BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 13 0198 -EI
FLORIDA POWER & LIGHT COMPANY

IN RE: PETITION FOR PRUDENCE DETERMINATION REGARDING NEW PIPELINE SYSTEM

DIRECT TESTIMONY & EXHIBITS OF:

ROSEMARY MORLEY

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

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JULY 26, 2013

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Rosemary Morley, and my business address is Florida Power & Light Company, 700 Universe Boulevard, Juno Beach, Florida 33408.

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

A. I am employed by Florida Power & Light Company ("FPL" or the "Company") as the Director of Load Forecasting and Analysis.

Q. Please describe your educational background and professional experience.

A. I hold a Bachelor of Arts ("B.A.") degree with honors in economics from the University of Maryland, a Master of Arts ("M.A.") degree in economics from Northwestern University, and a Doctorate in Business Administration ("D.B.A.") from Nova Southeastern University. I began my career with FPL in 1983 as an Assistant Economist. I have since held a variety of positions in the forecasting, planning, and regulatory areas. I assumed my current position in 2007. I have received designation as a certified professional forecaster ("CPF") from the Institute of Business Forecasting and Planning and am a member of the National Association of Business Economists.

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

A. I am responsible for the development of FPL's peak demand, energy, and customer forecasts.

Q. Are you sponsoring any exhibits in this case?

A. Yes. I am sponsoring the following exhibits which are attached to my direct testimony:

- RM-1 Customer Forecast
- RM-2 Forecast of Real Disposable Income per Household (Confidential)
- RM-3 Forecast of the Consumer Price Index for Energy (Confidential)
- RM-4 Summer Peak Forecast (MW)
- RM-5 Adjustment Factors Used in the Risk-Adjusted Forecasts
- RM-6 Forecast of Weighted Per Capita Income
- RM-7 Net Energy for Load Forecast (GWh)

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to describe FPL's load forecasting process, identify the underlying methodologies and assumptions, and review the results of FPL's long-term forecast. FPL's long-term forecast includes base case projections of customers, net energy for load, and peak demands. These base case projections are designed to reflect the most likely future values of these series. They are consistent with forecasts presented in FPL's 2013 Ten Year Site Plan, which was filed on April 1, 2013.

In addition, FPL's long-term load forecast includes risk-adjusted projections of net energy for load and summer peak demands. FPL's risk-adjusted projections are designed to reflect the higher levels of net energy for load and summer peak demands that could occur in the future given the uncertainties inherent in the forecasting process. These uncertainties have been quantified based on the differences between actual and forecasted values of the summer peak and net energy for load that FPL has experienced historically. The base case and risk-adjusted load forecasts have been utilized in FPL's analyses of the Pipeline System.

Q. Please summarize your testimony.

A. My testimony demonstrates that the assumptions and methodologies underlying both the base case and risk-adjusted load forecasts are prudent, reasonable, and well-supported. Both the base case and risk-adjusted forecasts used by FPL in this proceeding rely on statistically sound methods and inputs from objective third-party experts. Under FPL's base case forecast, summer peak is expected to reach 26,105 MW by 2022, an increase of 4,665 MW over the actual 2012 summer peak. Under the risk-adjusted forecast, summer peak is expected to reach 29,176 MW by 2022, an increase of 7,736 MW over the actual 2012 summer peak. The cumulative increases in net energy for load are likewise significant. Under FPL's base case forecast, net energy for load is expected to reach 130,965 gigawatt-hours ("GWh") by 2022, an increase of 20,145 GWh over the actual 2012 net energy for load. Under the risk-adjusted forecast, net energy for load is expected to reach

141,222 GWh by 2022, an increase of 30,402 GWh over the actual 2012 net energy for load.

II. OVERVIEW OF FPL'S LOAD FORECASTING PROCESS

Q. Please describe FPL's forecasting process.

A. FPL relies on econometrics as the primary tool for projecting future levels of customer growth, net energy for load, and summer peak demand. An econometric model is a numerical representation, obtained through statistical estimation techniques, of the degree of relationship between a dependent variable, e.g., the level of net energy for load, and the independent (explanatory) variables. A change in any of the independent variables will result in a corresponding change in the dependent variable. On a historical basis, econometric models have proven to be highly effective in explaining changes in the level of customer and load growth. FPL has consistently relied on econometric models for various forecasting purposes, and the modeling results have been reviewed and accepted by this Commission in past proceedings, including Docket Nos. 110018-EU (need determination for expansion of SWA renewable energy facility) and 110309-EI (need determination for modernization of Port Everglades Plant).

Q. What independent variables does FPL use to forecast customer growth, net energy for load, and peak demand?

A. Generally speaking, FPL has found that population growth, the economy, appliance standards, and weather are the primary drivers of future electricity needs. Accordingly, the models used to forecast customer growth, net energy for load, and peak demand rely on independent variables representing these drivers.

Q. What sources does FPL rely on for projections of these independent variables?

A. FPL relies on leading industry experts for projections of these independent variables. Population projections are produced by the University of Florida's Bureau of Economic and Business Research ("BEBR") in conjunction with the Office of Economic and Demographic Research ("EDR") of the state legislature. The projected economic conditions are from IHS Global Insight, a reputable economic forecasting firm. Estimates of appliance standards are provided by ITRON, one of the leading consultants on energy issues.

Q. How do FPL's base case and risk-adjusted forecasts differ?

A. FPL's base case forecast reflects the most likely future values of customers, summer peak, and net energy for load. As such, FPL's base case is designed to reflect an approximately equal chance of under- or over-forecasting the summer peak and net energy for load. FPL's risk-adjusted forecast has been developed to reflect the higher levels of net energy for load and summer peak demands that could occur in the future given past differences between actual and forecasted values for the summer peak and net energy for load. Based on comparisons between past actual and forecasted values, there is a 75% probability that the actual future level of each series will be equal to or less than its risk-adjusted projections. Conversely, there is a 25% probability, based on past actual-to-forecast comparisons, that the actual future values of the summer peak and net energy for load will be higher than their risk-adjusted projections. Thus, FPL's risk-adjusted projections are designed to reduce, but not eliminate, the probability of under-forecasting the summer peak and net energy for load.

Q. What data does FPL rely on for its risk-adjusted projections?

A. FPL's risk-adjusted projections are based on the historical differences between FPL's actual and forecasted summer peak and net energy for load over the last twenty-five years. The Ten Year Site Plans filed by FPL since 1988 provide the historical forecasts over the last twenty-five years used for this analysis.

Q. Why has FPL included risk-adjusted projections of the summer peak and net energy for load in this proceeding?

A. Risk-adjusted projections are included in this proceeding as a way of addressing the uncertainty inherent in long-term demand projections. In a typical need determination, the reserve margin requirement helps mitigate the risks resulting from load forecasting uncertainty as well as other factors. Since there is no equivalent to a reserve margin requirement for natural gas transportation planning, the risk-adjusted projections provide a means of addressing load forecasting uncertainty.

Q. How do the differences in forecasted load between the base case and risk-adjusted forecasts compare with the additional load that potentially could be served by a 20% reserve margin?

A. The risk-adjusted forecast of the summer peak is never more than 11.8% higher than the base case forecast. Thus, the risk-adjusted projections encompass a smaller range of forecasting uncertainty than could be potentially addressed by a 20% reserve margin. The delta between the base case and risk-adjusted projections is even smaller for the net energy for load forecasts. The risk-adjusted projections of net energy for load are never more than 7.8% higher than the base case projections. Of course, a 20% reserve margin is designed to address both demand and supply uncertainties, but these comparisons make it clear that using the risk-adjusted forecast to plan for FPL's gas transportation capacity needs represents a moderate degree of conservatism. I will address the differences between the base case and risk-adjusted forecasts in greater detail later in my testimony.

III. CUSTOMER FORECAST

Q. Please explain the development of FPL's customer growth forecast.

A. The growth of customers in FPL's service territory is a primary driver of the growth in the level of net energy for load and peak demand. In order to project the growth in the number of customers, FPL utilized the February 2013 population projections from EDR, the most current projections available at the time the forecast was developed.

Q. How do EDR's February 2013 population projections compare with historical trends in population growth?

A. EDR's February 2013 population projections indicate that Florida's future rates of population growth will be somewhat lower than the rates of population growth the state experienced prior to 2007. At the same time, EDR's February 2013 population projections show generally stronger rates of population growth relative to the rates of population growth experienced during the 2007-2011 economic downturn.

Q. In addition to EDR's February 2013 population projections, were there any other assumptions incorporated into the customer forecast?

A. Yes. An adjustment was made to the customer forecast to reflect the addition of approximately 34,000 customers previously served by the Vero Beach Electric System.

Q. What is FPL's projected customer growth?

A. As shown in Exhibit RM-1, the number of customers is expected to increase moderately, averaging a 1.4% annual rate of increase between 2012 and 2022, and 1.2% between 2012 and 2032. By 2019, the number of customers is expected to surpass the five million mark, and by 2022 the cumulative increase in customers from 2012 is expected to reach almost 678,000. Beginning in 2024, there is a gradual deceleration in the customer growth forecast which continues through 2032. By 2032, the cumulative increase in customers from 2012 is expected to reach almost 1.3 million.

Q. How does FPL's projected customer growth compare with the growth experienced historically?

A. On a percentage basis, the forecasted customer growth is less than the long term growth experienced historically. Over the last twenty years, FPL has experienced a 1.7% annual growth in customers. A 1.2% annual increase in customers is projected in the 2012 to 2032 period. On an absolute basis, the projected annual increase in customers is generally consistent with historical trends.

Q. Is FPL's customer forecast reasonable?

A. Yes. The forecast incorporates the most recent EDR population projections available at the time the forecast was developed, relies on the forecasting methods previously reviewed and accepted by the Commission, and is consistent with historical trends in customer growth.

IV. SUMMER PEAK FORECAST

Q. What is FPL's process to forecast summer peak demand?

A. Historically, growth in FPL's summer peak demand has been a function of a larger customer base, weather conditions, economic growth, energy efficiency standards, and changing patterns of customer behavior. FPL has developed a peak demand per customer model to capture these relationships.

Q. What weather information does FPL utilize?

A. FPL utilizes information from four weather stations scattered throughout its service territory. Composite estimates of the hourly temperatures representative of the FPL system as a whole are developed by weighting the values by weather station with the proportion of retail sales served in that area.

Q. How are weather conditions incorporated into the summer peak per customer model?

A. The summer peak per customer model is calibrated using historical data on two weather series: the maximum temperature on the day of the summer peak and the sum of the cooling degree hours during the day prior to the peak day. In forecasting these weather variables, FPL relies on a normal weather outlook. Normal weather is based on historical averages over the last twenty years.

Q. How are economic conditions incorporated into the summer peak per customer model?

A. The impact of the economy is captured through a variable on Florida's real disposable income per household. Real disposable income is based on the real (inflation-adjusted) level of income in Florida adjusted for taxes. Florida's real disposable income per household is provided by IHS Global Insight. Exhibit RM-2 shows moderate growth is projected in Florida's real disposable income per household, consistent with the long term growth experienced over the last twenty years.

Q. How is the impact from energy efficiency standards incorporated into the summer peak per customer model?

A. The savings from energy efficiency standards incorporated into the peak forecast include the impacts from the 2005 National Energy Policy Act, the 2007 Energy Independence and Security Act and the use of compact fluorescent light bulbs. The impact from these energy efficiency standards began in 2005, and their cumulative impact on the summer peak is expected to reach 2,898 MW by 2022. This reduction is inclusive of engineering estimates and any resulting behavioral changes. The cumulative 2022 impact from these energy efficiency standards effectively reduces FPL's summer peak for that year by 10%. On an incremental basis, net of the savings already experienced through 2012, the impact on the summer peak from these energy efficiency standards is expected to reach 1,826 MW in 2022. It should be noted that the savings from energy efficiency standards discussed here do not include the impact from utility sponsored demand-side management ("DSM") programs. As discussed in FPL witness Enjamio's testimony, the impact of incremental DSM is addressed in the resource planning process.

Q. How does FPL measure the impact that rising energy prices have on electric consumption?

A. FPL uses IHS Global Insight's forecast of the consumer price index for energy to measure the impact rising energy prices have on electric consumption. As shown in Exhibit RM-3, IHS Global Insight is projecting only modest increases in the consumer price index for energy throughout the forecasting horizon. IHS Global Insight has indicated that energy prices are likely to remain relatively stable because of sluggish world growth and moderate oil prices. The increase in the consumer price index for energy between 1992 and 2012 is heavily influenced by the exceptionally volatile energy prices experienced during the last decade. IHS Global Insight's forecast through 2032 more closely resembles the increases in the consumer price index for energy experienced during the mid-1990's, a period of relatively stable energy prices.

Q. How is the output from the summer peak per customer model incorporated into the base case summer peak forecast?

A. The output from the summer peak per customer model is multiplied by the forecasted number of customers less the additional customers from the Vero Beach Electric System. The result is a preliminary estimate of the forecasted summer peak.

Q. Is the forecast adjusted to include incremental wholesale and retail contracts?

A. Yes. The forecast is adjusted for incremental wholesale loads in order to reflect additional load not otherwise included in FPL's historical load levels resulting from new or modified wholesale contracts. The largest of these contracts is the power sales to the Lee County Electric Cooperative, a not-for-profit electric distribution cooperative serving a five-county area in Southwest Florida. In August 2007, the parties came to an agreement by which FPL will become Lee County's power supplier in two phases. In the short-term phase, for the term January 1, 2010 through December 31, 2013, FPL began providing partial requirements service to two of the three Lee County delivery points, which together serve approximately 25% of Lee County's load. In the long-term phase, which commences in January 2014, FPL will serve Lee County's full retail load. Based on information provided by the customer, Lee County's contribution to FPL's summer peak is expected to increase from 223 MW in 2012 to 819 in 2014, growing annually thereafter. Projections of Lee County's contribution to the summer peak are included as a line item adjustment increasing FPL's forecasted summer peak.

In addition, FPL has been serving the Florida Keys Electric Cooperative under a partial requirements service agreement since January 1992. Effective May 2011, FPL began serving the Florida Keys Electric Cooperative as a full requirements customer. FPL is expected to serve approximately 35 MW of additional load as a result of the Florida Keys Electric Cooperative's change from a partial requirements customer to a full requirements customer. This additional load from the Florida Keys Electric Cooperative is also included as a line item adjustment to the summer peak forecast. FPL also has begun providing full requirements service to two municipalities: the City of Wauchula, effective October 2011 (adds 13 MW to the summer peak between 2012 and 2016); and the City of Blountstown, effective May 2012 (adds additional 8 MW to the summer peak between 2012 and 2016). FPL will begin making sales to the Seminole Electric Cooperative in June 2014 under a long-term agreement. Sales to Seminole Electric Cooperative under this agreement are expected to add an additional 200 MW to the summer peak.

The addition of customers currently served by the Vero Beach Electric System is expected to add approximately 160 MW of load to FPL's summer peak initially, growing to about 180 MW by 2022 and about 210 MW by 2032.

Q. Are adjustments also made to reflect the expected termination of any existing wholesale contracts?

A. Yes. Existing contracts with the City of Key West and Metro-Dade County are scheduled to terminate in 2013. The termination of these contracts is expected to reduce the summer peak by approximately 46 MW.

Q. Are there any other adjustments to the summer peak forecast in addition to those for incremental wholesale load?

A. Yes. FPL includes an adjustment for the incremental load resulting from plug-in electric vehicles as well as adjustments for the new and incremental load resulting from its Economic Development Rider and Existing Facility Economic Rider.

Q. How is the load from plug-in electric vehicles projected?

A. Projections on the number of plug-in electric vehicles in FPL's service territory were developed by a group within the Customer Service Business Unit which routinely monitors developments in the electric vehicle industry. Projections of the U.S. market for plug-in electric vehicles were first estimated based on a review of multiple forecasts from leading experts and discussions with knowledgeable professionals in the automotive industry. FPL's share of the U.S. market for plug-in electric vehicles was then estimated based on the share of U.S. hybrid electric vehicles (excluding plug-in electric vehicles) that is currently located in FPL's service area. The contribution to the summer peak load from plug-in electric vehicles was then derived from the vehicle forecast, an estimate of vehicle demand, and the proportion of vehicles expected to be charged during the summer peak. Consistent with the expectations of leading experts in the field, the load from plug-in electric vehicles is projected to increase over the next decade. Nevertheless, the load from plug-in electric vehicles is projected to account for only a small portion of FPL's load. For example, by 2022 the load from plug-in electric vehicles is expected to reach 357 MW, about 1% of FPL's projected summer peak for that year.

Q. Does FPL's forecast assume that plug-in electric vehicles will account for a majority of the vehicles on the road?

A. No. FPL's forecast assumes that plug-in electric vehicles will account for only a small share of vehicles on the road throughout the forecasting horizon. Plug-in electric vehicles are projected to account for less than 1% of all vehicles in FPL's service area in 2019. By 2022, plug-in electric vehicles are projected to account for less than 3% of all vehicles in FPL's service area.

Q. Are adjustments being made for the Economic Development Rider and Existing Facility Economic Rider?

A. Yes. Under both the Economic Development Rider and Existing Facility Economic Rider, customers are provided discounts for adding new or incremental load. To qualify for either rider, customers are required to verify that the availability of the rider was a significant factor in their location or expansion decision. The Economic Development Rider was modified in July 2011 to allow customers with new or incremental load of at least 350 kW to qualify for the rider. Customers had previously been required to have at least 5,000 kW of new or incremental load to qualify for the rider and there was very limited customer participation. The lower threshold is expected to result in a significant increase in customer participation on the rider. Effective July 2011, the Commission also approved a new rider specifically for customers adding at least 350 kW of new load by occupying a currently vacant premise. The Economic Development Rider and Existing Facilities Economic Development Rider are expected to add incremental load to the summer peak between 2013 and 2018. Based on estimates developed by FPL's Economic Development group in conjunction with the Customer Service and Regulatory Business Units, the Economic Development Rider and Existing Facilities Economic Development Rider are projected to add about 13 MW to the summer peak beginning in 2013. This figure is expected to rise to about 78 MW by 2018. No additional load from the Economic Development Rider and Existing Facilities Economic Development Rider is expected after 2018.

Q. Have adjustments to the summer peak forecast for incremental wholesale load and new load resulting from plug-in electric vehicles been incorporated into prior forecasts?

A. Yes. Adjustments for incremental wholesale load and new load resulting from plug-in electric vehicles have been incorporated into FPL's long-term forecast since the company's 2009 Ten Year Site Plan. As a result, the load forecasts used in past need determination proceedings including the Docket Nos. 110018-EU (need determination for expansion of SWA renewable energy facility) and 110309-EI (need determination for modernization of Port Everglades Plant) have included adjustments for incremental wholesale load and the new load resulting from plug-in electric vehicles. Because the changes to the Economic Development Rider and the addition of the Existing Facilities Economic Development Rider were only approved in 2011, their impact was not incorporated into the forecast until the 2012 Ten Year Site Plan.

Q. What is FPL's base case forecast for summer peak?

A. As shown on Exhibit RM-4, the summer peak reaches 26,105 MW by 2022 and 32,423 MW by 2032 under the base case forecast. The base case forecast indicates a cumulative increase in the summer peak of 4,665 MW between 2012 and 2022. Between 2012 and 2032, the cumulative increase is 10,983 MW.

Q. How do the percentage growth rates in FPL's base case summer peak forecast compare with the growth rates experienced historically?

A. Absent the addition of incremental wholesale and retail contracts, the percentage growth under FPL's base case forecast would be at or below the increases in the summer peak experienced over the last twenty years. Between 1992 and 2012, FPL's summer peak grew at an average annual rate of 1.9%. By comparison, absent the addition of incremental wholesale and retail contracts, the summer peak demand under the base case forecast is expected to increase at an average annual rate of 1.6% between 2012 and 2022 and a 1.9% increase between 2012 and 2032. With the addition of incremental wholesale and retail contracts, the summer peak demand under the base case forecast is expected to increase at an average annual rate of 2.0% between 2012 and 2022 and a 2.1% increase between 2012 and 2032, which is only slightly higher than the growth rates experienced over the last twenty years.

Q. Is FPL's base case forecast of summer peak demand based on an econometric model with a strong goodness of fit and a high degree of statistical significance?

A. Yes. "Goodness of fit" refers to how closely the predicted values of a model match the actual observed values. FPL's summer peak model has a strong goodness of fit as demonstrated by the model's adjusted R square of 92.1%. This means that 92.1% of the variability in the summer peak per customer is explained by the model. In addition, the coefficients for all of the variables have the expected sign (+/-) and are statistically significant. This indicates that the variables influencing the summer peak demand have been properly identified and their predicted impact is statistically sound. Finally, the model has a Durbin-Watson statistic of 1.955 indicating the absence of significant autocorrelation. The absence of significant autocorrelation is a desirable quality in a well-constructed model. Overall, the summer peak model has excellent diagnostic statistics.

Q. In addition to its base case forecast has FPL developed an alternative forecast of the summer peak demand?

A. Yes. As previously discussed, FPL has also developed a risk-adjusted forecast of the summer peak in order to address the uncertainty inherent in long-term projections.

Q. How do FPL's base case and risk-adjusted forecasts of the summer peak differ?

A. FPL's base case forecast of the summer peak reflects the most likely future values of the summer peak. As such, the base case forecast is designed to reflect an approximately equal chance of under- or over-forecasting the summer peak. FPL's risk-adjusted forecast of summer peak is designed to reduce, but not eliminate the probability of under-forecasting the summer peak. The risk-adjusted forecast is designed to reflect the higher values of summer peak demands that could occur in the future given past differences between actual and forecasted values of the summer peak. Based on prior vintages of FPL's forecast, there is a 75% probability that the actual value of the summer peak in the future will be equal to or less than its risk-adjusted projections. Conversely, there is a 25% probability, based on past vintages of FPL's forecasted summer peak, that the actual future values of the summer peak will be higher than their risk-adjusted projections.

Q. Please describe more specifically the data supporting the risk-adjusted forecast.

A. The data on prior vintages of FPL's summer peak forecast were obtained from the company's Ten Year Site Plan filings since 1988. The percentage difference between actual and forecasted values for the summer peak was then calculated based on each forecasted year presented in each filing. These actual-to-forecast differences were then grouped based on the forecasting horizon. That is, the one year ahead actual-to-forecast difference in the 2012 Ten Year Site Plan was based on the difference between the percentage difference between the actual 2012 summer peak and the forecasted 2012 summer peak shown in the 2012 Ten Year Site Plan. Likewise, the one year ahead actual-to-forecast difference in the 2011 Ten Year Site Plan was based on the percentage difference between the actual 2011 summer peak and the forecasted 2011 summer peak shown in the 2011 Ten Year Site Plan and so forth. The same process was used for forecasting horizons ranging from two years ahead, up through ten years ahead.

Q. How was this data used to develop the risk-adjusted forecast of the summer peak?

A. The data on past actual-to-forecast differences were used to develop adjustment factors for forecasting risk. The adjustment factors for forecasting risk were obtained by developing a confidence interval around the actual-to-forecast differences historically experienced for each forecasting horizon. The upper limit of each confidence interval is the 75^{th} percentile of past actual-to-forecast differences. As a result, the adjustment factor for forecasting risk represents the increase in the summer peak forecast that historically would have been required to reduce the probability of under-forecasting the summer peak to 25%. The risk-adjusted forecast was obtained by multiplying the base case forecast by the risk adjustment factor corresponding to each forecasting horizon from year one through year ten.

Q. What are the adjustment factors for forecasting risk for year one through year ten?

A. The adjustment factors for forecasting risk are shown in RM-5. The adjustment factors for forecasting risk range from about 3.4% in 2013 (one year ahead) to 11.8% in 2022 (ten years ahead). As would be expected, the adjustment factor for forecasting risk increases over time.

Q. What adjustment factors for forecasting risk were used beyond 2022?

A. The Ten Year Site Plan filings only present forecasts over a ten year horizon, therefore the adjustment factors for forecasting risk were only available through 2022. Thereafter, a constant 11.8% adjustment factor is assumed.

Q. What is FPL's risk-adjusted forecast for summer peak?

A. As shown in Exhibit RM-4, the summer peak reaches 29,176 MW by 2022 and 36,238 MW by 2032 under the risk-adjusted forecast. The risk-adjusted forecast indicates a cumulative increase in the summer peak of 7,736 MW between 2012 and 2022. Between 2012 and 2032, the cumulative increase under the risk-adjusted forecast is 14,798 MW.

Q. How does the growth shown in FPL's risk-adjusted forecast for summer peak compare with historical growth rates?

A. FPL's risk-adjusted forecast shows an average annual increase of 3.1% in the summer peak demand between 2012 and 2022 and a 2.7% increase between 2012 and 2032. While these projected growth rates are higher than the 1.9% growth rate averaged over the last twenty years, they are comparable to the actual growth rates experienced during the 1990's.

Q. How does FPL's risk-adjusted forecast of the summer peak compare with its base case forecast?

A. As shown in RM-4, the risk-adjusted forecast is 3.4% higher than the base forecast in 2013, the equivalent of 740 MW. By 2022, the delta between the risk-adjusted forecast and base case forecast increases to 11.8% or 3,072 MW.

Q. Given the absence of an explicit reserve margin in FPL's planning process for gas transportation capacity, does FPL's risk-adjusted forecast represent a reasonable method of addressing forecasting uncertainty?

A. Yes. FPL's risk-adjusted forecast of summer peak demand is based on the actual-to-forecast values over the last 25 years. The growth rates implied by the risk-adjusted forecast are not unreasonable given the more robust growth in the summer peak historically experienced during periods of economic expansion. Finally, the delta between the risk-adjusted forecast and base case forecast never exceeds 11.8%.

V. NET ENERGY FOR LOAD

Q. What process does FPL use to forecast net energy for load?

A. FPL has found that the customer base, the economy, weather, and energy efficiency standards are the principal factors influencing net energy for load. Accordingly, a net energy per customer model has been developed incorporating these variables.

Q. How are weather conditions incorporated into the net energy per customer model?

A. The weather variables included in the net energy for load per customer model are cooling degree hours using a base of 72 degrees and winter heating degree days using a base of 66 degrees. In addition, a second measure of heating degree days is included using a base of 45 degrees in order to capture the additional heating load resulting from sustained periods of unusually cold weather.

Q. How are economic conditions incorporated into the net energy per customer model?

A. A composite variable based on Florida real per capita income weighted by the percent of the state's population employed is used as a measure of economic conditions. Thus, this composite economic variable encompasses two of the primary drivers of the economy: employment and income levels. Florida's real per capita income and employment levels are provided by IHS Global Insight. The population forecast is provided by EDR. Exhibit RM-6 shows the actual and forecasted values for Florida real per capita income weighted by the percent of the population employed. The projected growth in Florida real per capita income weighted by the percent of the population employed is influenced by the low starting value for this series as a result of declines experienced during the recent recession. The 2.4% projected average annual increase in this series between 2012 and 2022 suggests a fairly modest pace of recovery relative to the growth rates in the 1990s, which typically exceeded 3% a year.

The net energy per customer model also includes a variable designed to measure the health of the housing industry based on the ratio of inactive to active meters. Finally, the impact energy prices have on electricity consumption is measured by the Consumer Price Index for energy, as forecasted by IHS Global Insight.

Q. How is the impact from energy efficiency standards incorporated into the net energy per customer model?

A. A variable is included for the impact of energy efficiency standards based on end-use estimates developed by ITRON. The energy efficiency variable is included to capture the impacts of the 2005 National Energy Policy Act and the 2007 Energy Independence and Security Act, as well as the savings occurring from the use of compact fluorescent bulbs. The impact of these savings began in 2005 and their cumulative impact on NEL is expected to reach 11,850 GWh by 2022. This reduction is inclusive of engineering estimates and any resulting behavioral changes. The cumulative 2022 reduction from these energy efficiency standards effectively reduces FPL's NEL for that year by 8.3%. On an incremental basis, net of the savings already experienced through 2012, the savings in 2022 is expected to reach 7,883 GWh. It should be noted that the savings from energy efficiency standards discussed here do not include the impact from utility sponsored DSM programs. The impact of incremental DSM is addressed in the resource planning process, as discussed in the testimony of FPL witness Enjamio.

Q. Are the same line item adjustments made to the summer peak forecast also made to the net energy for load forecast?

A. Yes.

Q. What is FPL's base case forecast for net energy for load?

A. As shown on Exhibit RM-7, net energy for load reaches 130,965 GWh by 2022 and 151,819 GWh by 2032 under the base case forecast. The base case forecast indicates a cumulative increase in net energy for load of 20,145 GWh between 2012 and 2022. Between 2012 and 2032, the cumulative increase is 40,999 GWh.

Q. How do the growth rates in FPL's base case forecast of net energy for load compare with historical growth percentage rates?

A. The growth rates in FPL's base case forecast of net energy for load are below the long-term rates experienced over the last twenty years. Between 1992 and 2012, FPL's net energy for load increased at an average annual rate of 2.1%. By contrast, FPL's base case forecast shows an average annual increase of 1.7% in net energy for load between 2012 and 2022 and 1.6% increase between 2012 and 2032.

Q. Is FPL's base case forecast of net energy for load based on an econometric model with a strong goodness of fit and a high degree of statistical significance?

A. Yes. FPL's net energy for load model has a strong goodness of fit as demonstrated by the model's adjusted R square of 99.5%. This means that 99.5% of the variability in the net energy for load per customer is explained by the model. In addition, the coefficients for all of the variables have the expected sign (+/-) and are statistically significant. This indicates that the variables influencing net energy for load have been properly identified and their predicted impact is statistically sound. Finally, the model has a Durbin-Watson statistic of 1.992 indicating the absence of significant autocorrelation. The absence of significant autocorrelation is a desirable quality in a well-constructed model. Overall, the net energy for load model has excellent diagnostic statistics.

Q. In addition to its base case forecast, has FPL developed an alternative forecast of net energy for load?

A. Yes. FPL has also developed a risk-adjusted forecast of net energy for load in order to address the uncertainty inherent in long-term projections. FPL's risk-adjusted forecast of net energy for load is designed to reduce, but not eliminate the probability of under-forecasting net energy for load. The risk-adjusted forecast is designed to reflect the higher values of net energy for load that could occur in the future given past differences between actual and forecasted values of net energy for load. Based on prior vintages of FPL's forecast, there is a 75% probability that the actual value of net energy for load in the future will be equal to or less than its risk-adjusted projections. Conversely, there is a 25% probability based on past vintages of FPL's forecasted net energy for load, that the actual future values of net energy for load will exceed their risk-adjusted projections.

Q. Did FPL use the same methodology in developing its risk-adjusted forecast of net energy for load as that used for the risk-adjusted summer peak forecast?

A. Yes. The risk-adjusted net energy for load projections are based on risk adjustment factors derived from past actual-to-forecast differences. These differences were obtained by comparing actual historical values of net energy for load with the projections in past vintages of Ten Year Site Plan projections. The risk adjustment factor for net energy for load represents the increase in FPL's historical forecasts of net energy for load that would be required to reduce the probability of under-forecasting net energy for load down to 25%.

Q. What are the risk adjustment factors for net energy for load?

A. As shown in RM-5, the risk adjustment factors for net energy for load range from about 2.1% in 2013 to 7.8% in 2022. As would be expected, the risk adjustment factor increases over time.

Q. What risk adjustment factors were used beyond 2022?

A. As previously discussed, the Ten Year Site Plan filings only present forecasts over a ten year horizon, therefore the data underlying the risk adjustment factors were only available through 2022. Thereafter, a constant 7.8% adjustment factor is assumed.

Q. What is FPL's risk-adjusted forecast for net energy for load?

A. As shown in Exhibit RM-7, net energy for load reaches 141,222 GWh by 2022 and 163,710 GWh by 2032 under the risk-adjusted forecast. The risk-adjusted forecast indicates a cumulative increase in the NEL of 30,402 GWh between 2012 and 2022. Between 2012 and 2032, the cumulative increase under the risk-adjusted forecast is 52,890 GWh.

Q. How do the projected growth rates in FPL's risk-adjusted forecast of net energy for load compare with historical percentage growth rates?

A. FPL's risk-adjusted forecast shows an annual increase of 2.5% in net energy for load between 2012 and 2022 and a 2.0% increase between 2012 and 2032.

The risk-adjusted projected growth rate between 2012 and 2032 is comparable to the 2.1% increase in the average net energy for load over the last twenty years.

Q. How does FPL's risk-adjusted forecast of net energy for load compare with its base case forecast?

A. As shown in RM-7, the risk-adjusted forecast of net energy for load is 2.1% higher than the base forecast in 2013, the equivalent of 2,362 GWh. By 2022, the delta between the risk-adjusted forecast and base case forecast increases to 7.8% or 10,258 GWh.

Q. Given the absence of an explicit reserve margin in FPL's planning process for gas transportation capacity, does FPL's risk-adjusted forecast represent a reasonable method of addressing forecasting uncertainty?

A. Yes. FPL's risk-adjusted forecast of net energy for load is based on comparisons of actual-to-forecasted values over the last 25 years. The growth rates implied by the risk-adjusted forecast are not unreasonable given FPL's historical growth over the last twenty years. Finally, the delta between the risk-adjusted forecast and base case forecast of net energy for load never exceeds 7.8%.

Q. Does this conclude your direct testimony?

A. Yes.

Customer Forecast

AVERAGE ANNUAL GROWTH

HISTORY (1992 to 2012)	64,761	1.7%
FORECAST (2012 to 2022)	67,785	1.4%
FORECAST (2012 to 2032)	63,378	1.2%

HISTORY

		Growth	
		Absolute	%
1992	3,281,238	54,783	1.7%
1993	3,355,794	74,556	2.3%
1994	3,422,187	66,393	2.0%
1995	3,488,796	66,609	1.9%
1996	3,550,747	61,951	1.8%
1997	3,615,485	64,738	1.8%
1998	3,680,470	64,985	1.8%
1999	3,756,009	75,539	2.1%
2000	3,848,350	92,341	2.5%
2001	3,935,281	86,931	2.3%
2002	4,019,805	84,523	2.1%
2003	4,117,221	97,416	2.4%
2004	4,224,509	107,289	2.6%
2005	4,321,895	97,386	2.3%
2006	4,409,563	87,667	2.0%
2007	4,496,589	87,027	2.0%
2008	4,509,730	13,141	0.3%
2009	4,499,067	-10,663	-0.2%
2010	4,520,328	21,261	0.5%
2011	4,547,051	26,723	0.6%
2012	4,576,449	29,398	0.6%

FORECAST

		Growth	
	Forecast	Absolute	%
2013	4,617,509	41,060	0.9%
2014	4,705,879	88,370	1.9%
2015	4,770,981	65,103	1.4%
2016	4,841,466	70,485	1.5%
2017	4,913,456	71,989	1.5%
2018	4,985,069	71,614	1.5%
2019	5,055,714	70,645	1.4%
2020	5,124,207	68,492	1.4%
2021	5,189,124	64,917	1.3%
2022	5,254,304	65,180	1.3%
2023	5,319,996	65,692	1.3%
2024	5,386,222	66,227	1.2%
2025	5,450,586	64,363	1.2%
2026	5,508,615	58,029	1.1%
2027	5,566,667	58,052	1.1%
2028	5,625,167	58,500	1.1%
2029	5,684,141	58,974	1.0%
2030	5,741,356	57,215	1.0%
2031	5,792,686	51,330	0.9%
2032	5,844,018	51,332	0.9%

Forecast of Real Disposable Income Per Household

AVERAGE ANNUAL GROWTH

HISTORY (1992 to 2012)	1.01	1.4%

[redacted]

HISTORY

		Growth	
	60.35	Absolute	%
1992	60.62	0.3	0.4%
1993	61.66	1.0	1.7%
1994	62.60	0.9	1.5%
1995	63.96	1.4	2.2%
1996	64.53	0.6	0.9%
1997	64.98	0.4	0.7%
1998	67.86	2.9	4.4%
1999	68.73	0.9	1.3%
2000	70.84	2.1	3.1%
2001	71.10	0.3	0.4%
2002	72.89	1.8	2.5%
2003	73.76	0.9	1.2%
2004	76.37	2.6	3.5%
2005	77.45	1.1	1.4%
2006	81.13	3.7	4.8%
2007	82.23	1.1	1.4%
2008	83.29	1.1	1.3%
2009	79.89	-3.4	-4.1%
2010	80.72	0.8	1.0%
2011	81.07	0.4	0.4%
2012	80.79	-0.3	-0.4%

FORECAST

		Growth	
	Forecast	Absolute	%
2013	[redacted]		
2014			
2015			
2016			
2017			
2018			
2019			
2020			
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			
2031			
2032			

Forecast of the Consumer Price Index for Energy

AVERAGE ANNUAL GROWTH

HISTORY (1992 to 2012)	4.3%

[redacted]

HISTORY

		Growth %
	102	
1992	103	0.5%
1993	104	1.2%
1994	105	0.4%
1995	105	0.6%
1996	110	4.7%
1997	112	1.3%
1998	103	-7.8%
1999	107	3.6%
2000	125	16.8%
2001	129	3.7%
2002	122	-5.8%
2003	137	12.3%
2004	151	10.8%
2005	177	16.9%
2006	197	11.0%
2007	208	5.7%
2008	236	13.7%
2009	193	-18.1%
2010	212	9.5%
2011	244	15.2%
2012	240	-1.5%

FORECAST

	Forecast	Growth %
2013	[redacted]	
2014		
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		

Summer Peak Forecast (MW)

AVERAGE ANNUAL GROWTH

HISTORY (1992 to 2012)	339	1.9%
BASE CASE FORECAST (2012 to 2022)	466	2.0%
BASE CASE FORECAST (2012 to 2032)	549	2.1%
RISK ADJUSTED FORECAST (2012 to 2022)	774	3.1%
RISK ADJUSTED FORECAST (2012 to 2032)	740	2.7%

HISTORY

		Growth	
		Absolute	%
1992	14,661	538	3.8%
1993	15,266	605	4.1%
1994	15,179	-87	-0.6%
1995	15,813	634	4.2%
1996	16,064	251	1.6%
1997	16,613	549	3.4%
1998	17,897	1,284	7.7%
1999	17,615	-282	-1.6%
2000	17,808	193	1.1%
2001	18,754	946	5.3%
2002	19,219	465	2.5%
2003	19,668	449	2.3%
2004	20,545	877	4.5%
2005	22,361	1,816	8.8%
2006	21,819	-542	-2.4%
2007	21,962	143	0.7%
2008	21,060	-902	-4.1%
2009	22,351	1,291	6.1%
2010	22,256	-95	-0.4%
2011	21,619	-637	-2.9%
2012	21,440	-179	-0.8%

FORECAST

	Base Case	Growth		Risk Adjusted	Growth		Delta	
	Forecast	Absolute	%	Forecast	Absolute	%	Absolute	%
2013	21,790	350	1.6%	22,531	1,091	5.1%	740	3.4%
2014	22,928	1,137	5.2%	23,932	1,402	6.2%	1,004	4.4%
2015	23,359	431	1.9%	24,468	536	2.2%	1,109	4.7%
2016	23,733	374	1.6%	25,010	542	2.2%	1,277	5.4%
2017	24,122	389	1.6%	25,724	714	2.9%	1,602	6.6%
2018	24,493	371	1.5%	26,446	722	2.8%	1,953	8.0%
2019	24,901	408	1.7%	27,088	642	2.4%	2,186	8.8%
2020	25,302	401	1.6%	27,796	708	2.6%	2,493	9.9%
2021	25,560	258	1.0%	28,307	511	1.8%	2,747	10.7%
2022	26,105	545	2.1%	29,176	869	3.1%	3,072	11.8%
2023	26,782	678	2.6%	29,934	757	2.6%	3,151	11.8%
2024	27,475	693	2.6%	30,708	774	2.6%	3,233	11.8%
2025	28,154	679	2.5%	31,467	759	2.5%	3,313	11.8%
2026	28,801	647	2.3%	32,190	723	2.3%	3,389	11.8%
2027	29,460	659	2.3%	32,927	737	2.3%	3,467	11.8%
2028	30,106	645	2.2%	33,648	721	2.2%	3,543	11.8%
2029	30,670	565	1.9%	34,279	631	1.9%	3,609	11.8%
2030	31,228	557	1.8%	34,902	623	1.8%	3,675	11.8%
2031	31,807	579	1.9%	35,549	647	1.9%	3,743	11.8%
2032	32,423	616	1.9%	36,238	688	1.9%	3,815	11.8%

Adjustment Factors Used in the Risk Adjusted Forecasts

NET ENERGY FOR LOAD

	Base Case Forecast	Adjustment Factor	Risk Adjusted Forecast
2013	113,036	2.1%	115,398
2014	118,718	2.4%	121,566
2015	121,345	2.4%	124,279
2016	123,453	3.2%	127,353
2017	124,586	3.8%	129,374
2018	125,957	5.0%	132,204
2019	127,200	6.0%	134,852
2020	128,829	6.7%	137,467
2021	129,543	7.2%	138,853
2022	130,965	7.8%	141,222

SUMMER PEAK

	Base Case Forecast	Adjustment Factor	Risk Adjusted Forecast
2013	21,790	3.4%	22,531
2014	22,928	4.4%	23,932
2015	23,359	4.7%	24,468
2016	23,733	5.4%	25,010
2017	24,122	6.6%	25,724
2018	24,493	8.0%	26,446
2019	24,901	8.8%	27,088
2020	25,302	9.9%	27,796
2021	25,560	10.7%	28,307
2022	26,105	11.8%	29,176

Forecast of Weighted Per Capita Income

AVERAGE ANNUAL GROWTH

HISTORY (1992 to 2012)	0.14	1.2%
FORECAST (2012 to 2022)	0.36	2.4%
FORECAST (2012 to 2032)	0.36	2.2%

HISTORY

		Growth	
	10.46	Absolute	%
1992	10.45	0.0	-0.1%
1993	10.81	0.4	3.4%
1994	11.16	0.3	3.2%
1995	11.61	0.5	4.1%
1996	12.00	0.4	3.3%
1997	12.40	0.4	3.4%
1998	13.23	0.8	6.6%
1999	13.50	0.3	2.1%
2000	14.20	0.7	5.2%
2001	14.19	0.0	-0.1%
2002	14.04	-0.1	-1.0%
2003	13.96	-0.1	-0.6%
2004	14.73	0.8	5.6%
2005	15.45	0.7	4.9%
2006	16.22	0.8	5.0%
2007	16.14	-0.1	-0.5%
2008	15.24	-0.9	-5.6%
2009	13.27	-2.0	-12.9%
2010	13.12	-0.1	-1.1%
2011	13.31	0.2	1.4%
2012	13.30	0.0	0.0%

FORECAST

		Growth	
	Forecast	Absolute	%
2013	13.67	0.4	2.8%
2014	14.10	0.4	3.1%
2015	14.62	0.5	3.7%
2016	15.15	0.5	3.6%
2017	15.56	0.4	2.7%
2018	15.86	0.3	1.9%
2019	16.12	0.3	1.7%
2020	16.34	0.2	1.3%
2021	16.57	0.2	1.4%
2022	16.87	0.3	1.8%
2023	17.16	0.3	1.7%
2024	17.40	0.2	1.4%
2025	17.68	0.3	1.6%
2026	18.03	0.3	2.0%
2027	18.42	0.4	2.1%
2028	18.79	0.4	2.0%
2029	19.19	0.4	2.1%
2030	19.58	0.4	2.0%
2031	20.05	0.5	2.4%
2032	20.58	0.5	2.7%

Net Energy for Load Forecast (GWh)

AVERAGE ANNUAL GROWTH

HISTORY (1992 to 2012)	1,875	2.1%
BASE CASE FORECAST (2012 to 2022)	2,015	1.7%
BASE CASE FORECAST (2012 to 2032)	2,050	1.6%
RISK ADJUSTED FORECAST (2012 to 2022)	3,040	2.5%
RISK ADJUSTED FORECAST (2012 to 2032)	2,645	2.0%

HISTORY

		Growth	
		Absolute	%
1992	73,321	-105	-0.1%
1993	76,074	2,753	3.8%
1994	80,673	4,599	6.0%
1995	84,546	3,873	4.8%
1996	85,028	482	0.6%
1997	87,056	2,028	2.4%
1998	92,802	5,747	6.6%
1999	91,683	-1,119	-1.2%
2000	96,313	4,630	5.1%
2001	98,612	2,299	2.4%
2002	104,657	6,045	6.1%
2003	108,214	3,557	3.4%
2004	108,122	-93	-0.1%
2005	111,443	3,321	3.1%
2006	113,406	1,963	1.8%
2007	114,532	1,126	1.0%
2008	111,100	-3,432	-3.0%
2009	111,237	137	0.1%
2010	114,604	3,366	3.0%
2011	111,603	-3,001	-2.6%
2012	110,820	-783	-0.7%

FORECAST

	Base Case	Growth		Risk Adjusted	Growth		Delta	
	Forecast	Absolute	%	Forecast	Absolute	%	Absolute	%
2013	113,036	2,216	2.0%	115,398	4,579	4.1%	2,362	2.1%
2014	118,718	5,682	5.0%	121,566	6,167	5.3%	2,847	2.4%
2015	121,345	2,627	2.2%	124,279	2,713	2.2%	2,934	2.4%
2016	123,453	2,108	1.7%	127,353	3,074	2.5%	3,900	3.2%
2017	124,586	1,133	0.9%	129,374	2,021	1.6%	4,788	3.8%
2018	125,957	1,371	1.1%	132,204	2,830	2.2%	6,247	5.0%
2019	127,200	1,243	1.0%	134,852	2,648	2.0%	7,652	6.0%
2020	128,829	1,628	1.3%	137,467	2,615	1.9%	8,638	6.7%
2021	129,543	714	0.6%	138,853	1,386	1.0%	9,310	7.2%
2022	130,965	1,422	1.1%	141,222	2,370	1.7%	10,258	7.8%
2023	133,224	2,260	1.7%	143,659	2,437	1.7%	10,435	7.8%
2024	135,771	2,547	1.9%	146,406	2,747	1.9%	10,634	7.8%
2025	137,653	1,881	1.4%	148,434	2,028	1.4%	10,782	7.8%
2026	139,848	2,195	1.6%	150,801	2,367	1.6%	10,953	7.8%
2027	141,886	2,039	1.5%	152,999	2,198	1.5%	11,113	7.8%
2028	144,296	2,410	1.7%	155,598	2,599	1.7%	11,302	7.8%
2029	145,938	1,642	1.1%	157,368	1,770	1.1%	11,430	7.8%
2030	147,775	1,838	1.3%	159,350	1,981	1.3%	11,574	7.8%
2031	149,563	1,788	1.2%	161,278	1,928	1.2%	11,714	7.8%
2032	151,819	2,255	1.5%	163,710	2,432	1.5%	11,891	7.8%