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TECO
TAMPA ELECTRIC

ORIGINAL

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 07_____-EI
IN RE: TAMPA ELECTRIC'S
PETITION TO DETERMINE NEED FOR
POLK POWER PLANT UNIT 6

TESTIMONY AND EXHIBIT
OF
LORRAINE L. CIFUENTES

ORIGINAL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED DIRECT TESTIMONY

OF

LORRAINE L. CIFUENTES

Q. Please state your name, business address, occupation and employer.

A. My name is Lorraine L. Cifuentes. My business address is 702 North Franklin Street, Tampa, Florida 33602. I am employed by Tampa Electric Company ("Tampa Electric" or "company") as Manager, Load Research and Forecasting in the Regulatory Affairs Department.

Q. Please provide a brief outline of your educational background and business experience.

A. In 1986, I received a Bachelor of Science degree in Management Information Systems from the University of South Florida. In 1992, I received a Masters of Business Administration degree from the University of Tampa. In October 1987, I joined Tampa Electric as a Generation Planning Technician, and I have held various positions within the areas of Generation Planning, Load Forecasting and Load Research. In October 2002, I was promoted to

Manager, Load Research and Forecasting. My present responsibilities include the management of Tampa Electric's customer, peak demand and energy sales forecasts as well as management of Tampa Electric's load research program and other related activities.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe Tampa Electric's load forecasting process, describe the methodologies and assumptions, and present the load forecasts used in Tampa Electric's Determination of Need Study for Electrical Power: Polk Unit 6 ("Need Study"). Additionally, I will demonstrate how these forecasts are appropriate and reasonable based on the assumptions provided.

Q. Have you prepared an exhibit to support your testimony?

A. Yes, I am sponsoring Exhibit No. ____ (LLC-1) consisting of 11 documents, prepared under my direction and supervision. These consist of:

Document No. 1 Customer Forecast

Document No. 2 Economic Assumptions

Document No. 3 Billing Cycle Degree Days

Document No. 4	Real Price of Electricity
Document No. 5	Per-Customer Energy Consumption
Document No. 6	Retail Energy Sales
Document No. 7	Per-Customer Peak Demand
Document No. 8	Peak Demand
Document No. 9	Firm Peak Demand
Document No. 10	Load Factor
Document No. 11	2007 Updated Firm Peak Demand

Q. Are you sponsoring any sections of Tampa Electric's Need Study?

A. Yes. I sponsor section III.B. "Demand and Energy Forecasts" of the Need Study.

Q. What is Tampa Electric's existing and forecasted customer base?

A. Tampa Electric's current customer base and forecasted growth is shown in Document No. 1 of my Exhibit No. ____ (LLC-1). As of December 2006, Tampa Electric's customer base was 653,706 and is projected to grow at an average annual rate of 2.2 percent over the next ten years.

TAMPA ELECTRIC'S FORECASTING PROCESS

Q. Please describe Tampa Electric's load forecasting process.

A. Tampa Electric uses econometric models and statistically adjusted engineering ("SAE") models, which are integrated to develop projections of customer growth, energy consumption and peak demands. The econometric models measure past relationships between economic variables, such as population, employment and customer growth. The SAE models, which incorporate end-use structure into an econometric model, are used for projecting average per-customer consumption. These models have consistently been used by Tampa Electric for generation planning purposes and the modeling results have been submitted to the Commission for review and approval in past regulatory proceedings.

Q. Which assumptions were used in the base case analysis of customer growth?

A. The primary economic drivers for the customer forecast are state population estimates, service area households and Hillsborough County employment. The state population forecast is the starting point for developing the customer and energy projections. Both the University of

Florida's Bureau of Economic and Business Research ("BEBR") and Moody's Economy.com provide population projections for Florida. The population forecast is based upon the projections of BEBR in the short-term and is a blend of BEBR and Economy.com for the long-term forecast. Service area households and Hillsborough County employment assumptions are utilized in estimating non-residential customer growth. For example, an increase in the number of households results in a need for additional services, restaurants, and retail establishments. In addition, projections of employment in the construction sector are a good indicator of expected increases and decreases in local construction activity. Similarly, commercial and industrial employment growth is a good indicator of the level of activity to expect in their respective sectors. Economy.com provides projections of Hillsborough County households and employment by major sectors. The ten-year historical and forecasted average annual growth rates for these economic indicators are shown in Document No. 2 of my Exhibit No. ____ (LLC-1).

Q. Which assumptions were used in the base case analysis of energy sales growth?

A. Customer growth and per-customer consumption growth are the primary drivers for growth in energy sales. The average per-customer consumption for each revenue class is based on the SAE modeling approach. The SAE models have three components. The first component includes assumptions of the long-term saturation and efficiency trends in end-use equipment. The second component captures changes in economic conditions, such as increases in real household income, decreases in number of persons per household and the price of electricity and how these factors affect a residential customer's consumption level. A complete list of the critical economic assumptions used in developing these forecasts is shown in Document No. 2 of my Exhibit No. ____ (LLC-1). The third component captures the seasonality of energy consumption. Heating and cooling degree day assumptions allocate the appropriate monthly weather impacts and are based on weather patterns over the past 20 years. Historical and projected degree days are shown in Document No. 3 of my Exhibit No. ____ (LLC-1).

Q. Which assumptions were used in the base case analysis of peak demand growth?

A. Peak demand growth is affected by long-term appliance

trends, economic conditions and weather conditions. The end-use and economic conditions are integrated into the peak demand model from the energy sales forecast. The weather variables are heating and cooling degree days at the time of the peak and for the 24-hour period of the peak day. Weather variables provide the seasonality to the monthly peaks. By incorporating both temperature variables, the model accounts for cold or heat build up that contributes to determining the peak day. The temperature assumptions used are based on an analysis of 20 years of peak day temperatures. For the peak demand forecast, the design temperature at the time of winter and summer peak is 31 and 92 degrees Fahrenheit, respectively.

Q. Is 31 degrees Fahrenheit the 20-year average temperature at the time of the winter peak?

A. No. The 20-year average temperature at the time of the winter peak is 36 degrees Fahrenheit. Although 31 degrees is not the 20-year average, it is representative of the average temperature for the top ten coldest peaks in the past 20 years and also the top five coldest peaks in the past ten years. The 31 degrees Fahrenheit assumption has consistently been used by Tampa Electric

for generation planning purposes and in peak demand projections submitted to the Commission for review and approval in prior regulatory proceedings.

Q. Does Tampa Electric assess the reasonableness of these base assumptions?

A. Yes. The base case economic assumptions have been evaluated based on a comparison of the data series' historical average annual growth rates to the projected average annual growth rates for the forecast period. In addition, each economic data series is compared to an alternate source and evaluated for consistency. Economy.com's projections for Florida employment by major sectors and Florida real household income are compared to the projections of the Office of Economic and Demographic Research which is part of the Florida Legislature. The projections for Florida employment growth were very consistent between the two sources; therefore, it is reasonable to conclude that Economy.com's Hillsborough County employment growth was also reasonable.

Q. Were the forecasts for population growth also evaluated for reasonableness?

A. Yes. Economy.com and BEBR's population forecasts were also compared and evaluated for consistency. A blend of the two sources was used and provides a reasonable population projection for the state of Florida.

Q. Why are population projections at the state level used rather than at the Hillsborough County or service area level?

A. State level population projections are preferred over county level projections for several reasons. State level historical data is more consistent between data sources than county level data. Historical and projected population growth rates are similar for Florida and Hillsborough County, with Hillsborough County growing historically at a slightly faster pace. In addition, forecasting models show a very high correlation between Florida population and residential customer growth; therefore, Florida population is a reasonable explanatory variable to use in Tampa Electric's customer models.

Q. Was the price of electricity included in your energy sales models?

A. Yes. The price of electricity was included in each per-

customer consumption model. Document No. 4 of my Exhibit No. ____ (LLC-1) includes the real price of electricity by class. The price variable was primarily used to capture long-term impacts of the real price of electricity. The recent increases in the real price of electricity have resulted in reduced growth in residential and commercial sales in the short-term and increased growth as the price moderates. In order to eliminate recent abnormal swings in prices, a smoothed trend of the real price of electricity was used in the residential and commercial models. This change only impacted the sales growth for the first few years of the forecast; long-term results were not impacted. Energy sales for the remaining sectors were not as sensitive to the changes in the real price of electricity.

TAMPA ELECTRIC'S FORECASTED GROWTH

Q. What is Tampa Electric's customer growth forecast?

A. Tampa Electric is projecting an annual average increase of 16,393 new customers over the next ten years (2007-2016). This average annual increase of 2.2 percent is slightly lower than the average annual growth rate of 2.6 percent during the past ten years (1997-2006). Despite the slightly lower customer growth rate, higher absolute

customer growth over the period is anticipated as reflected in Document No. 1 of my Exhibit No. ____ (LLC-1).

Q. What is Tampa Electric's energy sales forecast?

A. The primary driver behind the increase in the energy sales forecast is the average annual increase in customers of 2.2 percent. In addition, per-customer consumption is expected to increase at an average annual rate of 0.5 percent, as shown in Document No. 5 of my Exhibit No. ____ (LLC-1). Combining the growth in customers and per-customer consumption, retail energy sales are expected to increase at an average annual rate of 2.8 percent. Excluding the phosphate sector which has recently been declining, retail energy sales are expected to increase at an average annual rate of 2.9 percent. Historical and forecasted energy sales are shown in Document No. 6 of my Exhibit No. ____ (LLC-1).

Q. Have higher energy prices adversely impacted consumption in recent years?

A. Yes. Tampa Electric has seen a correlation between recent increases in energy costs and a resulting

reduction in consumption levels. However, while the reduced consumption results in decreased energy sales, peak demand growth is still occurring due to the construction of larger homes and an increase in the size and number of appliances in the average household, which results in the need for additional generation resources.

Q. Did you consider the housing slowdown in your growth analysis?

A. Yes. The recent downturn in housing is reflected in the estimates used in the growth models. While it is evident that a slowdown in growth has occurred, it is expected that the downturn is merely a cyclical correction that occurs periodically. Tampa Electric expects that housing growth will revert back to normal levels by 2009 and beyond.

Q. What is Tampa Electric's peak demand forecast?

A. Summer and winter peak usage per-customer is projected to increase at an average annual rate of 0.6 percent, which is consistent with historical growth rates as well as per-customer energy consumption. Document No. 7 of my Exhibit No. ____ (LLC-1) shows historical and forecasted

peak usage per-customer for summer and winter peaks. The increase in customers and the increase in per-customer demand results in an average annual growth rate of 2.8 percent for the winter peak and a 2.9 percent growth rate for the summer peak. As shown in Document No. 8 of my Exhibit No. ____ (LLC-1), peak demand for the summer of 2007 is forecasted to be 4,113 MW, increasing to 5,300 MW in 2016, an average increase of 132 MW per year. The 2008 winter peak is forecasted to be 4,488 MW, increasing to 5,602 MW in 2016, an average increase of 138 MW per year. Summer and winter firm peak demands, which have been reduced by curtailable load such as load management and interruptible loads, are shown in Document No. 9 of my Exhibit No. ____ (LLC-1).

SENSITIVITY ANALYSIS

Q. Please describe the various other assumptions used in the load forecasts.

A. The base case scenario is tested for sensitivity to varying economic conditions and customer growth rates. The high and low peak demand and energy scenarios represent an alternative to the company's base case outlook. The high scenario represents more optimistic economic conditions in the areas of customers, employment

and income. The low band represents less optimistic scenarios in the same areas. Compared to the base case, the expected customer and economic growth rates are 0.5 percent higher in the high scenario and 0.5 percent lower in the low scenario.

Q. Are conservation and demand side management ("DSM") impacts accounted for in the energy sales and peak demand forecasts?

A. Yes. Tampa Electric forecasts demand and energy reductions for each conservation and DSM program, which are aggregated to represent the total cumulative savings. The energy sales and peak demand forecasts are adjusted by the total incremental savings each year.

Q. Does Tampa Electric conclude that the forecasts of customers, energy sales and demand are appropriate and reasonable?

A. Yes. The results have been compared to trend analyses and annual multi-regression sales models. The average annual growth rates for per-customer demand and energy usage are compared with each other for consistency and compared to historical growth rates. Summer and winter

load factors are reviewed to ensure proper integration of the peak and energy models. The results show that the load factors are reasonable compared to historical years. Load factors have dropped slightly due to the loss of phosphate load. The load factors are shown in Document No. 10 of my Exhibit No. ____ (LLC-1).

Q. Since Tampa Electric's initial analysis was completed, have the customer, peak demand and energy forecasts been updated?

A. Yes. The customer, peak demand and energy forecast models were updated as of June 2007. The new forecasts include updated economic assumptions, the company's new and modified DSM programs and more efficient appliance efficiency trend variables, as specified by the 2005 Energy Policy Act. Retail energy sales and peak demand growth have moderated in these new forecasts due to the increased conservation levels. Summer firm peak demand growth from 2007 to 2013 is 698 MW, compared to 748 MW in the forecast used in the initial analysis. The decrease in firm peak demand is not enough to eliminate or delay the need for Polk Unit 6. The results of the firm peak demand forecasts are shown in Document No. 11 of my Exhibit No. ____ (LLC-1).

Q. Please summarize your testimony.

A. Tampa Electric's service area will continue to grow at a consistent pace in the long-term which is driven by demographic trends and strong net migration in the area, affordable costs of living and solid long-term employment growth in the services industry. The customer, demand and energy forecasts presented in my testimony, as well as the forecasts updated as part of the company's 2007 annual business plan process, are based on appropriate and reasonable assumptions and support the need for Polk Unit 6 in 2013.

Q. Does this conclude your testimony?

A. Yes, it does.

TAMPA ELECTRIC COMPANY
DOCKET NO. 07_____-EI
FILED: 7/20/2007

EXHIBIT TO THE TESTIMONY OF

LORRAINE L. CIFUENTES

PETITION TO DETERMINE NEED FOR

POLK UNIT 6

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CUSTOMER FORECAST
EXHIBIT NO. _____ (LLC-1)
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Customer Forecast

Year	Customer Base
1997	518,367
1998	530,251
1999	543,660
2000	560,184
2001	575,780
2002	590,199
2003	604,901
2004	619,536
2005	635,621
2006	653,706
2007	669,650
2008	685,366
2009	701,178
2010	716,666
2011	731,859
2012	747,528
2013	764,104
2014	781,462
2015	799,264
2016	817,184

Average Annual Customer Growth Rates

1997-2006	2.6%
2007-2016	2.2%

Average Annual Absolute Customer Growth

1997-2006	15,038
2007-2016	16,393

Economic Assumptions
Average Annual Growth Rate
(AAGR)

	1997-2006	2007-2016
Florida Population	2.3%	2.0%
Persons Per Household	0.0%	-0.4%
Real Household Income	1.8%	1.6%
Construction Employment	4.1%	3.4%
Commercial Employment	3.1%	3.3%
Governmental Employment	1.2%	1.0%
Industrial Employment	-0.4%	-0.2%
Construction Output	2.0%	2.0%
Commercial Output	4.5%	5.3%
Governmental Output	2.5%	1.9%
Industrial Output	2.6%	2.1%
Industrial Production Index (Manuf.)	3.0%	2.4%

Billing Cycle Degree Days

	Heating Degree Days	Cooling Degree Days
1986	566	3,705
1987	532	3,319
1988	648	3,346
1989	399	3,836
1990	374	3,982
1991	360	3,967
1992	540	3,302
1993	441	3,453
1994	430	3,762
1995	547	3,689
1996	792	3,479
1997	343	3,754
1998	406	4,011
1999	342	3,719
2000	417	3,689
2001	572	3,613
2002	447	3,982
2003	605	3,736
2004	547	3,490
2005	534	3,469
2006	492	3,665
2007	492	3,665
2008	492	3,665
2009	492	3,665
2010	492	3,665
2011	492	3,665
2012	492	3,665
2013	492	3,665
2014	492	3,665
2015	492	3,665
2016	492	3,665
Average Annual Degree Days		
1986-2005	492	3,665
2006-2016	492	3,665

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Real Price of Electricity
($/kWh)

	Residential	Commercial	Industrial	Governmental
1997	64.22	51.93	42.56	50.31
1998	62.70	50.74	41.95	49.28
1999	61.46	49.52	42.19	48.29
2000	61.12	49.72	42.47	48.50
2001	62.75	51.82	44.39	50.82
2002	66.31	55.64	48.02	54.58
2003	64.39	54.41	47.02	53.14
2004	66.91	56.98	49.54	55.75
2005	64.13	54.10	47.34	53.03
2006	63.62	53.67	50.17	56.42
2007	62.99	53.33	52.65	59.99
2008	62.35	53.00	49.86	56.71
2009	61.72	52.66	46.44	52.82
2010	61.09	52.33	45.73	52.02
2011	60.45	51.99	45.62	51.89
2012	59.82	51.66	45.31	51.54
2013	59.19	51.32	44.96	51.13
2014	58.55	50.99	44.56	50.68
2015	57.92	50.65	44.14	50.21
2016	57.29	50.32	43.73	49.74
1997-2005	0.0%	0.5%	1.3%	0.7%
2006-2016	-1.0%	-0.6%	-1.4%	-1.3%

Per-Customer Energy Consumption
(kWh/Customer)

	Total Retail	Total Excluding Phosphate
1997	29,111	26,170
1998	30,226	27,358
1999	29,071	26,865
2000	29,701	27,366
2001	29,483	27,460
2002	30,371	28,039
2003	30,138	28,029
2004	29,759	27,777
2005	29,752	27,946
2006	29,103	27,673
2007	29,824	28,431
2008	29,963	28,601
2009	30,135	28,802
2010	30,309	29,006
2011	30,488	29,213
2012	30,662	29,413
2013	30,844	29,621
2014	31,012	29,817
2015	31,154	29,985
2016	31,319	30,176
Average Annual Growth Rates		
1997-2006	0.0% (1)	0.6%
2007-2016	0.5%	0.7%
Average Annual Absolute Growth		
1997-2006	(1)	167
2007-2016	166	194

(1) Total Retail includes phosphate energy, which can be very volatile, thereby distorting the actual customer usage trend. Therefore, removal of phosphate energy provides the actual customer usage trend.

Retail Energy Sales
(GWH)

	Total Retail	Total Excluding Phosphate
1997	15,090	13,564
1998	16,027	14,505
1999	15,805	14,604
2000	16,638	15,329
2001	16,976	15,810
2002	17,925	16,547
2003	18,230	16,954
2004	18,437	17,208
2005	18,911	17,762
2006	19,025	18,089
2007	19,972	19,037
2008	20,536	19,601
2009	21,130	20,194
2010	21,722	20,787
2011	22,313	21,379
2012	22,921	21,986
2013	23,568	22,633
2014	24,234	23,300
2015	24,900	23,965
2016	25,593	24,658
Average Annual Growth Rates		
1997-2006	2.6%	3.3%
2007-2016	2.8%	2.9%
Average Annual Absolute Growth		
1997-2006	437	503
2007-2016	625	625

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PER-CUSTOMER PEAK DEMAND
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Per-Customer Peak Demand
(kW/Customer)

	Winter	Summer
1997	6.02	5.79
1998	5.11	6.16
1999	6.27	6.20
2000	6.13	5.90
2001	6.60	5.99
2002	6.12	6.16
2003	6.42	5.99
2004	5.40	6.03
2005	5.80	6.24
2006	5.72	6.13
2007	6.52	6.14
2008	6.55	6.17
2009	6.58	6.20
2010	6.62	6.24
2011	6.66	6.28
2012	6.69	6.31
2013	6.73	6.35
2014	6.77	6.40
2015	6.81	6.44
2016	6.86	6.49
Average Annual Growth Rates		
1997-2006	-0.6%	0.6%
2007-2016	0.6%	0.6%
Average Annual Absolute Growth		
1997-2006	-0.03	0.04
2007-2016	0.04	0.04

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PEAK DEMAND
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Peak Demand
(MW)

	Winter	Summer
1997	3,118	3,001
1998	2,710	3,266
1999	3,409	3,372
2000	3,435	3,303
2001	3,801	3,448
2002	3,612	3,634
2003	3,881	3,623
2004	3,344	3,737
2005	3,686	3,968
2006	3,736	4,010
2007	4,364	4,113
2008	4,488	4,229
2009	4,615	4,350
2010	4,745	4,472
2011	4,872	4,593
2012	5,003	4,719
2013	5,141	4,855
2014	5,289	4,998
2015	5,444	5,148
2016	5,602	5,300
Average Annual Growth Rates		
1997-2006	2.0%	3.3%
2007-2016	2.8%	2.9%
Average Annual Absolute Growth		
1997-2006	69	112
2007-2016	138	132

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FIRM PEAK DEMAND
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Firm Peak Demand
(MW)

	Winter	Summer
1997	2,719	2,677
1998	2,332	2,945
1999	2,990	3,069
2000	3,009	3,028
2001	3,407	3,165
2002	3,259	3,318
2003	3,455	3,351
2004	2,936	3,445
2005	3,287	3,725
2006	3,523	3,769
2007	4,046	3,872
2008	4,178	3,991
2009	4,308	4,113
2010	4,440	4,235
2011	4,568	4,357
2012	4,700	4,484
2013	4,839	4,620
2014	4,988	4,765
2015	5,143	4,915
2016	5,304	5,068
Average Annual Growth Rates		
1997-2006	2.9%	3.9%
2007-2016	3.1%	3.0%
Average Annual Absolute Growth		
1997-2006	89	121
2007-2016	140	133

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LOAD FACTOR
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Load Factor
(%)

	Winter	Summer
1997	55.2	57.4
1998	67.5	56.0
1999	52.9	53.5
2000	55.3	57.5
2001	51.0	56.2
2002	56.7	56.3
2003	53.6	57.4
2004	62.9	56.3
2005	58.6	54.4
2006	58.1	54.2
2007	52.2	55.6
2008	52.1	55.4
2009	52.3	55.6
2010	52.3	55.5
2011	52.3	55.6
2012	52.2	55.4
2013	52.3	55.5
2014	52.3	55.4
2015	52.2	55.3
2016	52.0	55.0
	Average Annual Growth Rates	
1997-2006	0.6%	-0.6%
2007-2016	0.0%	-0.1%

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UPDATED FIRM PEAK DEMAND
EXHIBIT NO. _____ (LLC-1)
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2007 Updated Firm Peak Demand
(MW)

	Winter	Summer
1997	2,719	2,677
1998	2,332	2,945
1999	2,990	3,069
2000	3,009	3,028
2001	3,407	3,165
2002	3,259	3,318
2003	3,455	3,351
2004	2,936	3,445
2005	3,287	3,725
2006	3,523	3,769
2007	4,022	3,841
2008	4,130	3,963
2009	4,250	4,069
2010	4,370	4,179
2011	4,486	4,291
2012	4,610	4,415
2013	4,742	4,539
2014	4,876	4,670
2015	5,016	4,803
2016	5,159	4,942
Average Annual Growth Rates		
1997-2006	2.9%	3.9%
2007-2016	2.8%	2.8%
Average Annual Absolute Growth		
1997-2006	89	121
2007-2016	126	122