86

FPL's Responses to Staff's Fifth Set of Interrogatories Nos. 32-57.

Corrected Interrogatory No. 50

Additional files contained on Staff Hearing Exhibits CD for No. 43

<u>QUESTION</u>:
Fuel Emissions and Emissions Price
Referring to Page 6 of witness Enjamio's March 1, 2017 testimony, please explain how the proposed 2017-2018 Solar Plan will reduce annual CO2 emissions in Florida by 526,000 tons per year, and provide the corresponding calculations.

<u>RESPONSE</u>:
FPL used its production costing model, UPLAN, to project CO_2 emissions for two resource plans, one with and one without FPL's proposed 2017-2018 Solar Projects. The difference in total system CO_2 emissions between the two resource plans represents the CO_2 reduction due to adding the 2017-2018 Solar Projects to FPL's system. This CO_2 reduction comes from solar energy displacing fossil-fuel generated energy. The value of 526,000 tons is the average of all the annual reductions in CO_2 emissions for the period 2018 to 2050, *i.e.*, the "No Solar Plan" has an average of 44,280,000 tons for the period from 2018 to 2050, the "2017-2018 Solar Plan" has an average of 43,754,000 tons for that time period, and the difference of the averages equates to an avoidance of 526,000 tons.

<u>QUESTION</u>:
Referring to witness Enjamio's Direct Testimony, page 7, please explain how the proposed 2017-2018 Solar Plan will reduce annual SO_2 and NOx by an annual average 46 tons and 64 tons, respectively, and provide the corresponding calculations.

<u>RESPONSE</u>:
FPL used its production costing model, UPLAN, to project NO_x and SO_2 FPL system emissions for two resource plans, one with and one without FPL's proposed 2017-2018 Solar Projects. The difference in total NO_x and SO_2 system emissions between the two resource plans represents the emission reduction due to adding the 2017-2018 Solar Projects to FPL's system. These NO_x and SO_2 reductions come from solar energy displacing fossil-fuel generated energy. The values, 64 tons and 46 tons, respectively, are the average of all the annual reductions in NO_x and SO_2 emissions for the period 2018 to 2050. For NO_x, the "No Solar Plan" has an average for the period from 2018 to 2050 of 7,772 tons, the "2017-2018 Solar Plan" has an average of 7,708 for the same time period, and the difference equates to an avoidance of 64 tons. For SO_2, the "No Solar Plan" has an average for the period from 2018 to 2050 of 954 tons, the "2017-2018 Solar Plan" has an average of 908 tons for the same time period, and the difference equates to an avoidance of 46 tons.

QUESTION:
Please refer to witness Enjamio's Direct Testimony, page 3, for the following questions.
a. Referring to lines 9 - 13, does the ICF's CO_2 emission price forecast dated December 2016 include more than one scenario?
b. It your response to question 34.a. is affirmative, how many scenarios in total does the ICF's CO_2 emission price forecast include?
c. If your response to question 34.a. is affirmative, please specify which scenario FPL used as the base of its CO_2 cost projection for the instant docket, and explain why that scenario was chosen as the appropriate one to use.

RESPONSE:
(a) Yes. The ICF CO_2 price projections included three CO_2 price scenarios:

1. A "No Cost" scenario in which no future CO_2 regulation and/or legislation exists (this scenario has a $0/ton cost in each year);
2. A "Clean Power Plan" scenario; and,
3. A "High Cost" scenario which is based on an assumed 80% reduction by 2050 in national CO_2 emissions from 2005 levels.

ICF developed annual probabilities for each of these three scenarios. ICF then developed an expected cost set of values based on an overall probability-weighted CO_2 cost using all three scenarios. This weighted probability forecast was used by FPL as its medium CO_2 price scenario. For its low price scenario, FPL uses the "No Cost" scenario. For its high price scenario, FPL used the "High Cost" Scenario.

The CO_2 prices provided by ICF were provided in 2012 real prices. FPL escalated these prices to annual nominal prices.

(b) See response to (a) above.

(c) FPL used the ICF mid-band scenario described in the answer to subpart (a) of this Interrogatory. FPL used this ICF scenario as the base of its CO_2 cost projection because it is based on the overall probability-weighted forecast for CO_2. This method of developing an expected value projection is reasonable. ICF is well known in the industry, and FPL has been using their data for many years.

QUESTION:
Please provide a summary of all the existing federal, state, and local government policies and rules that regulate CO_2 emissions, and specify each such policy's or rule's economic impacts and associated compliance cost.

RESPONSE:
For coal-fired power plants in Florida, the only rule that currently "regulates" CO_2 emissions is the Federal Greenhouse Gas reporting requirement ("GHG Reporting Rule"). See the following link for more information: https://www.epa.gov/ghgreporting. Compliance costs for FPL related to this requirement are limited to the preparation of the report; any such costs are de minimus and have no economic impact on FPL or its customers. Additionally, when new sites are constructed or existing sites undergo major modifications, the utility must comply with additional regulations for air permitting purposes. These requirements are codified in the Environmental Protection Agency's (EPA's) Greenhouse Gas Tailoring Rule, 40 CFR Part 52.21, and are implemented in Florida Department of Environmental Protection's (FDEP's) rule 62-212.400, and incorporated by reference in Rule 62-204.800, F.A.C.

In addition to the GHG Reporting Rule, EPA's Clean Power Plan (CPP) regulating the emissions of CO_2 from existing electric generating plants is a final rule. In EPA's final rule, a state may choose to set compliance for sources on a system mass basis or rate basis. While FPL's system currently meets the rate set by EPA for Florida where we would have no additional requirements for compliance, we do not know which requirement the state will ultimately adopt and what rate or allocation of allowances the state would impose on FPL. This rule is currently stayed by the U.S. Supreme Court pending resolution of legal challenges to the rule. The timing and ultimate outcome of the Clean Power Plan are uncertain at this time.

On March 28, 2017, the President signed the "Energy Independence" Executive Order (EO) directing EPA to review revise or rescind the Clean Power Plan, including related proposed rules. Also on March 28, 2017, as directed by the President's EO, EPA Administrator Scott Pruitt signed a notice of withdrawal of the proposed Clean Power Plan's associated rules, such as the Federal Implementation Plan, model trading rules, and the proposed Clean Energy Incentive Program design details. On April 28, 2017 the D.C. Circuit granted EPA's request to stay litigation over the Clean Power Plan and ordered briefings on whether the case should be remanded to the agency or kept on hold. The Court's order holds the case in abeyance for 60 days and requires updates from EPA every 30 days. EPA's first status report was filed with the court on May 30, 2017, stating its continued review of the rule and potential initiation of a resulting proposed regulatory action in the near future

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QUESTION:

a. Please provide a summary of the current status of the United States' CO_2 emission market.

b. Has the CO_2 emission cost been actively charged/traded in the United States?

c. If your response to question 36.b. is affirmative, please provide a detailed explanation on how it works.

d. What was the average CO_2 emission cost in 2013, 2014, 2015 and 2016, respectively, in the United States' emission market?

e. What is the current CO_2 emission cost in the United States' emission market?

f. What source does FPL rely upon for its responses to questions 36a.- 36.e. above?

RESPONSE:

a. FPL is not subject to regulations that require it to participate in a CO_2 emissions trading program. We are, however, aware of two such programs in other locations in the United States.

   California CO_2 emissions are regulated by the California Air Resources Board. This Cap-and-Trade program is applicable to industrial facilities, fuel suppliers, and electricity importers. The program took effect in early 2012. The enforceable compliance obligation began on January 1, 2013, for greenhouse gas (GHG) emissions. More information can be found on the California Air Resources Board website at:
   https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

   The Northeast and Mid-Atlantic states participate in the Regional Greenhouse Gas Initiative (RGGI). RGGI is a cooperative effort among nine states – Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont – to reduce greenhouse gas emissions. Regulated entities are fossil-fuel powered electric power generators with a nameplate capacity of 25 MW or more. The first compliance period began on January 1, 2009. This multi-state initiative is facilitated by RGGI, Inc., a 501(c)(3) non-profit corporation created to support development and implementation. More information can be found on the RGGI website at: https://www.rggi.org/

b. CO_2 emissions have been actively traded in the markets identified in response to interrogatory 36(a). In addition to the initial allowances released by the states, there is an actively traded secondary market for each program.

c. Details about the California program can be found on the California Air Resources Board website at: https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm.

   Details about the RGGI program can be found at: http://www.rggi.org/market/co2_auctions.

d. Because FPL is not subject to either of the mentioned CO_2 emissions markets, the Company relies upon information from publicly available sources to respond to this interrogatory.

   After each of their allowance auctions, California publishes a Summary Results Report that shows the clearing prices for that auction. Those reports can be found at: https://www.arb.ca.gov/cc/capandtrade/auction/auction_archive.htm

   RGGI, Inc. produces an annual market report each year that includes pricing information from its auction of allowances. The most recent copy can be found at: https://www.rggi.org/market/market_monitor

   We are also aware there is a robust secondary market for each of these programs but do not have that pricing information.

e. See FPL's response to interrogatory 36(d).

f. See FPL's response to interrogatory 36(d).

QUESTION:
a. Historically, has FPL ever incurred any CO_2 emission costs?
b. If your response to question 37.a. is affirmative, please provide details about the transaction(s), as well as the corresponding cost recovery.
c. If your response to question 37.a. is negative, when does FPL expect that it will be affected by a CO2 emission regulation/rule in the near future?

RESPONSE:

a. No. FPL has not incurred any historical CO_2 emission costs
b. Not applicable.
c. FPL bases its projection of CO_2 prices (amount and timing) on the CO_2 forecasts provided by ICF. The low-cost CO_2 forecast assumes no CO_2 costs for every year of the analysis. The mid-band and high-band scenarios assume that CO_2 costs resulting from one or more CO_2 emission regulation(s)/rule(s) start in 2028. The amount of the CO_2 costs is significantly different in each of these two scenarios.

QUESTION:
Given President Trump's announcement that the U.S. will leave the Paris Climate Accord, what is the expected impact on future U.S. CO_2 emission costs?

RESPONSE:
The ICF International forecast for CO_2 emissions, used by FPL, is based on the weighted probabilities of different scenarios of future CO_2 policy. ICF has advised that it does not believe that the forecast needs to be revised at this time to account for President Trump's announcement that the U.S. will leave the Paris Climate Accord. The different scenarios used by ICF already address the uncertainties that Federal elections may have on future climate change and global-warming policies, including potential policy reversals.

QUESTION:
Fuel Price
Please refer to the March 1st 2017 testimony of Florida Power & Light (FPL) Witness Juan E. Enjamio, Page 4, lines 5-8. Please identify the sources and dates of FPL's fuel price forecast used in support of its proposed St. Johns River Power Park (SJRPP) Transaction.

RESPONSE:
A November 2016 fuel cost forecast was used in FPL's proposed SJRPP Transaction.

Fossil fuel price forecasts, and the resulting projected price differentials between fuels, are major drivers used to evaluate alternatives for meeting future resource needs. FPL's forecasts are generally consistent with other published contemporary forecasts.

Future oil and natural gas prices, and to a lesser extent, coal prices, are inherently uncertain due to a significant number of unpredictable and uncontrollable drivers that influence the short- and long-term price of oil, natural gas, and coal. These drivers include U.S. and worldwide demand, production capacity, economic growth, environmental requirements, and politics.

The inherent uncertainty and unpredictability of these factors today and in the future clearly underscore the need to develop a set of plausible oil, natural gas, and solid fuel (coal) price scenarios that will bound a reasonable set of long-term price outcomes.

FPL's Medium price forecast methodology is consistent for oil and natural gas. For oil and natural gas commodity prices, FPL's Medium price forecast applies the following methodology:

a. Through 2018, the methodology used the November 2016 forward curve for New York Harbor 0.7% sulfur heavy oil, Ultra-Low Sulfur Diesel (ULSD) fuel oil, and Henry Hub natural gas commodity prices;
b. For the next two years (2019 and 2020), FPL used a 50/50 blend of the November 2016 forward curve and the most current projections at the time from The PIRA Energy Group;
c. For the 2021 through 2035 period, FPL used the annual projections from The PIRA Energy Group; and,
d. For the period beyond 2036, FPL used the real rate of escalation from the Energy Information Administration (EIA). In addition to the development of oil and natural gas commodity prices, nominal price forecasts also were prepared for oil and natural gas transportation costs. The addition of commodity and transportation forecasts resulted in delivered price forecasts.

FPL's Medium price forecast methodology is also consistent for coal prices. Forecasted coal prices were based upon the following approach:

a. Delivered price forecasts for Central Appalachian (CAPP), Illinois Basin (IB), Powder River Basin (PRB), and South American coal were provided by JD Energy; and,

b. The coal price forecast for SJRPP and Plant Scherer assumes the continuation of the existing mine-mouth and transportation contracts until expiration, along with the purchase of spot coal, to meet generation requirements.

QUESTION:
Please identify the date, if known, of FPL's next/updated fuel price forecast that will be used for Company/business planning purposes.

RESPONSE
Consistent with FPL's annual updating process, FPL expects to update its long-term price fuel forecast at the end of 2017.

QUESTION:

Please refer to Witness Enjamio's March 1st 2017 testimony, Page 4, lines 5-8, 16-21, continuing to Page 5, lines 1-8.

a. Did FPL perform any sensitivity analysis of its fuel price forecast for the purposes of determining the Cumulative Present Value of Revenue Requirements (CPVRR) for either the "No Solar Plan," or the "2017-2018 Solar Plan."

b. If the response to 41.a. is negative, please explain why the Company did not perform a sensitivity analysis of its fuel price forecast.

RESPONSE:

a. Yes. FPL performed analyses with various sensitivities of natural gas price and CO_2 price forecasts for the purposes of determining the CPVRR between the "No Solar Plan" versus the "2017-2018 Solar Plan." Please see FPL's response to Staff's Fifth Set of Interrogatories No. 57.
b. Not applicable.

QUESTION:
Please provide the percent error in FPL's delivered natural gas price forecasts out 5 to 10 years for FPL's 2001 through 2006 Ten Year Site Plans, per the following tables.

RESPONSE:
Please see below the percent error in FPL's delivered natural gas price forecasts out 5 to 10 years for FPL's 2001 through 2006 Ten Year Site Plans.

Year	Natural Gas Price Annual Forecast ($/MMbtu)					
	Years Prior					
	10	9	8	7	6	5
2011	$5.32	$4.21	$5.79	$6.81	$6.94	$5.93
2012	$4.32	$5.94	$7.00	$7.17	$6.15	
2013	$6.10	$7.19	$7.40	$6.58		
2014	$7.40	$7.64	$6.92			
2015	$8.05	$7.30				
2016	$7.89					
Average	$6.51	$6.46	$6.78	$6.86	$6.54	$5.93

Year	Natural Gas Price Annual Actuals ($/MMbtu)					
	Years Prior					
	10	9	8	7	6	5
2011	$4.18	$4.18	$4.18	$4.18	$4.18	$4.18
2012	$2.92	$2.92	$2.92	$2.92	$2.92	
2013	$3.83	$3.83	$3.83	$3.83		
2014	$4.53	$4.53	$4.53			
2015	$2.72	$2.72				
2016	$2.52					
Average	$3.45	$3.64	$3.86	$3.64	$3.55	$4.18

Year	Natural Gas Price Annual Forecast Error Rate (%)					
	Years Prior					
	10	9	8	7	6	5
2011	21%	1%	28%	39%	40%	30%
2012	32%	51%	58%	59%	53%	
2013	37%	47%	48%	42%		
2014	39%	41%	35%			
2015	66%	63%				
2016	68%					
Average	47%	44%	43%	47%	46%	30%

QUESTION:
Please provide the average percentage increase/decrease in FPL's natural gas price forecast in this docket based on applying one standard deviation (plus and minus) of FPL's historical monthly delivered fuel price from 2002 through 2016 to FPL's natural gas price forecast. Please provide all related worksheets.

RESPONSE:
The average percentage increase/decrease in FPL's forecasted price from natural gas, calculated with the methodology described in this interrogatory is 47.75%. However, FPL's typical forecast methodology for its high and low long–term natural gas price forecasts is based on a statistical measurement of the volatility of gas prices over the past 8 years. This computation reflects one standard deviation in prices up and down from the average for that period, which provides less volatility as it removes the seasonality of the month to month changes in the calculation. Please see Attachment No. 1.

QUESTION:
Load Forecast
FPL's projection of 2017 winter peak demand (20,361 MW) is 20.2% higher than its 2016 historical level, as reported in Schedule 3.2, p. 44 of FPL's 2017 Ten-Year Site Plan. Please identify the factor or factors that account for this large increase in demand in 2017.

RESPONSE:
Mild temperatures during the winter of 2016 caused a lower observed winter peak demand than would have occurred with normal weather. This lower actual winter peak in 2016, combined with the winter peak forecast for 2017, which assumes normal weather, is the reason for the increase in the winter peak demand from actual 2016 to forecast 2017.

QUESTION:

FPL's projection of 2022 winter peak demand is lower than the previous year by approximately 0.28%. This is the only year included in the forecast period in which winter peak demand is projected to decline. To what factor or factors is this decline attributable?

RESPONSE:

FPL's projection for the 2022 winter peak demand is lower than the previous year because its contract with one of its wholesale customers ends in May 2021. Therefore, the load for this customer is included in the winter peak forecast for 2021, but is no longer included in the winter peak forecast for 2022.

QUESTION:
FPL's projection of 2017 Net Energy for Load (NEL) is 6.5% lower than the actual 2016 NEL, as reported in Schedule 3.3, page 45 of FPL's 2017 Ten-Year Site Plan. What are the factors that contribute to this decline?

RESPONSE:
Three factors account for the decline of 6.5% in NEL from actual 2016 to forecast 2017.

First, the 6.5% lower NEL forecast in 2017 compared with actual 2016 NEL is based on Schedule 3.3, column 2. This column does not include adjustments for demand side management (DSM) measures. Calculating this same percentage using column 5, which is actual NEL and includes DSM adjustments, reduces the -6.5% to -2.1%. The reason for this is the historical NEL in column 2 are the sum of columns 3, 4, and 5. Hence total DSM is added back to the actual NEL values. For the forecasted NEL, the same formula applies; however, for the forecast years, incremental DSM, not total DSM, is included in Schedule 3.3, therefore only incremental DSM is added to the forecast NEL values.

Second, 2016 experienced warmer than normal temperatures, resulting in a higher NEL than would have been experienced with normal weather. Adjusting for weather reduces 2016 NEL by about 1.8%.

Third, changes to FPL's wholesale contracts reduced the 2017 NEL forecast by about 0.5%.

<u>QUESTION</u>:
FPL forecasts a decline of 0.22% in NEL from 2020 to 2021. Please identify the factor or factors that contribute to this decline.

<u>RESPONSE</u>:
FPL's NEL projection for 2021 is lower than 2020 because its contract with one of its wholesale customers ends in May 2021. Without the termination of this contract, there would be a modest increase in NEL between 2020 and 2021.

QUESTION:
Please identify all assumptions and data sources regarding population growth used by FPL in its forecast of NEL.

RESPONSE:
FPL forecasts NEL using a NEL per customer regression model. The output from that model is multiplied by the total customer forecast to derive a NEL forecast. The total customer forecast is based on a regression model that has as one of its drivers, Florida population. Data on Florida population, both historical and forecast, are obtained from IHS Global Insight. Specifically, the population forecast used in developing FPL's total customer and NEL forecasts was IHS Global Insight's August 2016 update.

QUESTION:
Please identify any and all assumptions regarding FPL's customer forecasts used by FPL as inputs into its forecasts of system summer and winter peak demand and NEL.

RESPONSE:
The forecasts of system summer and winter peak demand and NEL are based on use per customer regression models. The output from those models is multiplied by the total customer forecast to derive the summer and winter peak demand and NEL forecasts. Total customers are projected using a regression model with an intercept term, Florida's population, and an Unknown Usage indicator. The Unknown Usage indicator represents a step change in FPL's customer growth due to the installation of Smart Meters. In addition, the model has two autoregressive terms and a seasonal autoregressive term to correct for correlation in the residuals. The growth in Florida's population is a key indicator in projecting FPL's total customers. Specifically, the population forecast used in developing FPL's total customer and summer and winter peak demand forecasts was the August 2016 IHS Global Insight update.

QUESTION:
Please identify any and all assumptions regarding cooling degree-days and heating degree-days used by FPL in its forecast of NEL growth.

RESPONSE:
Weather is an important factor affecting the company's forecast of NEL growth. Cooling degree-hours based on 72° F, winter heating degree-days based on 66° F, and heating degree-days based on 45° F are used to forecast energy sales.

The cooling degree-hours and heating degree-days are used to capture the changes in the electric usage of weather sensitive appliances, such as air conditioners and electric heaters, that occur because of changing weather conditions. Heating-degree days based on 45 degrees is used to capture heating load resulting from sustained periods of unusually cold weather not captured by the heating degree-day variable based on 66° F. The procedure for calculating cooling degree-hours and heating degree-days is as follows:

A composite system-wide temperature is developed using hourly temperatures from the four weather stations (Miami, Fort Myers, Daytona Beach, West Palm Beach) in FPL's service territory. The hourly temperatures from the four stations are weighted by the sales in that region to produce a system temperature.

Heating degree-days are calculated by subtracting the actual average daily composite temperature from a base temperature of 66° (the negative values are ignored).
The heating degree-days are then summed for the given month to obtain a monthly value.

Cooling degree-hours are calculated by subtracting a base temperature of 72° from the actual hourly composite temperature (the negative values are ignored). The cooling degree-hours are then summed together for the day and divided by 24 to obtain daily cooling degree-hours, which are then summed for the given month to obtain a monthly value.

QUESTION:
Please identify any and all assumptions and data sources regarding maximum and minimum temperatures used by FPL in its forecast of summer and winter system peak demand.

RESPONSE:
A composite system-wide temperature is developed using hourly temperatures from the four weather stations (Miami, Fort Myers, Daytona Beach, West Palm Beach) in FPL's service territory. The hourly temperatures from the four stations are weighted by the sales in that region to produce a system temperature. The maximum temperature on the peak day, along with the build-up of cooling degree-hours two days prior to the peak, are used to forecast the summer peaks. The minimum temperature on the peak day, along with the square of the build-up of heating degree-hours based on 66° F on the day prior to the peak, are used to forecast winter peaks.

QUESTION:
Please identify any and all assumptions and data sources regarding energy efficiency codes and standards on end-use energy efficiency.

RESPONSE:
Energy efficiency codes and standards are incorporated into the Net Energy for Load (NEL) forecast via an independent variable in the NEL regression model. This variable captures improvements in energy efficiency for 16 programs which encapsulate lighting, HVAC, refrigeration, water heating, and building codes. Models are developed for each of the 16 energy efficiency programs.

These models are developed by Itron, with whom FPL contracts to perform a biennial study on the impact of energy efficiency codes and standards in FPL's service territory. In addition to updating the current models, the study involves a review of Appliance Standards Awareness Project (ASAP) material and other sources to determine if any new standards are required to be modeled and included in the study or if modifications are required for any of the existing models. Only standards based on existing laws and regulations or standards scheduled to be implemented in the future that are the result of existing laws and regulations are included.

Itron provides historical and forecasted impacts of energy efficiency programs on an annual basis for NEL, summer peak, and winter peak. FPL then distributes the annual NEL to each month as follows:

- Weather sensitive loads are distributed based on each month's share of cooling degree hours,
- Lighting loads are distributed based on the number of nighttime hours in each month, and
- Refrigeration, water heating, and building codes are distributed based on the number of days in each month.

An energy efficiency impact per customer is then calculated by dividing the monthly energy efficiency impact by the monthly customers. This energy efficiency impact per customer is used in the NEL model as an independent variable.

<u>QUESTION</u>:
On page 3 of his March 1, 2017 direct testimony, Witness Enjamio states that FPL's economic analysis of its four proposed universal solar energy centers revealed that they "...result in a reduction in the Cumulative Present Value of Revenue Requirements ("CVPRR") to FPL customers, for a total savings of approximately $39 million." What total savings would result based on a change in FPL's NEL forecast (for all forecast years) of a) + 10% and b) - 10%?

<u>RESPONSE:</u>
FPL has never had a forecast error of +/-10% or more looking one or two years out for NEL and one to four years out for summer peak. Forecast errors greater than +/-10% beyond those time periods were due to the Great Recession. Also, a higher NEL would tend to result in a higher summer peak and vice versa. Therefore, based on clarifications provided by Staff regarding this interrogatory, FPL has evaluated scenarios based on FPL's own historical forecast errors for both NEL and summer peak which were then widened to +/- 10%.

The methodology used to calculate the high and low NEL and summer peak bands included calculating both the NEL and summer peak historical forecast error from one to ten years out. TYSP forecasts from 1989 to 2016 were used in the analysis. Once the mean and standard deviation of forecast errors one to ten years out were calculated for both NEL and summer peak, two-sided 50% confidence intervals were calculated. This provided P75 and P25 scenarios based on historical forecast errors for both NEL and summer peak. These bands ranged from roughly 1.5% one year out to 7.5% ten years out. The bands were then extended beyond the ten year forecast horizon by widening the bands from +/-7.5% to +/-10% over the following few years. The bands remained at +/-10% for the remainder of the analysis period.

The impact of the Great Recession on historical forecast errors is significant. Although the forecast bands in our analysis expand to 7.5% ten years out, we would not expect forecast errors to reach this level. The widened bands of 10% in the years that follow are even less probable. Removing the Great Recession years from the analysis results in more realistic forecast errors in the range of 1.3% - 3.7%.

Using the NEL/peak forecasts described above, including the years impacted by the Great Recession, FPL's economic analysis shows that under the high NEL/peak forecast (+10% scenario) the 2017 and 2018 Solar Projects result in $182 million savings to our customers (CPVRR), an increase over the filed case. Under the low NEL/peak load forecast (-10% scenario) the 2017 and 2018 Solar Projects result in $179 million costs to customers (CPVRR). For each of these two NEL/peak scenarios, these CPVRR values are based on the difference between two cases (with and without the Solar Projects) but using the same NEL/peak forecast.

These results are emblematic of the significant impact of the Great Recession on historical forecast errors. Because, as stated above, FPL does not expect errors to reach 7.5%, the resulting CPVRR derived from that error level is equally improbable.

QUESTION:
Please provide the historical system annual emissions of CO_2, SO_2, and NO_x for FPL generating units from 2007 through 2016.

RESPONSE:
The table below provides the historical emissions of Registered Air Pollutants and CO_2.

Year		SO_2		NO_X		CO_2	
		lb/MWh	Tons	lb/MWh	Tons	lb/MWh	Tons
Actual	**2007**	1.400	68,441	0.810	39,735	896	43,826,364
	2008	1.010	47,976	0.679	32,375	851	40,444,387
	2009	0.847	40,790	0.574	27,618	845	40,706,301
	2010	0.688	34,419	0.448	22,409	818	40,912,209
	2011	0.395	20,149	0.325	16,554	799	40,711,094
	2012	0.195	10,024	0.329	16,930	820	42,188,541
	2013	0.070	3,740	0.280	14,982	768	40,854,211
	2014	0.113	6,263	0.26	14,180	734	40,566,007
	2015	0.052	3,089	0.240	14,163	752	44,640,147
	2016	0.047	2,790	0.201	11,951	709	42,053,698

QUESTION:
Please specify FPL's forecasts of the annual system emission amounts for CO_2, SO_2, and NOx for 2017 through 2050, under the two resource plans discussed on Page 4 of witness Enjamio's March 1, 2017 testimony.

RESPONSE:
Please see attached FPL's forecast of the annual system emission amounts for CO_2, SO_2, and NO_x for 2017 through 2050 for both resource plans (No Solar Plan and 2017-2018 Solar Plan).

	No Solar Plan				2017-2018 Solar Plan		
	FPL's Annual System Emission Amounts for the following:				FPL's Annual System Emission Amounts for the following:		
Year	CO_2 (Tons)	SO_2 (Tons)	NO_x (Tons)	Year	CO_2 (Tons)	SO_2 (Tons)	NO_x (Tons)
2017	38,360,857	2,284	11,742	2017	38,360,284	2,284	11,742
2018	38,194,807	1,707	11,085	2018	37,502,796	1,473	10,699
2019	37,918,789	1,967	11,032	2019	37,212,827	1,727	10,648
2020	37,034,363	1,229	9,381	2020	36,395,531	1,152	9,057
2021	36,937,219	1,259	9,304	2021	36,220,992	1,181	8,938
2022	36,957,065	1,154	8,957	2022	36,283,965	1,044	8,583
2023	37,353,304	1,192	9,039	2023	36,690,591	1,072	8,721
2024	37,999,602	1,363	9,464	2024	37,315,785	1,220	9,148
2025	37,734,058	1,144	8,636	2025	37,671,996	1,188	9,535
2026	37,645,418	1,051	7,676	2026	37,602,501	1,081	8,359
2027	38,646,936	1,153	8,128	2027	38,065,605	1,059	7,904
2028	38,743,562	1,215	7,975	2028	38,095,423	1,106	7,717
2029	39,452,598	1,197	7,523	2029	39,238,421	1,158	8,216
2030	39,886,368	1,184	7,051	2030	39,568,489	1,072	7,363
2031	38,291,941	959	6,557	2031	37,691,880	906	6,365
2032	36,542,388	926	6,029	2032	35,896,753	845	5,781
2033	39,388,709	733	6,474	2033	38,866,143	728	6,386
2034	40,236,487	711	6,373	2034	39,724,509	710	6,306
2035	40,699,637	684	6,190	2035	40,123,994	672	6,083
2036	44,298,020	675	6,578	2036	43,786,650	671	6,510
2037	44,840,802	671	6,594	2037	44,320,899	664	6,526
2038	45,641,242	666	6,608	2038	45,126,937	662	6,542
2039	46,419,220	673	6,730	2039	45,920,300	670	6,671
2040	46,684,192	682	6,711	2040	46,167,557	675	6,616
2041	47,492,604	678	6,854	2041	46,981,146	675	6,756
2042	48,173,639	674	6,816	2042	47,667,913	671	6,752
2043	50,423,362	687	7,185	2043	49,921,874	685	7,122
2044	51,686,976	691	7,270	2044	51,176,368	690	7,201
2045	52,504,028	705	7,422	2045	51,988,378	701	7,341
2046	52,829,306	694	7,346	2046	52,316,662	691	7,280
2047	53,390,177	700	7,437	2047	52,889,164	693	7,378
2048	54,289,558	704	7,506	2048	53,780,952	697	7,441
2049	54,997,154	707	7,564	2049	54,488,439	699	7,500
2050	55,704,750	710	7,622	2050	55,195,927	701	7,559

QUESTION:
Please provide the most recent five years of monthly commodity, transportation, and delivered prices for natural gas in terms (nominal or real) consistent with Production of Documents request No. 1.

RESPONSE:
Please see attached the most recent five years of monthly commodity, transportation, and delivered prices for natural gas, consistent with FPL's response to Staff's Production of Documents Request No. 2.

Commodity Cost - Gas ($/mmbtu)[1 2]												
Year	January	February	March	April	May	June	July	August	September	October	November	December
2012	$3.03	$2.66	$2.38	$2.19	$2.14	$2.49	$2.90	$3.07	$2.71	$3.11	$3.55	$3.66
2013	$3.36	$3.27	$3.58	$4.08	$4.18	$4.14	$3.74	$3.48	$3.60	$3.55	$3.55	$3.96
2014	$4.45	$5.70	$4.88	$4.63	$4.74	$4.60	$4.32	$3.84	$3.95	$3.93	$3.80	$4.07
2015	$3.11	$2.85	$2.85	$2.55	$2.59	$2.78	$2.77	$2.84	$2.62	$2.46	$2.02	$2.08
2016	$2.32	$2.13	$1.69	$1.86	$1.94	$2.09	$2.89	$2.69	$2.84	$2.92	$2.65	$3.26

Transportation Cost - Gas ($/mmbtu)[3]												
Year	January	February	March	April	May	June	July	August	September	October	November	December
2012	$0.080	$0.070	$0.064	$0.087	$0.086	$0.097	$0.114	$0.123	$0.106	$0.091	$0.100	$0.102
2013	$0.094	$0.093	$0.103	$0.141	$0.151	$0.152	$0.139	$0.131	$0.133	$0.097	$0.096	$0.106
2014	$0.120	$0.148	$0.131	$0.126	$0.131	$0.127	$0.118	$0.105	$0.105	$0.115	$0.105	$0.113
2015	$0.089	$0.082	$0.083	$0.103	$0.104	$0.112	$0.112	$0.117	$0.108	$0.090	$0.075	$0.079
2016	$0.083	$0.078	$0.068	$0.071	$0.072	$0.078	$0.103	$0.100	$0.102	$0.089	$0.078	$0.093

Delivered Cost - Gas ($/mmbtu)[4]												
Year	January	February	March	April	May	June	July	August	September	October	November	December
2012	$3.11	$2.73	$2.44	$2.28	$2.23	$2.59	$3.01	$3.19	$2.82	$3.20	$3.65	$3.76
2013	$3.46	$3.36	$3.68	$4.22	$4.33	$4.29	$3.88	$3.62	$3.73	$3.65	$3.65	$4.07
2014	$4.57	$5.84	$5.01	$4.75	$4.87	$4.73	$4.44	$3.94	$4.05	$4.04	$3.91	$4.18
2015	$3.19	$2.93	$2.93	$2.66	$2.70	$2.89	$2.88	$2.96	$2.72	$2.55	$2.10	$2.16
2016	$2.40	$2.21	$1.76	$1.93	$2.01	$2.17	$2.99	$2.79	$2.94	$3.01	$2.73	$3.35

Notes:

1 - Commodity Cost includes basis

2 - Commodity Cost is a function of the natural gas mmbtu purchased at various upstream locations.

3 - Transportation includes a weighted average loss factor for FGT and Gulfstream

4- Calculation: Sum of Commodity and Transportation Costs

QUESTION:
Please provide any alternative scenarios of the CPVRR of FPL's Solar Plan vs. No Solar Plan discussed on Page 6 Enjamio's March 1, 2017 testimony based on reasonable fluctuations of major cost drivers, such as fuel price and CO2 costs.

RESPONSE:
Since FPL witnesses Enjamio and Brannen filed their direct testimonies on March 1, 2017, there have been two major assumption changes that affect the economic analysis of FPL's Solar Projects. These changes are: (1) a reduction in real estate property taxes due to the passage of Florida Senate Bill 90, which provides a tax exemption to qualifying solar installations; and (2) a reduction in the Solar Projects' expected capital costs. Updating these assumptions improves the CPVRR savings of the Solar Plan. Contemporaneous with the filing of this discovery response, both Mr. Enjamio and Mr. Brannen will file supplemental testimony describing these assumption changes and the resulting improvement in cost savings for FPL's customers.

FPL has performed CO_2 emission and natural gas cost sensitivities based on the updated CPVRR analysis, which accounts for the reduced property taxes and capital costs. The table below provides the results of these alternative sensitivities of the CPVRR of FPL's 2017-2018 Solar Plan vs. No Solar Plan. The low and high CO_2 cost and natural gas cost forecasts used in these sensitivities are described below.

CO2 Cost Forecast – Sensitivities
For the low CO_2 cost sensitivity (called ENV I), FPL assumed that CO_2 costs were zero throughout the analysis. For the base case sensitivity (called ENV II), FPL used a forecast developed by ICF International which assumes CO_2 costs start in 2028. For the high CO_2 cost cases (called ENV III), FPL used a high band case developed by ICF which assumed legislative action that would take effect in 2028 resulting in higher costs than the base case (ENV II) forecast.

Natural Gas Cost Sensitivities
FPL's high and low long–term natural gas price forecasts are based on a statistical measurement of the volatility of gas prices over the past 8 years. This computation reflects one standard deviation in prices up and down from the average for that period and results in high and low prices, which are approximately +/- 20% of the base forecast.

SoBRA Gas Price and Environmental Cost Sensitivities *
(millions, CPVRR, 2017 - 2050)

(1)	(2)	(3)	(4)	(5) = (3) - (4)
Fuel Cost Forecast	Environmental Compliance Cost Forecast	Total Costs for Plans Resource Plan 2017-2018 Solar Plan	Resource Plan No Solar Plan	Total Cost Difference 2017-2018 Solar Plan minus No Solar Plan
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High Fuel Cost	Env I	$56,877	$57,007	**(131)**
High Fuel Cost	Env II	$63,496	$63,699	**(204)**
High Fuel Cost	Env III	$76,736	$77,095	**(359)**
Medium Fuel Cost	Env I	$49,358	$49,390	**(32)**
Medium Fuel Cost	Env II	$55,874	$55,980	**(106)**
Medium Fuel Cost	Env III	$69,105	$69,368	**(263)**
Low Fuel Cost	Env I	$41,617	$41,557	**60**
Low Fuel Cost	Env II	$48,140	$48,154	**(14)**
Low Fuel Cost	Env III	$61,375	$61,545	**(170)**

* Negative Indicates Savings to FPL Customers

ENV I is the low CO_2 Forecast. ENV II is the base case CO_2 forecast. ENV III is the high cost CO_2 forecast.

DECLARATION

I co-sponsored the answer to Interrogatory 53 from Staff's Fifth Set of Interrogatories (Nos. 32-57) to Florida Power & Light Company in Docket No. 20170001-EI. The responses are true and correct based on my personal knowledge.

Under penalties of perjury, I declare that I have read the foregoing declaration and the interrogatory answers identified above, and that the facts stated therein are true.

Richard Feldman

Date: 8-11-17

DECLARATION

I co-sponsored the answer to Interrogatory 53 from Staff's Fifth Set of Interrogatories (Nos. 32-57) to Florida Power & Light Company in Docket No. 20170001-EI. The responses are true and correct based on my personal knowledge.

Under penalties of perjury, I declare that I have read the foregoing declaration and the interrogatory answers identified above, and that the facts stated therein are true.

Juan Enjamio
Juan Enjamio

Date: August 11, 2017

DECLARATION

I sponsored the answers to Interrogatory Nos. 39, 42 through 43 and 56 from Staff's Fifth Set of Interrogatories (Nos. 32-57) to Florida Power & Light Company in Docket No. 20170001-EI, and that the responses are true and correct based on my personal knowledge.

Under penalties of perjury, I declare that I have read the foregoing declaration and the interrogatory answers identified above, and that the facts stated therein are true.

Gerard J. Yupp

Date: 7/27/17

DECLARATION

I sponsored the answers to Interrogatory Nos. 44 through 52 from Staff's Fifth Set of Interrogatories (Nos. 32-57) to Florida Power & Light Company in Docket No. 20170001-EI, and that the responses are true and correct based on my personal knowledge.

Under penalties of perjury, I declare that I have read the foregoing declaration and the interrogatory answers identified above, and that the facts stated therein are true.

Matthew Simmons

Date: 7/26/17

DECLARATION

I sponsored the answers to Interrogatory Nos. 35 through 38 and 54 from Staff's Fifth Set of Interrogatories (Nos. 32-57) to Florida Power & Light Company in Docket No. 20170001-EI, and that the responses are true and correct based on my personal knowledge.

Under penalties of perjury, I declare that I have read the foregoing declaration and the interrogatory answers identified above, and that the facts stated therein are true.

John Hampp

Date: July 26, 2017

DECLARATION

I sponsored the answers to Interrogatory Nos. 32-34, 40-41, 55 and 57 from Staff's Fifth Set of Interrogatories (Nos. 32-57) to Florida Power & Light Company in Docket No. 20170001-EI, and that the responses are true and correct based on my personal knowledge.

Under penalties of perjury, I declare that I have read the foregoing declaration and the interrogatory answers identified above, and that the facts stated therein are true.

Juan Enjamio

Date: Aug. 2, 2017