BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 130040-EI

IN RE: TAMPA ELECTRIC COMPANY'S
PETITION FOR AN INCREASE IN BASE RATES
AND MISCELLANEOUS SERVICE CHARGES

DIRECT TESTIMONY AND EXHIBIT

OF

ERIC FOX

ON BEHALF OF TAMPA ELECTRIC COMPANY

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PREPARED DIRECT TESTIMONY

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Q. Please state your name and business address.

A. My name is Eric Fox. My business address is 20 Park Plaza, Suite 910, Boston, Massachusetts 02116. I am employed by Itron, Inc. ("Itron"), as Director, Forecast Solutions.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Tampa Electric Company ("Tampa Electric" or the "company").

Q. Please state your education, professional and work experience.

A. I received my M.A. in Economics from San Diego State University in 1984 and my B.A. in Economics from San Diego State University in 1981. While attending graduate school, I worked for Regional Economic Research, Inc.

("RER") as a SAS programmer. After graduating, I worked as an Analyst in the Forecasting Department of San Diego Gas & Electric. Later I was promoted to Senior Analyst in the Rate Department. I also taught statistics in the Economics Department of San Diego State University on a part-time basis.

In 1986, I became employed by RER as a Senior Analyst. I worked at RER for three years before moving to Boston and taking a position with New England Electric as a Senior Analyst in the Forecasting Group. I was later promoted to Manager of Load Research. In 1994, I left New England Electric to open the Boston office for RER, which Itron acquired in 2002.

Over the last twenty-five years, I have provided support for a wide range of utility operations and planning requirements including forecasting, load research, weather normalization, rate design, financial analysis, and conservation and load management program evaluation. Clients include traditional integrated utilities, distribution companies, Independent System Operators, generation and power trading companies and energy retailers. I have presented various forecasting and energy analysis topics at numerous forecasting

conferences and forums. I also direct electric and gas forecasting workshops that focus on estimating econometric models and using statistical-based models for monthly sales and customer forecasting, weather normalization and calculation of billed and unbilled sales. Over the last twenty years, I have provided forecast training to several hundred utility analysts and analysts in other businesses.

I have directly assisted numerous utilities with developing budget and long-term sales, energy and demand forecast models and processes for tracking and evaluating forecast performance. I have been working with Tampa Electric over the last ten years, to help improve the company's sales, customer and load forecast models, assess sales and customer trends and fine-tune weather normalization, load research and revenue modeling. My resume and list of past project work is provided in Document No. 1 of my Exhibit No. ____ (EF-1).

Q. Please describe Itron.

A. Itron is a leading technology provider and critical source of knowledge to the global energy and water industries. More than 3,000 utilities worldwide rely on

Itron technology to deliver the knowledge they require to optimize the delivery and use of energy and water. Itron provides industry-leading solutions for electricity metering; meter data collection; energy information management; demand response; load forecasting, analysis and consulting services; distribution system design and optimization; web based workforce automation; and enterprise and residential energy management.

Q. What are your responsibilities as Director, Forecast Solutions?

A. I am responsible for directing forecast and load analysis work to support electric and gas utility operations and planning. I manage the day-to-day work of Itron's Boston office. I work with utilities and regulatory organizations across the country and in Canada to address a range of long-term and short-term forecasting and load analysis issues. My work also includes directing the activity of Itron's Energy Forecasting Group (a long-term energy forecasting data and analysis service with over 50 participating utilities), conducting forecast workshops and web-based presentations on specific forecasting and analysis topics. I am an active participant in forecasting and load analysis conferences and forums

across the country.

Q. Have you previously testified before a regulatory commission?

A. Yes. I have provided testimony to support rate cases, site plan filings, and Integrated Resource Plans, in several states including Florida. My regulatory experience is also summarized in Document No. 1 of my exhibit.

Q. What is the purpose of your direct testimony?

A. The purpose of my direct testimony is to support the load forecast that the company used to prepare the 2014 test year revenue forecast. Tampa Electric witness Lorraine L. Cifuentes sponsors the company's demand and energy forecast for 2014, which was completed in June 2012, and explains how it was developed. I was asked by Tampa Electric to review the forecast models and results of their current sales forecast. I will be referring to the forecast for 2014, completed in June 2012, as the *2013 Budget-Year Forecast*.

As part of my assessment, I also compared the 2013

Budget-Year Forecast against current sales forecasts for the South Atlantic Census Division derived from the U.S. Energy Information Administration's ("EIA") 2012 Annual Energy Outlook and recent sales projections reported by other utilities.

Q. Have you reviewed Tampa Electric's current energy sales forecasts?

A. Yes. I have reviewed the individual customer class models and find that they are statistically strong. I have also reviewed the forecasts produced by these models and they are appropriate and reasonable given the expected improvements in population, economic growth and improvements in end-use efficiencies. In total, 2014 growth rates for customers and energy sales of 1.3 percent and 0.9 percent, respectively, are reasonable. Over the forecast horizon (2013-2022) the average annual customer and energy sales growth rate of 1.5 percent and 1.2 percent, respectively, are also reasonable and consistent with the sales growth projections for the South Atlantic Census Region.

Q. Please describe Tampa Electric's forecasting approach.

A. Tampa Electric has adopted a Statistically Adjusted End-Use ("SAE") modeling framework for forecasting residential and commercial customer class sales. This approach entails estimating monthly regression average use models that explicitly incorporate expected impacts of end-use energy intensity trends as well as the impact of economic activity, price, and weather conditions. Monthly end-use variables are constructed by appropriately weighting the economic drivers through imposed elasticities and combining the economic drivers with end-use intensity trends, monthly Heating Degree Days and Cooling Degree Days, and billing days. Monthly average-use regression models are then estimated as a function of heating (XHeat), cooling (XCool), and other use (XOther).

A monthly sales forecast is derived by combining the class average use forecast with a customer forecast. The residential customer forecast is based on a monthly regression model that relates residential customers to population projections. The commercial customer forecast is in turn driven by the residential customer forecast.

Both the small industrial customer class and public authority sales are also forecasted using a commercial

SAE model specification; though classified as industrial, the small industrial load profile looks very much like commercial load. A more generalized monthly econometric forecast model is used for forecasting large industrial and street lighting sales.

Q. Does the SAE model generate reasonable sales forecasts?

A. Yes. The SAE model is a theoretically sound approach for forecasting electric sales. The SAE model integrates the theoretical strength of the end-use model (such as the EPRI residential (REEPS) and commercial (COMMEND) end-use models) into an econometric framework. The model captures the impact of end-use energy-intensity trends as well as economic, weather and short-term price impacts by incorporating constructed end-use variables into an estimated monthly average use regression model. Itron has been developing and improving the SAE model framework and model inputs for over ten years. The SAE model has been adopted by numerous utilities and approved by regulatory commissions across the United States and Canada. Itron's Energy Forecasting Group (EFG) was started to support utility implementation and updates of the SAE models and model inputs. There are currently fifty-one utility EFG members. Itron works closely with

the EIA in updating SAE end-use data inputs with the objective of developing regional and utility-level forecasts that are consistent with the EIA Annual Energy Outlook and expected impact of new end-use standards and technology on electric and gas sales.

Q. What software program does Tampa Electric use for sales and customer forecasting?

A. Tampa Electric uses the MetrixND software program developed by Itron. MetrixND is an energy modeling and analysis software package developed and supported by Itron. MetrixND is an integrated application that includes several statistical modeling options including regression analysis, model simulations, statistical reports, data transformation capabilities and reports that link to external reporting and other forecasting and analysis applications. The initial version was released in 1997. Since then, there have been several updates with each new release incorporating improved modeling and analysis capabilities. MetrixND is used by energy companies around the world; this includes most major utilities in the United States and Canada. Users include independent system operators, gas and electric distribution companies, generation and power traders and

energy retail companies. Currently there are over 150 companies using MetrixND. Itron's forecasting staff provides support for MetrixND and other related forecasting products through the annual user group meeting, forecast workshops, product training sessions and direct staff assistance.

Q. Do the company's models perform well?

A. Yes. Monthly regression models are estimated using billed sales and customer data from January 2002 to May 2012; this represents 125 monthly observations. The estimated residential and commercial models are statistically strong as measured by the coefficient, in-sample and out-of-sample model statistics. In both the residential and commercial average use models, the primary end-use variables (as measured by the model variable T statistics) are all statistically significant at the 95 percent level of significance. The Adjusted R2 (which measures the proportion of the monthly variation the model is able to explain) indicates strong model fits with a 0.978 Adjusted R2 in the residential average use model and a 0.971 Adjusted R2 in the commercial average use model. The model mean absolute percent errors ("MAPE") show a similar strong fit. The MAPE measures

the average absolute forecast error on a percent basis. For the estimation period, the residential average use model MAPE is 2.11 percent and the commercial average use MAPE is 1.20 percent. The residential and commercial customer forecast models have in-sample MAPEs of less than 0.2 percent. Plots comparing actual and predicted average use and actual and predicted customers also show that the models do an excellent job of capturing usage and customer trends and month-to-month variation.

One way of testing the performance of the forecast models is to hold some of the actual sales and customer data out of the estimation period, re-estimate the model with the shorter data set and then compare the model-predicted results with actual usage and customers. This is known as an out-of-sample test. Ideally, the out-of-sample performance statistics will be close to that of the in-sample model fit statistics. To perform this test, the last twelve months (June 2011 to May 2012) are held out of the estimation period. The models are re-estimated and the predicted values for this period are compared with the actual monthly average use and monthly customer counts. The residential average use out-of-sample MAPE is 3.07 percent and the commercial average use out-of-sample MAPE is 1.36 percent. The

residential and commercial customer out-of-sample MAPEs are 0.07 percent and 0.12 percent, respectively. The out-of-sample MAPEs are reasonable and similar to results from other utility residential and commercial average use models that I have evaluated or directly estimated. The Tampa Electric out-of-sample tests indicate that the models will yield reasonable forecasts given forecast assumptions.

Q. Is the near-term forecast consistent with recent sales and customer trends?

A. Yes. The recent recession and slow recovery has had a significant impact on Tampa Electric's residential and commercial electric sales. This lower sales level sets the basis for future sales growth. Since 2007, weather-normalized Tampa Electric residential average use has declined 1.3 percent per year. Tampa Electric's normalized commercial average use has declined 1.6 percent per year. With little customer growth, 2012 normalized residential sales are 3.7 percent lower than normalized 2007 sales; commercial sales are 5.4 percent lower than 2007 normalized commercial sales.

It now appears that customer growth and sales are

beginning to recover. Tampa Electric added close to 7,700 new residential customers and 500 new commercial customers in 2012. Normalized 2012 residential sales turned positive for the first time since 2006; normalized 2012 sales residential sales are up 0.3 percent over 2011. While 2012 normalized commercial sales growth is still negative (down 0.3 percent), it is the smallest decline in sales since 2007.

The economy and population is expected to show slow, but positive growth in 2013 and slightly stronger growth in 2014. Tampa Electric expects residential customer growth of 1.2 percent in 2013 and 1.3 percent in 2014. Normalized residential sales after adjusting for demand-side management ("DSM"), increases 0.4 percent in 2013 and 1.0 percent in 2014. Residential sales improve over the longer term with increasing population growth and improving economic conditions.

New federal lighting standards will have a significant impact on residential usage. Residential average use before DSM adjustments declines 0.6 percent in 2013 and another 0.1 percent in 2014. Traditional 75-watt incandescent light bulbs are phased out beginning in 2013 and 60-watt and 40-watt incandescent light bulbs are

phased out in 2014. The 100-watt incandescent light bulb was phased out in 2012. By the end of 2014, EIA estimates that the new lighting standards will reduce residential lighting intensity (kWh per household) by nearly 20 percent. New residential and commercial end-use standards that cover a wide range of end-uses also start phasing in beginning in 2014.

Commercial normalized sales (after adjusting for DSM) are expected to increase 1.1 percent in 2013 and 2014. The near-term forecast is consistent with the continuing economic improvement projected by Moody Analytics.

Q. Are the forecast results reasonable?

A. Yes. The 2013 Budget-Year Forecast is reasonable given the expected improvements in population and economic growth and improvements in end-use efficiencies. While the economy is improving, new lighting and other new end-use standards, natural-occurring efficiency improvements and strong DSM program activity will limit customer usage growth well into the future.

Tampa Electric projects flat residential average usage over the next ten years and a 0.2 percent average annual

decline when adjusted for DSM savings. This is consistent with expected sales growth for the South Atlantic Census Region. In comparison, Itron's residential SAE model for the South Atlantic Census Division (based on EIA's 2012 Annual Energy Outlook), shows average residential use declining 0.1 percent annually through 2022.

The 2013 Budget-Year commercial customer usage averages 0.3 percent annual growth over the next ten years before DSM adjustments and averages a 0.1 percent decline when adjusted for DSM savings. This is also consistent with EIA's 2012 commercial end-use intensity projection for the South Atlantic Census Division, which shows commercial energy intensity (use per square ft.) averaging 0.1 percent annual growth through 2022.

With flat to declining average customer use, residential and commercial sales growth is largely driven by customer growth. The key customer forecast driver is the Tampa Electric population forecast. Population projections drive the residential customers based on an estimated monthly econometric model that relates monthly customer counts to monthly population. The resulting residential customer forecast in turn drives the commercial customer

forecast through an estimated monthly commercial customer forecast model. The correlation between residential customers and the population estimates is extremely strong with a correlation coefficient of 0.992 (1.0 is a perfect correlation). Similarly, the correlation between the number of commercial customers and residential customers is also nearly perfect with a correlation coefficient of 0.992. Population averages 1.5 percent annual growth through 2022. With a 1.5 percent population forecast, the estimated customer regression model results in annual residential customer growth of 1.5 percent per year. Residential customer growth coupled with DSM adjusted average use decline of 0.2 percent yields long-term residential sales growth of 1.3 percent. The commercial customer base expands 1.4 percent annually over the next ten years resulting in long-term commercial sales growth (adjusted for DSM) of 1.3 percent per year.

Q. How does Tampa Electric sales forecasts compare with other utilities?

A. Tampa Electric's sales forecasts are similar to what other utilities are reporting and to forecasts that I have evaluated and developed for other utilities. The

general expectation is that sales will be flat to showing some growth in 2013 with stronger growth in 2014 and 2015 as the economy improves.

In Itron's annual utility forecast survey (completed March 2012), respondents from the southern states (there were 25 utility respondents from the southern states) on average reported expected residential annual sales growth (2012 to 2021) of 1.0 percent and commercial annual sales growth of 1.2 percent. This is consistent with Tampa Electric's long-term projected residential and commercial annual sales growth of 1.3 percent. Tampa Electric should see slightly higher sales growth than other utilities, as the Tampa area population and economy is projected to grow faster than the country and most other regions.

Q. The 2013 Forecast is significantly lower than the 2009 Test-Year Forecast submitted in 2008. Is there a good reason for this?

A. Yes. The primary reason for the lower 2013 Forecast is that the economic and population growth forecasted in 2008 never materialized; by 2012, actual sales (the starting point for the 2013 Budget-Year Forecast) were

already 13 percent below the 2009 Budget-Year Forecast. The 2009 Forecast was based on economic and population forecasts that reflected a much milder recession than what actually occurred. Moody Analytics (formerly Economy.com) forecasted slow, but positive real regional output growth for 2008 of 0.9 percent. Actual output that year fell 3.5 percent. For 2009 real output was forecasted to increase 3.0 percent, but actually fell another 2.0 percent. Real output was projected to average 3.0 percent annual growth between 2007 and 2012. Actual output over this period averaged a 0.3 percent decline. Where the number of system customers was expected to increase 1.7 percent annually between 2007 and 2012 based on 2008 population projections, actual customer growth averaged just 0.6 percent.

Document No. 2 of my exhibit compares the current economic recovery with past recessions and recoveries. For each of the major recessions (back to 1960), Document No. 2 of my exhibit shows the number of months before total employment recovers to pre-recession peak level. In general, the recovery from a recession has been taking longer over time. Prior to 2000, it took less than 2 years for employment to recover to pre-recession levels. In 2001 it took nearly five years for employment to

recovery. We are now five years out from the start of the 2008 Great Recession and employment has still not recovered. In December 2012 (60 months out) national employment was still 2.4 percent below peak 2008 employment-level, while Florida employment was 1.6 percent below 2008 peak employment level in August 2012.

Going forward, the economic forecast that drives the 2013 Forecast is also significantly lower than that in the 2009 Forecast. Real output is now projected to average 3.0 percent growth over the next ten years compared with the 2009 Forecast of 3.6 percent annual growth. Employment is forecasted to increase 1.8 percent per year compared with the 2009 Forecast of 2.2 percent. The most current population forecast is also lower than that used in the 2009 Forecast. In the current forecast, population growth averages 1.5 percent per year through 2022. This compares with 2.1 percent average population growth forecast used in the 2009 Forecast.

Q. How did other utility near-term forecasts perform?

A. The majority of utilities that responded to the Itron 2012 survey, also over forecasted near-term sales. The reported average residential forecast error for 2011 was

0.6 percent higher than actual 2011 sales and the average 2011 commercial sales forecast was 0.7 percent higher than what actually occurred. For those utilities in the South, residential and commercial 2011 sales forecasts were on average 1.0 percent higher than what actually occurred.

Q. Is the approach used to adjust the sales forecast for DSM impacts reasonable?

A. Yes. Tampa Electric adjusted the sales forecast for future DSM impacts using an approach adopted by most utilities. Tampa Electric assumes that the impact of all past DSM savings is embedded in the estimated model and resulting forecast. The forecast is adjusted for DSM savings by subtracting off the DSM savings forecast from the starting, unadjusted forecast. DSM adjustments reduce residential sales growth by 0.2 percent in 2013 and 0.3 percent in 2014. DSM adjustments reduce commercial sales growth by 0.5 percent in 2013 and 2014.

Q. Could you summarize your direct testimony?

A. I have reviewed the 2013 Budget Year individual customer class sales forecasts and find the forecast for the 2014

test-year and following years to be reasonable given economic, population and expected end-use intensity trends. The average annual growth rates for total customers of 1.5 percent and total sales of 1.2 percent over the forecast horizon are appropriate and reasonable. Tampa Electric has adopted an SAE modeling framework for forecasting its residential and commercial sales. The Tampa Electric SAE model represents the "best-in-class" forecasting approach as the models are theoretically strong, explain residential and commercial sales growth, as well as measured by estimated in-sample and out-of-sample model statistics and generates reasonable forecasts. The forecasts are consistent with Tampa Electric's historical sales trends, EIA projections at the regional and national level, expected impacts of new end-use standards and Moody Analytics' forecast for continuing economic improvements and population growth. The Tampa Electric forecasts are also consistent with other utility forecasts as reported in Itron's annual utility forecast survey. The company's forecasts are appropriately adjusted for future DSM using an approach adopted by most utilities.

Q. Does this conclude your direct testimony?

A. Yes.

DOCKET NO. 130040-EI
WITNESS: FOX

EXHIBIT

OF

ERIC FOX

ON BEHALF OF TAMPA ELECTRIC COMPANY

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Eric Fox

Director, Forecast Solutions

Education

- M.A. in Economics, San Diego State University, 1984
- B.A. in Economics, San Diego State University, 1981

Employment History

- Director, Forecasting Solutions, Itron, Inc. 2002 - present
- Vice President, Regional Economic Research, Inc. (now part of Itron, Inc.), 1999 – 2002
- Project Manager, Regional Economic Research, Inc., 1994 – 1999
- New England Electric Service Power Company, 1990 – 1994
  Positions Held:
  - Principal Rate Analyst, Rates
  - Coordinator, Load Research
  - Senior Analyst, Forecasting
- Senior Economist, Regional Economic Research, Inc, 1987 – 1990
- San Diego Gas & Electric, 1984 – 1987
  Positions Held:
  - Senior Analyst, Rate Department
  - Analyst, Forecasting and Evaluation Department
- Instructor, Economics Department, San Diego State University, 1985 – 1986

Experience

Mr. Eric Fox is Director, Forecasting Solutions with Itron where he directs electric and gas forecasting projects and manages Itron's Boston office. Mr. Fox has over 25 years of forecasting experience with extensive expertise in electric and gas load, sales, and revenue forecasting.

Most recently, Mr. Fox has been focused on developing forecast systems to support business operations in the competitive power market. This work includes directing development and implementation of integrated sales and revenue forecasting systems and Itron's new load research system. He also directs Itron's forecast support work, which includes developing energy and demand forecasts for financial and long-term planning, billed and unbilled sales and revenue analysis, weather normalization for monthly sales variance analysis and rate case support, and analyzing technology and economic trends and their impact on long-term energy demand.

Mr. Fox has provided expert support in rate and regulatory related issues. This support has included developing forecasts for resource planning and rate filings, providing supporting testimony, and conducting forecast workshops with regulatory staff. He is also one of Itron's primary forecast instructors. He provides forecast training through workshops sponsored by Itron, utility on-site training programs and workshops held by other organizations including EPRI and the Institute of Business Forecasting.

Prior to joining RER/Itron, Mr. Fox supervised the load research group at New England Electric where he oversaw systems development, directed load research programs, and customer load analysis. He also worked in the Rate Department as a Principal Analyst where he was responsible for DSM rate and incentive filings, and related cost studies. The position required providing testimony in regulatory proceedings.

Projects, Reports, and Presentations

Statistical End-Use Model Implementation, Nova Scotia Power, December 2012

Fundamentals of Forecasting, Workshop, Boston, MA, November 2012

Rate Class Profile Development for Settlement Support, NYSEG and RGE (Iberdrola), September 2012

Budget Forecasting System Implementation, and Training, Horizon Utilities, August 2012

Commercial Sales Forecasting: Getting it Right, Itron Brownbag Web Presentation, June 2012

Long-Term Energy Trends and Budget Forecast Assessment, Tampa Electric Company, June 2012

Budget-Year 2013 Sales and Revenue Forecast, Green Mountain Power, April 2012

Long-Term Residential and Commercial Energy Trends and Forecast, Electric Utility Forecasting Week, Las Vegas, May 2012

NV Energy Forecast Workshop, with Terry Baxter, NV Energy, March 2012

Commercial Sales Forecasting, the Neglected Sector, Electric Utility Forecasting Forum, Orlando, November 2011

Vermont Long-Term Energy and Demand Forecast, Vermont Electric Transmission Company, November 2011

Fundamentals of Forecasting Workshop, Boston, September 2011

Forecasting Top 100 PPL Load-Hours, with David Woodruff, AEIC Summer Load Research Conference, Alexandra, VA, August 2011

Budget and Long-Term Energy and Demand Forecast Model Development, Central Electric Power Cooperative, April 2011

Development of an Integrated Revenue Forecasting Application, TVA, March 2011

Integrating Energy Efficiency Into Utility Load Forecasts, with Shawn Enterline, 2010 ACEE Summer Study on Energy Efficiency in Buildings, August 2010

Using Load Research Data to Develop Peak Demand Forecasts, AEIC Load Research Conference, Sandestin, FL, August 2010

Development of a Long-term Energy and Demand Forecasting Framework, Consumer Energy, October 2009

Review of Entergy Arkansas Weather Normalization Methodology for the 2009 Rate Case, Entergy Arkansas Inc, September 2009

Green Mountain Power Budget Year and Rate Case Sales and Revenue Forecast, Green Mountain Power, May 2009

Vectren Gas Peak-Day Design Day Load Forecast and Analysis, Vectren Energy, April 2009

Nevada Power, Long-Term Energy and Demand Forecast, NV Energy, March 2009

Estimating End-Use Load Profiles, Leveraging Off of Load Research Data, Western Load Research Conference, Atlanta, March 2009

Fundamentals of Load Forecasting Workshop, Orlando, March 2009

DPL Long-Term Energy and Demand Forecast, 2009 IRP Filing, Dayton Power & Light, February 2009

Development and Application of Long-Term End-Use Hourly Load Forecasting Model, AEP, October 2008

Load Research from the User's Perspective, AEIC Annual Load Research Conference, Oklahoma City, August 2008

OGE Weather Normalized Sales Study, Estimation of Weather Normalized Sales for 2007 Rate Case, July 2008

Vermont Long-Term and Zonal Demand Forecast, Vermont Power Company, July 2008

Budget Forecast System Implementation, Entergy June 2008

Approaches for Analyzing Electric Sales Trends, Electric Forecasting Group, Las Vegas, May 2008

2008 Budget Sales Forecast, NStar, August 2007

Long-Term Peak Demand Forecast, ITC, August 2007

Long-Term Forecasting Workshops, Ameren and Missouri Public Utilities Commission, April 2007

Fundamentals of Forecasting Workshop, March 2007, Orlando Florida

Statistically Adjusted End-Use Modeling Overview, Vermont Public Utilities Commission, December 2006

2007 Budget Sales and Revenue Forecast, Green Mountain Power Company, October 2006

Estimation of Long-Term Peak, Michigan Electric Transmission Company, August 2006

Review and Estimation of Gas Price Elasticities, with Dr. Stuart McMenamin, PSEG, March 2006

Implementation of Long-Term Energy and Hourly Load Forecasting Application, Project Manager, Florida Power & Light, March 2006

Development of Long-Term Energy and Demand Forecast, Orlando Utilities Commission, February 2006

Development of Long-Term Energy and Demand Forecast, Orlando Utilities Commission, February 2006

Development of Normalized Class Hourly Load Shapes for Cost of Service Study, KCPL, October 2005

Estimation of Long-Term Peak, Michigan Electric Transmission Company, August 2005

Electric Sales and Customer Forecast to Support General Rate Case Filing, (Central Hudson Gas & Electric), July 2005

Development of Long-Term Sales, Energy, and Demand Forecast, Indianapolis Power & Light (IPL), May 2005

Long-Term Gas Sales and Demand Forecast for Vectren of Ohio (submitted to the Ohio Public Utilities Commission, June 2005

Budget Forecasting and Variance Analysis Workshop, Orlando, Florida, April 2005

Residential Fuel Oil Price Response Study, Griffith Oil (subsidiary of Central Hudson Company), November 2004

Review and Analysis of Proposed Changes to Billed and Unbilled Sales Calculation. Indianapolis Power & Light (IPL). September 2004.

Review of 2004 Long-Term Energy and Demand Forecast for Public Service of Colorado. Xcel Energy. August 2004.

Implementation of an Electric and Gas Sale, Revenue, and Variance Analysis and Forecasting Application. NSTAR. Project Manager. June 2004

TVA Implementation of the Interruptible Load Forecast System. Tennessee Valley Authority. Project Manager. May 2004.

Statisically Adjusted End-Use Forecasting Methodology. Electric Forecasting Group. With M. Aydinalp. Las Vegas. April 2004

Fundamentals of Energy Forecasting. New Orleans. April 2004.

Energy and Long-term Hourly Load Forecast. KCP&L. Project Manager. March 2004.

Real Time System Hourly Load Forecasting Application. Florida Power and Light. Project Manager. December 2003

Implementation of an Electric Sales and Variance Analysis Application. Ameren Corporation. Project Manager. October 2003

Implementation of an Electric and Gas Rate Class Sales and Customer Forecast System, Central Hudson Energy. Project Manager. June 2003

Forecasting with Artificial Neural Networks. Workshop. Forecasting Summit. Boston. August 2003

Electric and Water Sales, Customer, and Revenue Forecast. Orlando Utilities Commission. March 2003.

Construction of a Delivery Point Forecast System. Tennessee Valley Authority. Project Manager. November 2002

Delivery of a System Load and Network Demand Forecasting System. Consolidated Edison Company of New York. November 2002

Advanced Forecast Methodologies. Institute of Business Forecasting Workshop. Boston, Massachusetts. August 2002

Implementation of Sales and Revenue Forecasting System. Tampa Electric Company. Project Manager. July 2002

Budget and Long-Term Energy, Demand, and Revenue Forecast. National Grid Company. Project Manager. October 2001

Development of Regional Power Supply Area Forecasts. For National Grid Company. Project Manager. March 2001

Hourly Load Forecast System Implementation and Training. Consumers Energy Company. Project Manager. February 2001

Fundamentals of Energy Forecasting. Forecast Workshop. Orlando, Florida. November 2000

Using Regression Modeling for Weather Normalizing Electric Sales. MetrixND User Group Meeting. San Diego. October 2000

Application of Artificial Neural Network Models to Business Forecasting Problems – A *Tutorial*. Institute of Business Forecasting. Orlando, Florida. June 2000

Regulatory Experience

October 2012: Nevada Public Utilities Commission. Provided testimony supporting Nevada Power Company's 2012 Long-Term Energy and Demand Forecast

October 2012: Nevada Public Utilities Commission. Provided testimony supporting Sierra Pacific Power Company's 2012 Long-Term Energy and Demand Forecast

May 2010: Nevada Public Utilities Commission. Provided testimony supporting Sierra Pacific Power's Company's 2010 Long-Term Energy and Demand Forecast

March 2010: Nevada Public Utilities Commission. Provided testimony supporting Nevada Power Company's 2010 Long-Term Energy and Demand Forecast

August 2009: Arkansas Public Service Commission. Reviewed Entergy Arkansas weather normalization and provided supporting

August 2008: Arkansas Public Service Commission. Provided testimony to support OG&E weather normalization sales exhibit

March 2006: Florida Public Utilities Commission. Provided testimony to support Orlando Utilities Commission *Need for PowerApplication* long-term energy forecast

July 2005: New York State Public Utilities Commission. Provided testimony to support Central Hudson's electric sales forecast

April 2004: Missouri Public Utilities Commission . Held Weather Normalization Workshop with Commission Staff

July 2001: Colorado Public Utilities Commission: Directed Forecasting Workshop on Long-Term Forecasting

March 2001: Missouri Public Utilities Commission. Conducted weather normalization workshop

July 2000: Florida Public Utilities Commission. Submitted long-term forecast and supporting testimony for the Orlando Utilities Commission service area.

October 1993: Massachusetts Department Public Utilities, and Rhode Island Public Utilities Commission. Submitted testimony in support of DSM earned incentives and related rate design. Position: Principal Analyst, Rate Department, New England Power Service Company. Supervisor: Mr. Larry Reilly.

June 1993: Massachusetts Department Public Utilities. Testified in matters related to the annual Energy Conservation Services Charge. Position: Principal Analyst, Rate Department, New England Power Service Company. Supervisor: Mr. Larry Reilly.

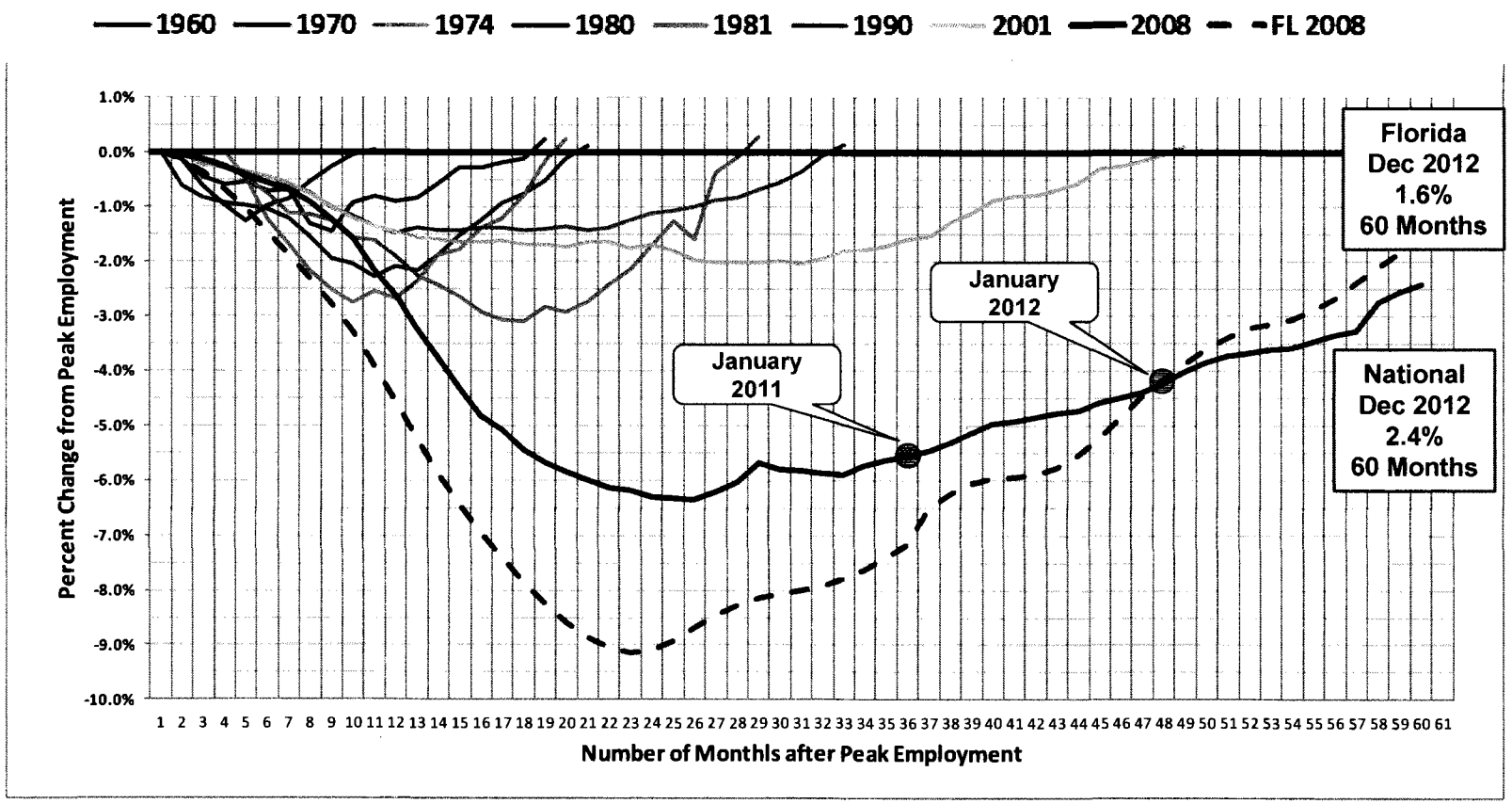
June 1990: Nevada Public Utilities Commission. Submitted testimony in Nevada Power's behalf in matters related to gas transportation rates proposed by Southwest Gas in Southwest Gas rate proceedings. Position: Sr. Analyst, Regional Economic Research, Inc.

October 1988: California Public Utilities Commission. Testified to development and application of a Gas Marginal Cost of Service Study for unbundling natural gas rates. Part of a generic hearing to restructure the natural gas industry in California. Position: Sr. Analyst, Rate Department, San Diego Gas & Electric. Supervisor: Mr. Douglas Hansen

June 1988: California Public Utilities Commission. Testified in matters related to the reasonableness of PUC Staff proposal for evaluating SDG&E's "Reasonableness" in uranium procurements. Position: Sr. Analyst, Rate Department, San Diego Gas & Electric. Supervisor: Mr. Douglas Hansen

April 1987: California Energy Commission. Testified in matters related to SDG&E's residential air conditioning cycling program. Position: Analyst, Load Forecasting Department, San Diego Gas & Electric. Supervisor: Mr. Steve Jack

SPEED OF RECOVERY IS THE ISSUE



Source: U.S. Bureau of Labor Statistics