000 in nominal dollars (which are also \$1,000,000 in net present value
7 2013\$ because the benefits occur in 2013), then the breakeven cost for the
8 2013 project is \$1,000,000 both in terms of nominal and NPV dollars. This is
9 shown in Column (3) in the exhibit in both the upper and lower halves of the
10 page.

11
12 Now let's move the same project out in time so that it has a 2022 in-service
13 date. In Scenario 1, presented in the top half of the exhibit, we assume that
14 the nominal savings remain at \$1,000,000 in the year 2022 as shown in
15 Column (5). Therefore, the nominal breakeven cost will remain at
16 \$1,000,000. However, after discounting this nominal value back to 2013, the
17 2013\$ present value breakeven cost becomes \$523,772 as shown in Column
18 (6), not the \$1,000,000 value of the 2013 in-service project. Clearly the
19 present value 2013\$ breakeven costs of the two projects are neither identical
20 nor transferable.

21
22 In Scenario 2, presented on the bottom half of the exhibit, we assume that the
23 avoided costs (i.e., the benefits) escalate over the 10 year period from 2013 to

1 2022 by an escalation rate of 2.5% per year. Now the nominal benefits
2 increase from \$1,000,000 to \$1,248,863 as shown in Column (8). Similarly,
3 the present value 2013\$ benefits increase to \$654,119 as shown in Column
4 (9). In this scenario the 2013\$ benefits value again represents the 2013\$
5 breakeven cost. However, this 2013\$ present value breakeven cost of
6 \$654,119 is still not the same as the \$1,000,000 breakeven cost value in 2013\$
7 for the 2013 in-service project. Therefore, again in this scenario the
8 breakeven costs are neither identical nor transferable.

9
10 This simple example demonstrates that Dr. Jacobs' attempt at selecting a
11 breakeven cost value for one project, then using it as a standard by which to
12 judge the economics of another project that is dissimilar in regard to even one
13 key characteristic (in-service date), is fundamentally flawed (even if the two
14 resource options have the word "nuclear" in their titles).

15 16 **Section III: Other Problematic Statements**

17
18 **Q. Were there problems in other statements or claims made in Dr. Jacobs'**
19 **testimony that have not yet been addressed?**

20 **A.** Yes. Dr. Jacobs' testimony contains a number of problematic statements that
21 address three topics: (i) the exclusion of sunk costs in economic analyses, (ii)
22 the difference between installed and overnight costs, and (iii) whether the

1 FPSC would have made a different decision last year if a different EPU cost
2 projection had been discussed at the hearing.

3 **Q. What statements do you wish to discuss from Dr. Jacobs' testimony**
4 **regarding the exclusion of sunk costs in economic analyses?**

5 A. These statements include:

6 - *"I challenged FPL's methodology for gauging the economic feasibility of*
7 *its uprates, which involved excluding past expenditures from the*
8 *study."* (emphasis added) (page 8, lines 4-6);

9 - *"...considering the future construction and related costs alone (in other*
10 *words, consistent with FPL's preferred feasibility methodology)..."*
11 (emphasis added) (page 11, line 23 to page 12, line 2); and,

12 - *"...based even on Dr. Sim's flawed insistence on ignoring sunk*
13 *costs."*(emphasis added) (page 26, lines 22 and 23).

14
15 Dr. Jacobs is clearly trying to portray the exclusion of sunk costs in economic
16 analyses as something that FPL or I dreamed up for use in the EPU analyses.

17 Nothing could be further from the truth.

18 **Q. Please elaborate.**

19 A. The practice of excluding costs that have already been spent (i.e., sunk costs)
20 in economic analyses is standard practice because such costs are obviously
21 immaterial in regard to a decision regarding whether to proceed with a project.
22 Three points should help demonstrate the fact that excluding sunk costs is
23 standard practice and not an FPL contrivance.

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First is the fact that the FPSC provided early direction in regard to how to account for costs in feasibility analyses of nuclear projects. Their direction was that the costs to include in the analyses are the costs to complete the project. The costs to complete are clearly separate from costs that have already been spent. Thus the FPSC has recognized that the costs to complete the project, not costs already spent, are the appropriate costs to include in feasibility analyses and they directed the utilities to act accordingly in their analyses.

Second is the fact that in a recent (2009) nuclear docket in Georgia, a panel consisting of Dr. Jacobs and Mr. Hayet was asked a question regarding the fact that Georgia Power excludes sunk costs in their economic analyses. Mr. Hayet provided the panel's response:

“The point there is just to point out that the economic analysis as you go forward with the project, the question that you have to answer is what are the future costs that will be incurred and what do those costs – how do those costs compare to your next best alternative. So, the notion of the costs that have already been spent as being sunk is something that you do ignore and we’re just simply pointing that out, that’s the company’s practice, we agree with it and that’s fairly industry standard.” (page 202,

1 lines 23-25 and page 203, lines 1-7; Georgia Public Service Commission
2 Docket No. 29849)

3
4 Third is the article on sunk costs by Mr. Charles Conway that Dr. Jacobs
5 included as Exhibit WRJ - 7 to his direct testimony. On page 1 of 5, third
6 paragraph of this exhibit/article, Mr. Conway states:

7
8 *“Sunk costs are money that you’ve already spent on one of the options,*
9 *before making the decision. Regardless of which option you choose, the*
10 *money has already been spent. That money is, for all intents and*
11 *purposes, gone. If you choose option A, the money is spent. If you choose*
12 *option B, the money is spent. If you choose to do nothing, the money has*
13 *still been spent. The result is that sunk costs should not be considered in*
14 *your decisions. Sunk costs do not alter the future costs and revenues of*
15 *your options, so they should not be included in the analysis.”*

16
17 Thus other parties, including the FPSC, a co-panelist of Dr. Jacobs in another
18 nuclear docket, and an author selected by Dr. Jacobs to serve as a reference
19 source for his testimony this year, all agree with FPL that excluding sunk
20 costs from economic analyses is the correct approach, even if Dr. Jacobs does
21 not.

22 **Q. Are there also problematic statements in Dr. Jacobs’ testimony regarding**
23 **certain terminology such as overnight costs and installed costs?**

1 A. Yes. I believe there were problems relating to these terms in his 2012
2 testimony. FPL pointed these problems out in its 2012 rebuttal testimony.
3 Unfortunately, Dr. Jacobs attempts to defend his 2012 choice of types of costs
4 to use for a comparison in his 2013 testimony and this may have created
5 confusion for readers of his 2013 testimony.

6 **Q. An attempt to clear up this confusion regarding terminology would be**
7 **helpful. Please start with providing simple definitions, and then discuss**
8 **what the 2012 testimonies presented.**

9 A. Both of these terms refer to the cost of construction, but the terms refer to
10 different types of costs. In simple terms, “overnight cost” (or “overnight
11 construction cost”) refers to the cost if one could literally build a project
12 overnight. Therefore, no escalation of costs that typically occurs during the
13 years of construction is accounted for. Overnight costs are typically presented
14 in terms of \$/kw in the current year’s dollars. Because this cost is presented in
15 current year dollars, the cost value represents both a nominal and a present
16 value cost.

17
18 On the other hand, “installed costs” typically refers to the total cost of the
19 constructed project and does account for escalation of costs during the years
20 of construction. Installed costs can be presented in terms of total dollars or
21 \$/kw and can be presented in terms of nominal dollars or present value
22 dollars. However, the nominal and present value dollars values for installed
23 costs will typically be different numeric values.

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In his 2012 testimony, Dr. Jacobs attempted to make a comparison between a \$5,190/kw overnight cost value in 2012\$ for Turkey Point 6 & 7 and a \$7,520/kw installed cost value he calculated for the Turkey Point subset of the EPU project. He assumed this cost was also in 2012\$. Presumably because both values were presented in terms of 2012\$, he assumed his comparison of an overnight cost to an installed cost represented a meaningful, apples-to-apples comparison.

In FPL’s 2012 rebuttal testimonies, I first reminded Dr. Jacobs that his attempt to compare these two resource options, which have significantly different characteristics, on a \$/kw basis could not provide meaningful results in regard to making resource decisions. (This issue had been extensively discussed in my rebuttal testimonies in the 2009 and 2010 NCRC dockets.) Then, both FPL witness Jones and I pointed out in our rebuttal testimonies that Dr. Jacobs’ comparison was also not meaningful because he was attempting to compare two different types of costs. The \$5,190/kw value for Turkey Point 6 & 7 was a projected overnight cost that did not include cost escalation that will occur during the years of project construction. The \$7,520/kw value was a projected installed cost value for the Turkey Point subset of the EPU project that did include the cost escalation that had already been incurred throughout the construction process.

1 We pointed out that a more meaningful comparison (but still an inadequate
2 comparison for making resource decisions) would be to compare installed
3 costs for both projects. An installed cost for Turkey Point 6 & 7 of
4 approximately \$8,500/kw was presented. We recognized that both the
5 \$8,500/kw value and the \$7,520/kw value are in nominal dollars, but that the
6 in-service years are approximately 10 years apart. However, we believed
7 then, and believe now, that it is more meaningful to at least attempt to
8 compare projects using the same type of costs, even though the in-service
9 years differ, than it is to try to compare projects using two completely
10 different types of costs such as Dr. Jacobs attempted to do in 2012 with his
11 discussion of overnight costs and installed costs. (However, as previously
12 discussed, Dr. Jacobs in his 2013 testimony unfortunately chose to not only
13 continue to attempt to compare two different types of costs, he decided to now
14 use a third type of cost: “breakeven” costs.)

15
16 In his 2013 testimony, Dr. Jacobs attempted to explain/defend his attempt to
17 compare two different types of costs in his 2012 testimony. In doing so, he
18 made a couple of incorrect and/or misleading statements.

19 **Q. Please discuss what Dr. Jacobs says in his 2013 testimony regarding this.**

20 **A.** Dr. Jacobs states the following in his 2013 testimony:

21 - *“Dr. Sim asserted that the cost of EPU capacity completed at the present*
22 *time should be compared to the cost of the Turkey Point Units 6&7*
23 *expressed in dollars that have been inflated over a period of some 10*

1 *years. His assertion had no value, other than the fact that it was one*
2 *way of trying to avoid the obvious conclusion that the Turkey Point*
3 *EPU capacity was already more expensive than the corresponding*
4 *cost of new nuclear capacity one year ago.” (page 16, lines 6-11)*

5 - *“Earlier, you alluded to Dr. Sim’s use of 2013 dollars and 2022-2023*
6 *dollars in the same comparison. Can FPL justify the cost of the*
7 *Turkey Point EPU project using that yardstick in this hearing cycle,*
8 *which involves EPU project completion and close-out costs?” (page*
9 *18, lines 21-23, and page 19, lines 1 and 2)*

10 **Q. What is your reaction to these statements?**

11 A. In regard to the first statement, I disagree with Dr. Jacobs’ characterization of
12 my testimony from last year. What was actually stated in my 2012 rebuttal
13 testimony was that Dr. Jacobs had made several mistakes. I first reminded Dr.
14 Jacobs that an attempt to compare dissimilar projects on a \$/kw basis could
15 not provide meaningful results in regard to making resource decisions. Then
16 FPL witness Jones and I pointed out that Dr. Jacobs had misunderstood a
17 statement Mr. Jones had made which was in regard to installed costs for the
18 EPU project and new nuclear units. Finally, we explained that Dr. Jacobs was
19 mistakenly trying to compare projects using two different types of costs:
20 overnight costs and installed costs.

21
22 The message Dr. Jacobs should have taken from this 2012 rebuttal testimony
23 discussion was not that the correct way to analyze dissimilar projects is on a

1 \$/kw basis using installed cost in nominal dollars. Instead, the message was
2 that he would at least be slightly less wrong if he at least tried to compare
3 projects using the same type of costs, rather than attempting to compare
4 projects using two types of costs.

5
6 In regard to the second statement, Dr. Jacobs has posed a question which has a
7 false premise. FPL is not trying to justify the cost of the completed EPU
8 using a \$/kw comparison to an unrelated project that is dissimilar in several
9 key characteristics. As mentioned before, this fundamentally flawed approach
10 is solely the creation of Dr. Jacobs.

11 **Q. What was the statement in Dr. Jacobs' testimony that you wish to discuss**
12 **regarding his claim that the FPSC might have made a different decision**
13 **in 2012 if more current cost information had been discussed?**

14 A. That statement is: *“(The actual expenditures for calendar year 2012*
15 *exceeded FPL's April 2012 estimate of \$688 million by \$287 million.) Had*
16 *the FPSC known this information one year ago, it may have decided the issue*
17 *of disallowance that OPC raised at that time differently.”* (page 26, lines 3-6)

18
19 This statement follows earlier discussion by Dr. Jacobs in his testimony to the
20 effect that one FPL projection of EPU 2012 expenditures for the Turkey Point
21 subset was \$688 million while actual expenditures eventually turned out to be
22 \$975 million; i.e., \$287 million higher than projected. Dr. Jacobs also states
23 that FPL witness Jones knew at the time of the 2012 hearing that \$670 million

1 had already been spent during 2012. (These claims are rebutted by FPL
2 witness Jones.) Dr. Jacobs concludes that if the FPSC had known about the
3 expenditures already incurred up to the time of the hearing, the FPSC's
4 decision about the economics of completing the EPU project might have been
5 different.

6 **Q. What is your opinion about Dr. Jacobs' statement that the FPSC "*may***
7 ***have decided...differently*"?**

8 A. My opinion is that I do not believe it is likely that the FPSC would have come
9 to a different decision. The basis for my opinion is a consideration of what
10 the impact of already spent expenditures would have had on an updated
11 version of FPL's 2012 feasibility analyses of the EPU project that logically
12 would have been included in a discussion of already spent expenditures.

13
14 The 2012 feasibility analyses of the EPU project assumed that the cost
15 component of the project related to the Turkey Point site was approximately
16 \$751 million. This value represented projected costs to be incurred from
17 January 1, 2012 through December 31, 2012. It also represented projected
18 total costs for the year including various costs (such as O&M and asbestos
19 removal) that were not part of the \$688 million cost value. The results of the
20 2012 feasibility analyses using the \$751 million value were that completing
21 the EPU project was projected to be cost-effective in 6 of 7 scenarios of fuel
22 cost forecasts and environmental compliance cost forecasts.

23

1 However, if the 2012 feasibility analyses had been updated in August of 2012
2 to account for the fact that \$670 million had already been spent by that time in
3 2012, those expenditures would then have been categorized as sunk costs.
4 Consequently, these costs would have correctly been excluded from the
5 updated feasibility analyses that examined whether completing EPU was
6 projected to be cost-effective. The benefits side of the 2012 feasibility
7 analysis would not have changed if this updated analysis had been performed,
8 but the cost side would definitely have changed. The result would have been
9 a significantly lower projection of costs to complete the project.

10 **Q. Does this conclude your testimony?**

11 A. Yes.

Docket No. 130009-EI
**An Example of How Present Value Results From Projects
 With Different In-Service Dates Are Not Transferable**
 Exhibit SRS - 10, Page 1 of 1

**An Example of How Present Value Results From Projects
 With Different In-Service Dates Are Not Transferable**

- Overview:**
- The same project is examined with two in-service dates: 2013 and 2022
 - The projected benefits represent the "breakeven" cost of the project

Scenario 1: With no annual escalation of benefits for the 2022 project

	w/ 2013 In-Service Date			w/ 2022 In-Service Date		
	(1) Annual Discount Factor (0.0745)	(2) Benefits (Nominal \$)	(3) Benefits (NPV 2013\$) = (1) x (2)	(4) Compound Escalation Rate (0.000)	(5) Benefits (Nominal \$) = (2) x (4) (for <i>in-service year</i>)	(6) Benefits (NPV 2013\$) = (1) x (5)
Year						
2013	1.000	1,000,000	1,000,000	1.000		
2014	0.931			1.000		
2015	0.866			1.000		
2016	0.806			1.000		
2017	0.750			1.000		
2018	0.698			1.000		
2019	0.650			1.000		
2020	0.605			1.000		
2021	0.563			1.000		
2022	0.524			1.000	1,000,000	523,772
		Breakeven Cost (2013\$) = 1,000,000			Breakeven Cost (2013\$) = 523,772	

Scenario 2: With 2.5% annual escalation of benefits for the 2022 project

	w/ 2013 In-Service Date			w/ 2022 In-Service Date		
	(1) Annual Discount Factor (0.0745)	(2) Benefits (Nominal \$)	(3) Benefits (NPV 2013\$) = (1) x (2)	(7) Compound Escalation Rate (0.025)	(8) Benefits (Nominal \$) = (2) x (7) (for <i>in-service year</i>)	(9) Benefits (NPV 2013\$) = (1) x (8)
Year						
2013	1.000	1,000,000	1,000,000	1.000		
2014	0.931			1.025		
2015	0.866			1.051		
2016	0.806			1.077		
2017	0.750			1.104		
2018	0.698			1.131		
2019	0.650			1.160		
2020	0.605			1.189		
2021	0.563			1.218		
2022	0.524			1.249	1,248,863	654,119
		Breakeven Cost (2013\$) = 1,000,000			Breakeven Cost (2013\$) = 654,119	

