REPORT
April 1, 2015

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April 1, 2015

VIA: ELECTRONIC FILING

Ms. Carlotta S. Stauffer
Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Tampa Electric Company's 2015 Ten-Year Site Plan

Dear Ms. Stauffer

Attached for filing on behalf of Tampa Electric Company is the company's January 2015 to December 2024 Ten-Year Site Plan.

Thank you for your assistance in connection with this matter.

Sincerely,

JJ Wahlen

J. Jeffry Wahlen

JJW/pp
Attachment

Downtown Tampa Skyline

January 2015 to December 2024

Ten-Year Site Plan

For Electrical Generating Facilities
and Associated Transmission Lines

TECO
TAMPA ELECTRIC

Responsibly Serving Our
Customers' Growing Needs

926.0031 CorpComm 3/15

Tampa Electric Company

Ten-Year Site Plan

for Electric Generating Facilities and Associated Transmission Lines
January 2015 – December 2024

Submitted to: Florida Public Service Commission
April 1, 2015

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GLOSSARY OF TERMS

CODE IDENTIFICATION SHEET

Unit Type:	CC	=	Combined Cycle
	D	=	Diesel
	FS	=	Fossil Steam
	GT	=	Gas Turbine (includes jet engine design)
	HRSG	=	Heat Recovery Steam Generator
	IC	=	Internal Combustion
	IGCC	=	Integrated Gasification Combined Cycle
	ST	=	Steam Turbine
Unit Status:	LTRS	=	Long-Term Reserve Stand-By
	OT	=	Other
	P	=	Planned
	T	=	Regulatory Approval Received
	U	=	Under Construction, less than or equal to 50% complete
	V	=	Under Construction, more than 50% complete
Fuel Type:	BIT	=	Bituminous Coal
	RFO	=	Heavy Oil (#6 Oil)
	DFO	=	Light Oil (#2 Oil)
	NG	=	Natural Gas
	PC	=	Petroleum Coke
	WH	=	Waste Heat
	BIO	=	Biomass
Environmental:	FQ	=	Fuel Quality
	LS	=	Low Sulfur
	SCR	=	Selective Catalytic Reduction
Transportation:	PL	=	Pipeline
	RR	=	Railroad
	TK	=	Truck
	WA	=	Water
Other:	NA	=	Not Applicable

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Executive Summary

Tampa Electric Company's (TEC) 2015 Ten Year Site Plan (TYSP) features plans to enhance electric generating capability as part of our efforts to meet projected incremental resource needs for the 2015 – 2024 time period. The 2015 TYSP provides the Florida Public Service Commission with assurance that TEC will be able to supply cost effective alternatives to ensure the delivery of adequate, safe and reliable power to our customers.

The resource plan presented here is very similar to the plan presented by TEC in 2014. TEC is in the process of constructing incremental capacity of 463 MW winter and 459 MW summer as part of the Polk 2 CC conversion project with a commercial operation date of January 1, 2017. In addition, TEC also plans to build a future CT to meet reserve margin needs in the summer of 2021.

Tampa Electric Company is committed to reliably serve the system's demand and energy requirements of its customers. TEC will continue to meet resource requirements with the most economical combination of demand-side management (DSM), conservation, renewable energy, purchased power, and generation capacity additions. The resource additions in TEC's 2015 TYSP are projected to be needed based on our current integrated resource planning (IRP) process. The IRP process incorporates an on-going evaluation of demand and supply resources and conservation measures to maintain system reliability. The IRP process is discussed further in Chapter V.

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Chapter I

DESCRIPTION OF EXISTING FACILITIES

Tampa Electric has five (5) generating stations that include fossil steam units, combined cycle units, combustion turbine peaking units, an integrated coal gasification combined cycle unit, and internal combustion diesel units.

Big Bend Power Station

The station operates four (4) pulverized coal-fired steam units equipped with desulfurization scrubbers, electrostatic precipitators, and Selective Catalytic Reduction (SCR) air pollution control systems. In addition, the station operates one (1) aero-derivative combustion turbine that entered into service in 2009 and can be fired with natural gas or distillate oil.

H.L. Culbreath Bayside Power Station

The station operates two (2) natural gas-fired combined cycle units. Bayside Unit 1 utilizes three (3) combustion turbines, three (3) heat recovery steam generators (HRSGs) and one (1) steam turbine. Bayside Unit 2 utilizes four (4) combustion turbines, four (4) HRSGs and one (1) steam turbine. In addition, the station operates four (4) natural gas fired aero-derivative combustion turbines that were placed into service in 2009.

Polk Power Station

The station operates five (5) generating units. Polk Unit 1 is an integrated gasification combined cycle (IGCC) unit fired with synthetic gas produced from gasified coal and other carbonaceous fuels. This technology integrates state-of-the-art environmental processes to create a clean fuel gas from a variety of feedstock with the efficiency benefits of combined cycle generation equipment. Polk Units 2 through 5 are combustion turbines fired primarily with natural gas. Unit 1 can also be fired with natural gas and units 2 and 3 can be fired with distillate oil.

J.H. Phillips Power Station

The station is comprised of two (2) residual or distillate oil-fired diesel engines. The units were placed into long-term reserve standby in September 2009.

Partnership Power Station

The station is comprised of two (2) natural gas fired internal combustion engines. This project was developed in partnership with Tampa Electric and the City of Tampa. The units were placed into long-term reserve standby in July of 2012.

Schedule 1

Existing Generating Facilities
As of December 31, 2014

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
								Alt	Commercial	Expected	Gen. Max.	Net Capability	
Plant	Unit		Unit	Fuel		Fuel Transport		Fuel	In-Service	Retirement	Nameplate	Summer	Winter
Name	No.	Location	Type	Pri	Alt	Pri	Alt	Days	Mo/Yr	Mo/Yr	kW	MW	MW
Big Bend		**Hillsborough**											
		Co. 14/31S/19E									**1,892,485**	**1,658**	**1,693**
	1		ST	BIT	NA	WA/RR	NA	NA	10/70	**	445,500	385	395
	2		ST	BIT	NA	WA/RR	NA	NA	04/73	**	445,500	385	395
	3		ST	BIT	NA	WA/RR	NA	NA	05/76	**	445,500	395	400
	4		ST	BIT	NA	WA/RR	NA	NA	02/85	**	486,000	437	442
	CT 4		GT	NG	DFO	PL	TK	*	08/09	**	69,985	56	61
Bayside		**Hillsborough**											
		Co. 4/30S/19E									**2,294,100**	**1,854**	**2,083**
	1		CC	NG	NA	PL	NA	NA	04/03	**	809,060	701	792
	2		CC	NG	NA	PL	NA	NA	01/04	**	1,205,100	929	1,047
	3		GT	NG	NA	PL	NA	NA	07/09	**	69,985	56	61
	4		GT	NG	NA	PL	NA	NA	07/09	**	69,985	56	61
	5		GT	NG	NA	PL	NA	NA	04/09	**	69,985	56	61
	6		GT	NG	NA	PL	NA	NA	04/09	**	69,985	56	61
Phillips		**Highland Co.**											
		12-055									**38,430**	**36**	**36**
	1		IC	RFO	DFO	TK	TK	NA	06/83	LTRS 09/09	19,215	18	18
	2		IC	RFO	DFO	TK	TK	NA	06/83	LTRS 09/09	19,215	18	18
Polk		**Polk Co.**											
		2,3/32S/23E									**1,029,379**	**824**	**952**
	1		IGCC	PC/BIT	NG	WA/TK	PL	*	09/96	**	326,299	220	220
	2		GT	NG	DFO	PL	TK	*	07/00	**	175,770	151	183
	3		GT	NG	DFO	PL	TK	*	05/02	**	175,770	151	183
	4		GT	NG	NA	PL	NA	NA	03/07	**	175,770	151	183
	5		GT	NG	NA	PL	NA	NA	04/07	**	175,770	151	183
Partnership		**Hillsborough**											
		Co. W30/29/19									**5,800**	**6**	**6**
	1		IC	NG	NA	PL	NA	NA	04/01	LTRS 07/12	2,900	3	3
	2		IC	NG	NA	PL	NA	NA	04/01	LTRS 07/12	2,900	3	3
											TOTAL	**4,378**	**4,770**

Notes:

* Limited by environmental permit

** Undetermined

Figure I-I: Tampa Electric Service Area Map

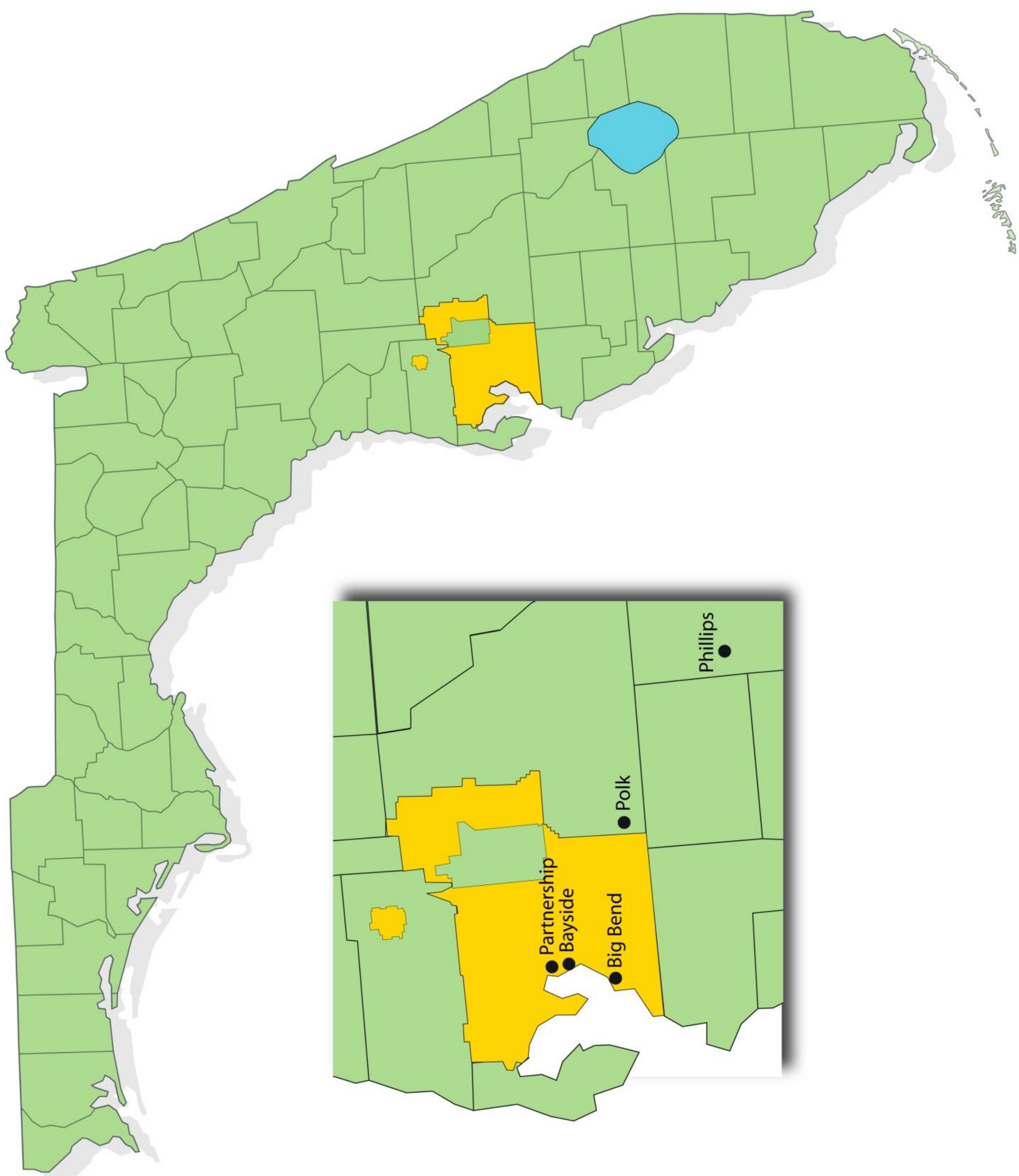

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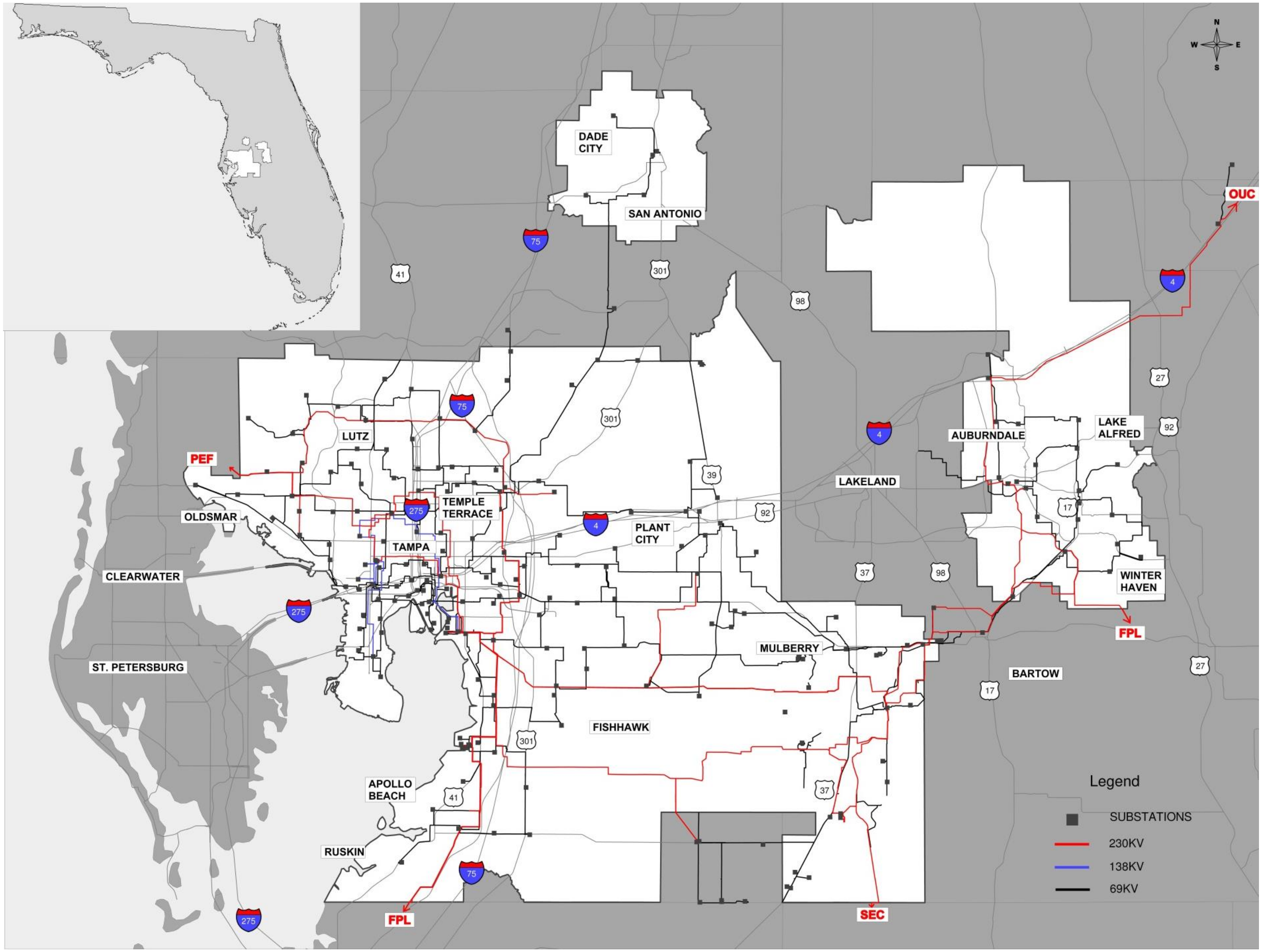
Figure I-II: Tampa Electric Service Area Transmission Facility



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Chapter II

FORECAST OF ELECTRIC POWER, DEMAND, AND ENERGY CONSUMPTION

Tables in Schedules 2 through 4 reflect three different levels of load forecasting: base case, high case, and low case. The expansion plan is developed using the base case load forecast and is reflected on Schedules 5 through 9. This forecast band best represents the current economic conditions and the long-term impacts to Tampa Electric's service territory.

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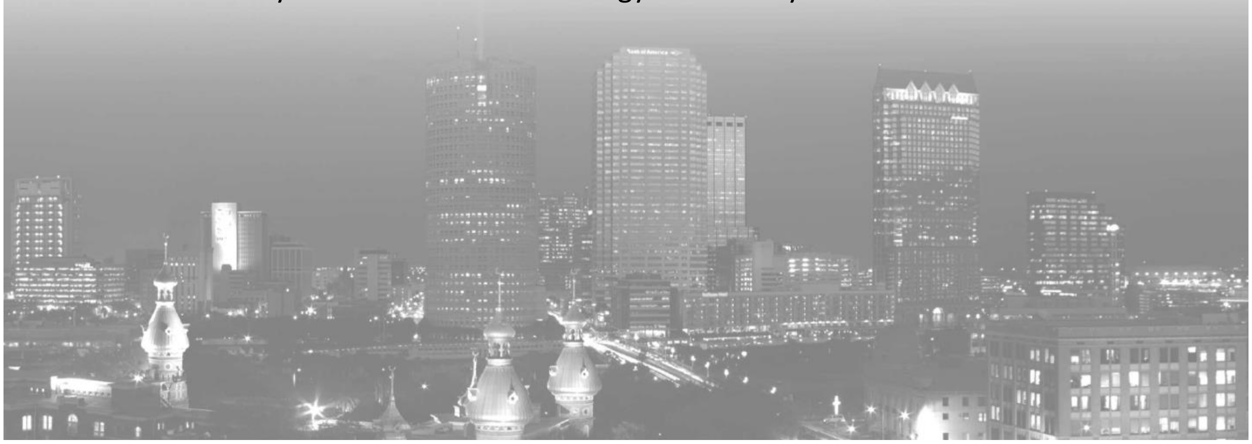

Schedule 2.1

History and Forecast of Energy Consumption and Number of Customers by Customer Class
Base Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Rural and Residential					Commercial		
Year	Hillsborough County Population	Members Per Household	GWH	Customers*	Average KWH Consumption Per Customer	GWH	Customers*	Average KWH Consumption Per Customer
2005	1,138,786	2.5	8,562	558,728	15,324	6,233	69,027	90,298
2006	1,170,851	2.5	8,721	575,111	15,164	6,357	70,205	90,549
2007	1,194,436	2.5	8,871	586,776	15,119	6,542	70,891	92,276
2008	1,206,084	2.5	8,546	587,602	14,545	6,399	70,770	90,415
2009	1,215,216	2.5	8,666	587,396	14,754	6,274	70,182	89,395
2010	1,229,226	2.6	9,185	591,554	15,526	6,221	70,176	88,655
2011	1,238,951	2.6	8,718	595,914	14,630	6,207	70,522	88,009
2012	1,256,118	2.6	8,395	603,594	13,909	6,185	71,143	86,937
2013	1,276,410	2.6	8,470	613,206	13,812	6,090	71,966	84,619
2014	1,301,887	2.6	8,656	623,846	13,875	6,142	72,647	84,548
2015	1,324,353	2.6	8,728	633,096	13,786	6,212	73,589	84,415
2016	1,349,316	2.6	8,851	643,620	13,752	6,289	74,658	84,241
2017	1,374,598	2.6	8,967	654,672	13,698	6,374	75,661	84,247
2018	1,399,788	2.6	9,070	665,882	13,620	6,447	76,640	84,115
2019	1,424,820	2.6	9,204	676,729	13,601	6,531	77,616	84,147
2020	1,449,950	2.6	9,324	687,650	13,560	6,614	78,625	84,122
2021	1,473,758	2.6	9,456	697,975	13,547	6,685	79,600	83,978
2022	1,496,469	2.6	9,589	707,808	13,548	6,760	80,539	83,933
2023	1,518,469	2.6	9,721	717,331	13,552	6,831	81,454	83,860
2024	1,539,859	2.6	9,858	726,588	13,568	6,908	82,343	83,892

Notes:
December 31, 2014 Status
* Average of end-of-month customers for the calendar year.
Values shown may be affected due to rounding.

Schedule 2.1

Forecast of Energy Consumption and Number of Customers by Customer Class High Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Rural and Residential					Commercial		
Year	Hillsborough County Population	Members Per Household	GWH	Customers*	Average KWH Consumption Per Customer	GWH	Customers*	Average KWH Consumption Per Customer
2015	1,330,863	2.6	8,787	636,193	13,812	6,233	73,837	84,422
2016	1,362,602	2.6	8,972	649,932	13,804	6,333	75,165	84,255
2017	1,394,946	2.6	9,153	664,329	13,777	6,441	76,436	84,271
2018	1,427,484	2.6	9,321	679,015	13,727	6,538	77,696	84,148
2019	1,460,149	2.6	9,525	693,463	13,735	6,648	78,961	84,192
2020	1,493,203	2.7	9,716	708,115	13,721	6,757	80,270	84,179
2021	1,527,005	2.7	9,922	722,284	13,737	6,854	81,554	84,048
2022	1,559,713	2.7	10,132	736,068	13,766	6,958	82,811	84,017
2023	1,591,548	2.7	10,344	749,649	13,798	7,057	84,053	83,960
2024	1,622,903	2.7	10,564	763,071	13,843	7,164	85,278	84,008

Notes:

* Average of end-of-month customers for the calendar year.
Values shown may be affected due to rounding.

Schedule 2.1

Forecast of Energy Consumption and
Number of Customers by Customer Class
Low Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Rural and Residential					Commercial		
Year	Hillsborough County Population	Members Per Household	GWH	Customers*	Average KWH Consumption Per Customer	GWH	Customers*	Average KWH Consumption Per Customer
2015	1,317,844	2.6	8,669	629,999	13,760	6,191	73,340	84,409
2016	1,336,094	2.6	8,731	637,339	13,699	6,246	74,153	84,226
2017	1,354,448	2.6	8,785	645,111	13,618	6,308	74,892	84,223
2018	1,372,497	2.5	8,824	652,942	13,514	6,357	75,600	84,081
2019	1,390,179	2.5	8,893	660,322	13,467	6,417	76,298	84,101
2020	1,407,747	2.5	8,946	667,682	13,399	6,475	77,020	84,064
2021	1,423,823	2.5	9,009	674,373	13,359	6,520	77,703	83,906
2022	1,438,646	2.5	9,072	680,505	13,332	6,569	78,344	83,846
2023	1,452,602	2.4	9,132	686,259	13,307	6,613	78,954	83,758
2024	1,465,801	2.4	9,195	691,685	13,294	6,663	79,535	83,772

Notes:
* Average of end-of-month customers for the calendar year.
Values shown may be affected due to rounding.

Schedule 2.2

History and Forecast of Energy Consumption and Number of Customers by Customer Class Base Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Industrial						
Year	GWH	Customers*	Average KWH Consumption Per Customer	Railroads and Railways GWH	Street & Highway Lighting GWH	Other Sales to Public Authorities GWH	Total Sales to Ultimate Consumers GWH
2005	2,478	1,337	1,853,403	0	60	1,582	18,915
2006	2,279	1,485	1,534,680	0	61	1,607	19,025
2007	2,366	1,494	1,583,695	0	63	1,692	19,533
2008	2,205	1,421	1,551,724	0	64	1,776	18,990
2009	1,995	1,424	1,401,219	0	68	1,771	18,774
2010	2,010	1,434	1,401,767	0	73	1,724	19,213
2011	1,804	1,494	1,207,299	0	74	1,761	18,564
2012	2,001	1,537	1,302,171	0	75	1,756	18,412
2013	2,027	1,564	1,295,916	0	75	1,756	18,418
2014	1,901	1,572	1,208,831	0	75	1,752	18,526
2015	1,827	1,598	1,143,306	0	77	1,786	18,630
2016	1,846	1,615	1,142,642	0	78	1,810	18,874
2017	1,818	1,628	1,116,711	0	79	1,839	19,077
2018	1,814	1,637	1,108,128	0	79	1,863	19,272
2019	1,816	1,645	1,104,031	0	80	1,890	19,522
2020	1,811	1,654	1,094,545	0	81	1,916	19,747
2021	1,805	1,664	1,084,368	0	82	1,939	19,966
2022	1,799	1,674	1,074,190	0	83	1,962	20,193
2023	1,419	1,684	842,491	0	84	1,985	20,039
2024	1,412	1,693	834,125	0	84	2,010	20,272

Notes:

December 31, 2014 Status

* Average of end-of-month customers for the calendar year.

Values shown may be affected due to rounding.

Schedule 2.2

Forecast of Energy Consumption and Number of Customers by Customer Class High Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Industrial						
Year	GWH	Customers*	Average KWH Consumption Per Customer	Railroads and Railways GWH	Street & Highway Lighting GWH	Other Sales to Public Authorities GWH	Total Sales to Ultimate Consumers GWH
2015	1,829	1,601	1,142,236	0	77	1,792	18,719
2016	1,848	1,621	1,140,226	0	78	1,823	19,054
2017	1,822	1,637	1,112,838	0	79	1,857	19,352
2018	1,819	1,649	1,103,261	0	80	1,888	19,646
2019	1,823	1,661	1,097,577	0	81	1,922	19,999
2020	1,819	1,674	1,086,474	0	82	1,956	20,330
2021	1,814	1,687	1,075,279	0	83	1,986	20,659
2022	1,809	1,701	1,063,390	0	84	2,018	21,001
2023	1,430	1,714	834,311	0	85	2,048	20,965
2024	1,425	1,727	824,947	0	86	2,082	21,320

Notes:

* Average of end-of-month customers for the calendar year.

Values shown may be affected due to rounding.

Schedule 2.2

Forecast of Energy Consumption and
Number of Customers by Customer Class
Low Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Industrial				Street &	Other Sales	Total Sales
			Average KWH	Railroads	Highway	to Public	to Ultimate
			Consumption	and Railways	Lighting	Authorities	Consumers
Year	GWH	Customers*	Per Customer	GWH	GWH	GWH	GWH
2015	1,826	1,595	1,144,833	0	77	1,780	18,542
2016	1,843	1,609	1,145,358	0	77	1,798	18,695
2017	1,814	1,619	1,120,202	0	78	1,820	18,805
2018	1,809	1,625	1,112,961	0	79	1,838	18,905
2019	1,810	1,630	1,110,338	0	79	1,858	19,057
2020	1,803	1,636	1,102,146	0	80	1,877	19,181
2021	1,796	1,642	1,093,797	0	81	1,893	19,298
2022	1,789	1,649	1,084,669	0	81	1,909	19,420
2023	1,408	1,655	850,563	0	82	1,924	19,159
2024	1,400	1,660	843,565	0	82	1,942	19,283

Notes:
* Average of end-of-month customers for the calendar year.
Values shown may be affected due to rounding.

Schedule 2.3

History and Forecast of Energy Consumption and Number of Customers by Customer Class Base Case

(1)	(2)	(3)	(4)	(5)	(6)
Year	Sales for * Resale GWH	Utility Use ** & Losses GWH	Net Energy *** for Load GWH	Other **** Customers	Total **** Customers
2005	712	952	20,579	6,656	635,748
2006	700	1,000	20,725	6,905	653,706
2007	829	916	21,278	7,193	666,354
2008	752	909	20,650	7,473	667,266
2009	191	978	19,943	7,748	666,750
2010	305	1,149	20,667	7,827	670,991
2011	93	642	19,298	7,869	675,799
2012	69	839	19,320	7,962	684,236
2013	0	760	19,177	7,999	694,735
2014	0	789	19,315	8,095	706,161
2015	0	932	19,563	8,187	716,470
2016	104	944	19,922	8,282	728,176
2017	104	955	20,135	8,382	740,342
2018	104	965	20,341	8,482	752,641
2019	0	977	20,499	8,578	764,569
2020	0	989	20,735	8,676	776,606
2021	0	1,000	20,965	8,768	788,007
2022	0	1,012	21,204	8,856	798,877
2023	0	1,004	21,043	8,941	809,409
2024	0	1,016	21,288	9,024	819,647

Notes:

December 31, 2014 Status

* Includes sales to Progress Energy Florida, Wauchula, Ft. Meade, St. Cloud, Reedy Creek and Florida Power & Light. Contract ended with Ft. Meade on 12/31/08, Reedy Creek on 12/31/10, Progress Energy Florida on 2/31/11, Wachula on 9/31/11, St.Cloud on 12/31/2012 and Florida Power & Light on 12/31/12. Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

** Utility Use and Losses include accrued sales.

*** Net Energy for Load includes output to line including energy supplied by purchased cogeneration.

**** Average of end-of-month customers for the calendar year.

Values shown may be affected due to rounding.

Schedule 2.3

Forecast of Energy Consumption and
Number of Customers by Customer Class
High Case

(1) Year	(2) Sales for * Resale GWH	(3) Utility Use ** & Losses GWH	(4) Net Energy *** for Load GWH	(5) Other **** Customers	(6) Total **** Customers
2015	0	935	19,654	8,212	719,843
2016	104	952	20,110	8,333	735,051
2017	104	968	20,424	8,460	750,862
2018	104	984	20,734	8,589	766,949
2019	0	999	20,998	8,714	782,799
2020	0	1,019	21,349	8,842	798,901
2021	0	1,033	21,692	8,965	814,490
2022	0	1,053	22,054	9,085	829,665
2023	0	1,049	22,014	9,203	844,619
2024	0	1,068	22,388	9,320	859,396

Notes:

* Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

** Utility Use and Losses include accrued sales.

*** Net Energy for Load includes output to line including energy supplied by purchased cogeneration.

**** Average of end-of-month customers for the calendar year.

Values shown may be affected due to rounding.

Schedule 2.3

Forecast of Energy Consumption and
Number of Customers by Customer Class
Low Case

(1)	(2)	(3)	(4)	(5)	(6)
Year	Sales for * Resale GWH	Utility Use ** & Losses GWH	Net Energy *** for Load GWH	Other **** Customers	Total **** Customers
2015	0	929	19,471	8,162	713,096
2016	104	936	19,735	8,231	721,332
2017	104	942	19,851	8,304	729,926
2018	104	946	19,955	8,377	738,544
2019	0	954	20,011	8,445	746,695
2020	0	961	20,142	8,514	754,852
2021	0	966	20,264	8,576	762,294
2022	0	973	20,393	8,634	769,132
2023	0	962	20,121	8,688	775,556
2024	0	966	20,249	8,741	781,621

Notes:

* Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.
** Utility Use and Losses include accrued sales.
*** Net Energy for Load includes output to line including energy supplied by purchased cogeneration.
**** Average of end-of-month customers for the calendar year.
Values shown may be affected due to rounding.

Schedule 3.1

History and Forecast of Summer Peak Demand (MW)
Base Case

(1) Year	(2) Total *	(3) Wholesale**	(4) Retail *	(5) Interruptible	(6) Residential Load Management	(7) Residential Conservation***	(8) Comm./Ind. Load Management	(9) Comm./Ind. Conservation	(10) Net Firm Demand
2005	4,218	128	4,090	144	79	73	19	49	3,725
2006	4,265	128	4,136	146	77	77	18	50	3,769
2007	4,428	172	4,256	159	69	80	18	53	3,876
2008	4,276	148	4,128	143	69	84	53	55	3,723
2009	4,316	136	4,180	120	54	90	58	59	3,799
2010	4,171	118	4,053	73	33	97	75	65	3,710
2011	4,130	28	4,102	109	48	103	75	68	3,699
2012	4,089	15	4,073	133	45	111	86	71	3,627
2013	4,072	0	4,072	131	39	122	89	77	3,614
2014	4,270	0	4,270	170	36	132	91	83	3,757
2015	4,224	0	4,224	116	30	145	98	85	3,750
2016	4,304	15	4,289	119	25	155	102	89	3,800
2017	4,364	15	4,349	116	20	166	105	93	3,849
2018	4,423	15	4,408	117	15	176	108	97	3,895
2019	4,474	0	4,474	118	10	187	111	101	3,947
2020	4,537	0	4,537	118	5	197	114	105	3,998
2021	4,598	0	4,598	118	2	208	117	109	4,043
2022	4,658	0	4,658	118	2	219	120	112	4,087
2023	4,681	0	4,681	83	2	230	123	116	4,127
2024	4,741	0	4,741	83	2	240	126	120	4,170

Notes:

December 31, 2014 Status
2010 Net Firm Demand is not coincident with system peak
* Includes residential and commercial/industrial conservation.
** Includes sales to Ft. Meade, Reedy Creek, Progress Energy Florida, Wauchula, St. Cloud and Florida Power & Light. Contract ended with Ft. Meade on 12/31/08, Reedy Creek on 12/31/10, Progress Energy Florida on 2/28/11, Wauchula on 9/31/11, St.Cloud on 12/31/2012 and Florida Power & Light on 12/31/12. Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.
*** Includes Energy Planner program
Values shown may be affected due to rounding.

Schedule 3.1

Forecast of Summer Peak Demand (MW)
High Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total *	Wholesale**	Retail *	Interruptible	Residential Load Management	Residential Conservation***	Comm./Ind. Load Management	Comm./Ind. Conservation	Net Firm Demand
2015	4,243	0	4,243	116	30	145	98	85	3,769
2016	4,343	15	4,328	119	25	155	102	89	3,839
2017	4,423	15	4,408	116	20	166	105	93	3,908
2018	4,504	15	4,489	117	15	176	108	97	3,976
2019	4,577	0	4,577	118	10	187	111	101	4,050
2020	4,663	0	4,663	118	5	197	114	105	4,124
2021	4,747	0	4,747	118	2	208	117	109	4,192
2022	4,832	0	4,832	118	2	219	120	112	4,261
2023	4,880	0	4,880	83	2	230	123	116	4,326
2024	4,967	0	4,967	83	2	240	126	120	4,396

Notes:

* Includes residential and commercial/industrial conservation.

** Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

*** Includes Energy Planner program

Values shown may be affected due to rounding.

Schedule 3.1

Forecast of Summer Peak Demand (MW)
Low Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total *	Wholesale**	Retail *	Interruptible	Residential Load Management	Residential Conservation***	Comm./Ind. Load Management	Comm./Ind. Conservation	Net Firm Demand
2015	4,205	0	4,205	116	30	145	98	85	3,731
2016	4,265	15	4,250	119	25	155	102	89	3,761
2017	4,305	15	4,290	116	20	166	105	93	3,790
2018	4,344	15	4,329	117	15	176	108	97	3,816
2019	4,374	0	4,374	118	10	187	111	101	3,847
2020	4,415	0	4,415	118	5	197	114	105	3,876
2021	4,453	0	4,453	118	2	208	117	109	3,898
2022	4,492	0	4,492	118	2	219	120	112	3,921
2023	4,491	0	4,491	83	2	230	123	116	3,937
2024	4,528	0	4,528	83	2	240	126	120	3,957

Notes:

* Includes residential and commercial/industrial conservation.

** Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

*** Includes Energy Planner program

Values shown may be affected due to rounding.

Schedule 3.2

History and Forecast of Winter Peak Demand (MW)
Base Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total *	Wholesale **	Retail *	Interruptible	Residential Load Management	Residential Conservation***	Comm./Ind. Load Management	Comm./Ind. Conservation	Net Firm Demand
2004/05	4,307	129	4,178	194	189	443	16	49	3,287
2005/06	4,404	171	4,233	51	144	447	18	50	3,523
2006/07	4,063	162	3,900	157	96	452	18	51	3,127
2007/08	4,405	152	4,253	120	130	456	53	52	3,443
2008/09	4,696	67	4,629	181	105	462	75	52	3,754
2009/10	5,195	122	5,073	117	109	470	75	56	4,246
2010/11	4,695	120	4,575	140	88	480	75	58	3,735
2011/12	4,081	15	4,066	103	68	487	83	58	3,267
2012/13	3,764	0	3,764	130	65	501	90	61	2,918
2013/14	3,876	0	3,876	61	63	512	97	64	3,079
2014/15	4,727	0	4,727	107	55	524	100	63	3,878
2015/16	4,802	15	4,787	109	46	536	106	65	3,926
2016/17	4,869	15	4,854	107	38	547	110	66	3,986
2017/18	4,934	15	4,919	108	29	558	115	68	4,041
2018/19	4,988	0	4,988	109	21	569	119	70	4,100
2019/20	5,058	0	5,058	109	12	581	124	72	4,160
2020/21	5,125	0	5,125	109	4	592	128	74	4,217
2021/22	5,190	0	5,190	109	4	604	133	75	4,265
2022/23	5,217	0	5,217	74	4	615	137	77	4,310
2023/24	5,281	0	5,281	74	4	627	142	79	4,355

Notes:

December 31, 2014 Status
2011/2012 Net Firm Demand is not coincident with system peak
* Includes residential and commercial/industrial conservation.
** Includes sales to Ft. Meade, Reedy Creek, Progress Energy Florida, Wauchula, St. Cloud and Florida Power & Light. Contract ended with Ft. Meade on 12/31/08, Reedy Creek on 12/31/10, Progress Energy Florida on 2/28/11, Wauchula on 9/31/11, St.Cloud on 12/31/2012 and Florida Power & Light on 12/31/12.
Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.
*** Includes energy planner program
Values shown may be affected due to rounding.

Schedule 3.2

Forecast of Winter Peak Demand (MW)
High Case

(1) Year	(2) Total *	(3) Wholesale**	(4) Retail *	(5) Interruptible	(6) Residential Load Management	(7) Residential Conservation***	(8) Comm./Ind. Load Management	(9) Comm./Ind. Conservation	(10) Net Firm Demand
2014/15	4,747	0	4,747	107	55	524	100	63	3,898
2015/16	4,841	15	4,826	109	46	536	106	65	3,965
2016/17	4,930	15	4,915	107	38	547	110	66	4,047
2017/18	5,017	15	5,002	108	29	558	115	68	4,124
2018/19	5,093	0	5,093	109	21	569	119	70	4,205
2019/20	5,187	0	5,187	109	12	581	124	72	4,289
2020/21	5,278	0	5,278	109	4	592	128	74	4,370
2021/22	5,368	0	5,368	109	4	604	133	75	4,443
2022/23	5,422	0	5,422	74	4	615	137	77	4,515
2023/24	5,512	0	5,512	74	4	627	142	79	4,586

Notes:

* Includes residential and commercial/industrial conservation.

** Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

*** Includes Energy Planner program

Values shown may be affected due to rounding.

Schedule 3.2

Forecast of Winter Peak Demand (MW)
Low Case

(1) Year	(2) Total *	(3) Wholesale**	(4) Retail *	(5) Interruptible	(6) Residential Load Management	(7) Residential Conservation***	(8) Comm./Ind. Load Management	(9) Comm./Ind. Conservation	(10) Net Firm Demand
2014/15	4,708	0	4,708	107	55	524	100	63	3,859
2015/16	4,762	15	4,747	109	46	536	106	65	3,886
2016/17	4,809	15	4,794	107	38	547	110	66	3,926
2017/18	4,853	15	4,838	108	29	558	115	68	3,960
2018/19	4,885	0	4,885	109	21	569	119	70	3,997
2019/20	4,933	0	4,933	109	12	581	124	72	4,035
2020/21	4,976	0	4,976	109	4	592	128	74	4,068
2021/22	5,018	0	5,018	109	4	604	133	75	4,093
2022/23	5,021	0	5,021	74	4	615	137	77	4,114
2023/24	5,061	0	5,061	74	4	627	142	79	4,135

Notes:

* Includes residential and commercial/industrial conservation.

** Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

*** Includes Energy Planner program

Values shown may be affected due to rounding.

Schedule 3.3

History and Forecast of Annual Net Energy for Load (GWh)
Base Case

(1) Year	(2) Total*	(3) Residential Conservation**	(4) Comm./Ind. Conservation	(5) Retail	(6) Wholesale ***	(7) Utility Use & Losses	(8) Net Energy for Load	(9) Load **** Factor %
2005	19,495	404	176	18,915	712	952	20,579	57.4
2006	19,625	412	188	19,025	700	1,000	20,725	57.2
2007	20,153	421	200	19,533	829	916	21,278	56.6
2008	19,632	431	212	18,990	752	909	20,650	56.8
2009	19,449	444	231	18,774	191	978	19,943	54.4
2010	19,923	458	251	19,213	305	1,149	20,667	50.5
2011	19,296	474	259	18,564	93	642	19,298	53.0
2012	19,178	493	273	18,412	69	839	19,320	56.3
2013	19,225	513	294	18,418	0	760	19,177	56.5
2014	19,377	546	305	18,526	0	789	19,315	54.4
2015	19,507	554	323	18,630	0	932	19,563	53.9
2016	19,783	570	339	18,874	104	944	19,922	54.0
2017	20,020	586	357	19,077	104	955	20,135	54.0
2018	20,249	603	374	19,272	104	965	20,341	53.9
2019	20,532	619	391	19,522	0	977	20,499	53.8
2020	20,789	636	406	19,747	0	989	20,735	53.6
2021	21,041	653	422	19,966	0	1,000	20,965	53.7
2022	21,300	670	437	20,193	0	1,012	21,204	53.7
2023	21,179	687	453	20,039	0	1,004	21,043	53.1
2024	21,445	704	468	20,272	0	1,016	21,288	53.0

Notes:

December 31, 2014 Status

* Includes residential and commercial/industrial conservation.

** Includes Energy Planner program

*** Includes sales to Ft. Meade, Reedy Creek, Progress Energy Florida, Wauchula, St. Cloud and Florida Power & Light. Contract ended with Ft. Meade on 12/31/08, Reedy Creek on 12/31/10, Progress Energy Florida on 2/28/11, Wauchula on 9/31/11, St.Cloud on 12/31/2012 and Florida Power & Light on 12/31/12. Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

**** Load Factor is the ratio of total system average load to peak demand.

Values shown may be affected due to rounding.

Schedule 3.3

Forecast of Annual Net Energy for Load (GWh)
High Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Total*	Residential Conservation**	Comm./Ind. Conservation	Retail	Wholesale ***	Utility Use & Losses	Net Energy for Load	Load **** Factor %
2015	19,595	554	323	18,719	0	935	19,654	54.1
2016	19,963	570	339	19,054	104	952	20,110	54.2
2017	20,295	586	357	19,352	104	968	20,424	54.3
2018	20,623	603	374	19,646	104	984	20,734	54.2
2019	21,009	619	391	19,999	0	999	20,998	54.2
2020	21,373	636	406	20,330	0	1,019	21,349	54.0
2021	21,734	653	422	20,659	0	1,033	21,692	54.2
2022	22,108	670	437	21,001	0	1,053	22,054	54.2
2023	22,104	687	453	20,965	0	1,049	22,014	53.7
2024	22,492	704	468	21,320	0	1,068	22,388	53.6

Notes:

* Includes residential and commercial/industrial conservation.

** Includes Energy Planner program

*** Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.

**** Load Factor is the ratio of total system average load to peak demand.

Values shown may be affected due to rounding.

Schedule 3.3

Forecast of Annual Net Energy for Load (GWh)
Low Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Total*	Residential Conservation**	Comm./Ind. Conservation	Retail	Wholesale ***	Utility Use & Losses	Net Energy for Load	Load **** Factor %
2015	19,419	554	323	18,542	0	929	19,471	54.5
2016	19,605	570	339	18,695	104	936	19,735	54.1
2017	19,748	586	357	18,805	104	942	19,851	54.3
2018	19,882	603	374	18,905	104	946	19,955	53.6
2019	20,067	619	391	19,057	0	954	20,011	54.2
2020	20,191	636	406	19,181	0	961	20,142	54.1
2021	20,341	653	422	19,298	0	966	20,264	54.2
2022	20,495	670	437	19,420	0	973	20,393	54.2
2023	20,267	687	453	19,159	0	962	20,121	54.1
2024	20,422	704	468	19,283	0	966	20,249	54.0

Notes:
* Includes residential and commercial/industrial conservation.
** Includes Energy Planner program
*** Forecast includes long-term firm wholesale sales to Reedy Creek, 2016 through 2018.
**** Load Factor is the ratio of total system average load to peak demand.
Values shown may be affected due to rounding.

Schedule 4

Base Case

Previous Year and 2-Year Forecast of Peak Demand and Net Energy for Load (NEL) by Month

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2014 Actual		2015 Forecast		2016 Forecast	
Month	Peak Demand * MW	NEL GWH	Peak Demand * MW	NEL GWH	Peak Demand * MW	NEL GWH
January	3,300	1,549	4,140	1,463	4,202	1,489
February	2,719	1,282	3,426	1,318	3,480	1,342
March	2,526	1,355	3,111	1,419	3,161	1,446
April	3,460	1,475	3,251	1,493	3,302	1,521
May	3,512	1,737	3,721	1,761	3,780	1,793
June	3,917	1,856	3,847	1,887	3,910	1,920
July	3,817	1,935	3,970	1,944	4,035	1,978
August	4,054	2,010	3,994	1,969	4,060	2,004
September	3,735	1,773	3,843	1,837	3,907	1,870
October	3,534	1,596	3,541	1,654	3,602	1,685
November	2,785	1,329	2,901	1,358	2,955	1,386
December	2,884	1,417	3,310	1,459	3,371	1,490
TOTAL		19,315		19,563		19,923

Notes:
December 31, 2014 Status
* Peak demand represents total retail and wholesale demand, excluding conservation impacts.
Values shown may be affected due to rounding.

Schedule 4

High Case

Previous Year and 2-Year Forecast of Peak Demand and Net Energy for Load (NEL) by Month

(1)	(2)	(3)	(4)	(5)
	2015 Forecast		2016 Forecast	
Month	**Peak Demand * MW**	**NEL GWH**	**Peak Demand * MW**	**NEL GWH**
January	4,160	1,470	4,241	1,502
February	3,442	1,324	3,513	1,354
March	3,125	1,426	3,191	1,459
April	3,267	1,500	3,334	1,534
May	3,738	1,769	3,816	1,810
June	3,865	1,896	3,947	1,939
July	3,989	1,954	4,073	1,997
August	4,013	1,978	4,099	2,023
September	3,861	1,845	3,944	1,888
October	3,558	1,662	3,637	1,701
November	2,915	1,364	2,984	1,399
December	3,326	1,466	3,403	1,503
TOTAL		19,654		20,110

Notes:
* Peak demand represents total retail and wholesale demand, excluding conservation impacts.
Values shown may be affected due to rounding.

Schedule 4

Low Case

Previous Year and 2-Year Forecast of Peak Demand and Net Energy for Load (NEL) by Month

(1)	(2)	(3)	(4)	(5)
	2015 Forecast		2016 Forecast	
Month	Peak Demand * MW	NEL GWH	Peak Demand * MW	NEL GWH
January	4,121	1,456	4,162	1,474
February	3,410	1,312	3,448	1,329
March	3,096	1,413	3,131	1,433
April	3,236	1,486	3,271	1,507
May	3,703	1,753	3,745	1,776
June	3,828	1,878	3,873	1,902
July	3,952	1,935	3,996	1,958
August	3,975	1,959	4,021	1,984
September	3,824	1,828	3,870	1,852
October	3,524	1,646	3,568	1,669
November	2,887	1,352	2,928	1,374
December	3,294	1,453	3,339	1,476
TOTAL		19,471		19,735

Notes:
* Peak demand represents total retail and wholesale demand, excluding conservation impacts.
Values shown may be affected due to rounding.

Schedule 5

History and Forecast of Fuel Requirements
Base Case Forecast Basis

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
			Actual	Actual										
	Fuel Requirements	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
(1)	Nuclear	Trillion BTU	0	0	0	0	0	0	0	0	0	0	0	0
(2)	Coal	1000 Ton	4,283	4,557	4,380	4,897	4,964	4,766	4,793	4,548	4,546	4,584	4,605	4,512
(3)	Residual	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(4)	ST	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(5)	CC	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(6)	GT	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(7)	D	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(8)	Distillate	1000 BBL	14	0	0	0	0	0	0	0	0	0	0	0
(9)	ST	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(10)	CC	1000 BBL	14	0	0	0	0	0	0	0	0	0	0	0
(11)	GT	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(12)	D	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(13)	Natural Gas	1000 MCF	56,531	51,608	62,111	56,049	54,082	59,955	60,271	65,977	68,351	68,988	67,647	71,256
(14)	ST	1000 MCF	0	0	0	0	0	0	0	0	0	0	0	0
(15)	CC	1000 MCF	53,529	49,498	50,786	45,691	52,961	59,317	59,703	65,341	65,442	67,949	66,296	69,643
(16)	GT	1000 MCF	3,002	2,110	11,325	10,358	1,121	638	568	636	2,909	1,039	1,351	1,613
(17)	Other (Specify)													
(18)	PC	1000 Ton	419	433	396	441	440	406	440	441	406	439	439	408

Notes:
Values shown may be affected due to rounding.
All values exclude ignition.

Schedule 6.1

History and Forecast of Net Energy for Load by Fuel Source
Base Case Forecast Basis

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Energy Sources	**Unit**	**Actual 2013**	**Actual 2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
(1)	Annual Firm Interchange	GWh	200	194	268	231	85	43	0	0	0	0	0	0
(2)	Nuclear	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(3)	Coal	GWh	9,647	10,383	9,717	10,887	10,847	10,377	10,431	9,826	9,822	9,907	9,958	9,755
(4)	Residual	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(5)	ST	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(6)	CC	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(7)	GT	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(8)	D	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(9)	Distillate	GWh	8	0	0	0	0	0	0	0	0	0	0	0
(10)	ST	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(11)	CC	GWh	8	0	0	0	0	0	0	0	0	0	0	0
(12)	GT	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(13)	D	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(14)	Natural Gas	GWh	7,601	7,116	8,216	7,376	7,727	8,582	8,637	9,473	9,741	9,887	9,662	10,197
(15)	ST	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(16)	CC	GWh	7,343	6,937	7,128	6,386	7,620	8,521	8,583	9,413	9,461	9,788	9,533	10,043
(17)	GT	GWh	258	179	1,088	990	107	61	54	60	280	99	129	154
(18)	Other (Specify)													
(19)	PC	GWh	1,174	1,212	1,091	1,217	1,213	1,121	1,213	1,216	1,120	1,213	1,212	1,124
(20)	Net Interchange	GWh	271	139	15	28	80	36	34	37	99	15	28	29
(21)	Purchased Energy from Non-Utility Generators	GWh	276	272	255	183	183	181	183	183	183	183	182	183
(22)	Net Energy for Load	GWh	19,177	19,315	19,563	19,922	20,135	20,341	20,499	20,735	20,965	21,204	21,043	21,288

Notes:

Line (21) includes energy purchased from Non-Renewable and Renewable resources.

Values shown may be affected due to rounding.

Schedule 6.2

History and Forecast of Net Energy for Load by Fuel Source
Base Case Forecast Basis

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Energy Sources	**Unit**	**Actual 2013**	**Actual 2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
(1)	Annual Firm Interchange	%	1.0	1.0	1.4	1.2	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0
(2)	Nuclear	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(3)	Coal	%	50.3	53.8	49.7	54.6	53.9	51.0	50.9	47.4	46.8	46.7	47.3	45.8
(4)	Residual	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(5)	ST	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(6)	CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(7)	GT	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(8)	D	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(9)	Distillate	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(10)	ST	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(11)	CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(12)	GT	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(13)	D	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(14)	Natural Gas	%	39.6	36.8	42.0	37.0	38.4	42.2	42.1	45.7	46.5	46.6	45.9	47.9
(15)	ST	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(16)	CC	%	38.3	35.9	36.4	32.1	37.8	41.9	41.9	45.4	45.1	46.2	45.3	47.2
(17)	GT	%	1.3	0.9	5.6	5.0	0.5	0.3	0.3	0.3	1.3	0.5	0.6	0.7
(18)	Other (Specify)													
(19)	PC	%	6.1	6.3	5.6	6.1	6.0	5.5	5.9	5.9	5.3	5.7	5.8	5.3
(20)	Net Interchange	%	1.4	0.7	0.1	0.1	0.4	0.2	0.2	0.2	0.5	0.1	0.1	0.1
(21)	Purchased Energy from Non-Utility Generators	%	1.4	1.4	1.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
(22)	Net Energy for Load	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes:

Line (21) includes energy purchased from Non-Renewable and Renewable resources.

Values shown may be affected due to rounding.

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Chapter III

TAMPA ELECTRIC COMPANY FORECASTING METHODOLOGY

The Customer, Demand and Energy Forecasts are the foundation from which the integrated resource plan is developed. Recognizing its importance, Tampa Electric employs the necessary methodologies for carrying out this function. The primary objective of this procedure is to blend proven statistical techniques with practical forecasting experience to provide a projection that represents the highest probability of occurrence.

This chapter is devoted to describing Tampa Electric's forecasting methods and the major assumptions utilized in developing the 2015-2024 forecasts. The data tables in Chapter II outline the expected customer, demand, and energy values for the 2015-2024 time period.

RETAIL LOAD

MetrixND, an advanced statistics program for analysis and forecasting, was used to develop the 2015-2024 Customer, Demand and Energy forecasts. This software allows a platform for the development of more dynamic and fully integrated models.

In addition, Tampa Electric uses MetrixLT, which integrates with MetrixND to develop multiple-year forecasts of energy usage at the hourly level. This tool allows the annual or monthly forecasts in MetrixND to be combined with hourly load shape data to develop a long-term "bottom-up" forecast that is consistent with short-term statistical forecasts.

Tampa Electric's retail customer, demand and energy forecasts are the result of six separate forecasting analyses:

1. Economic Analysis
2. Customer Multiregression Model
3. Energy Multiregression Model
4. Peak Demand Multiregression Model
5. Interruptible Rate Class Demand and Energy Analysis
6. Conservation, Load Management and Cogeneration Programs

The MetrixND models are the company's most sophisticated and primary load forecasting models. The phosphate demand and energy is forecasted separately and then combined in the final forecast. Likewise, the effects of Tampa Electric's conservation, load management, and cogeneration programs are incorporated into the process by subtracting the expected reduction in demand and energy from the forecast.

1. Economic Analysis

The economic assumptions used in the forecast models are derived from forecasts from Moody's Analytics and the University of Florida's Bureau of Economic and Business Research (BEBR).

See the "Base Case Forecast Assumptions" section of this chapter for an explanation of the most significant economic inputs to the MetrixND models.

2. Customer Multiregression Model

The customer multiregression forecasting model is a seven-equation model. The primary economic drivers in the customer forecast models are population estimates, service area households and employment growth. Below is a description of the models used for the five-customer classes.

1. *Residential Customer Model:* Customer projections are a function of regional population. Since a strong correlation exists between regional population and historical changes in service area customers, regional population estimates were used to forecast the future growth patterns in residential customers.

2. *Commercial Customer Model:* Total commercial customers include commercial customers plus temporary service customers (temporary poles on construction sites); therefore, two models are used to forecast total commercial customers:

    a. The <u>Commercial Customer Model</u> is a function of residential customers. An increase in the number of households provides the need for additional services, restaurants, and retail establishments. The amount of residential activity also plays a part in the attractiveness of the Tampa Bay area as a place to relocate or start a new business.

    b. Projections of employment in the construction sector are a good indicator of expected increases and decreases in local construction activity. Therefore, the <u>Temporary Service Model</u> projects the number of customers as a function of construction employment.

3. *Industrial Customer Model (Non-Phosphate):* Non-phosphate industrial customers include two rate classes that have been modeled individually: General Service and General Service Demand.

a. The General Service Customer Model is a function of Hillsborough County commercial employment.

b. The General Service Demand Customer Model is based on the recent growth trend in the sector.

4. *Public Authority Customer Model:* Customer projections are a function of regional population. The need for public services will depend on the number of people in the region; therefore, consistent with the residential customer model, population projections are used to determine future growth in the public authorities sector.

5. *Street & Highway Lighting Customer Model:* Customer projections are based on the recent growth trend in the sector.

3. Energy Multiregression Model

There are a total of seven energy models. All of these models represent average usage per customer (kWh/customer), except for the temporary services model which represents total kWh sales. The average usage models interact with the customer models to arrive at total sales for each class.

The energy models are based on an approach known as Statistically Adjusted Engineering (SAE). SAE entails specifying end-use variables, such as heating, cooling and base use appliance/equipment, and incorporating these variables into regression models. This approach allows the models to capture long-term structural changes that end-use models are known for, while also performing well in the short-term time frame, as do econometric regression models.

1. *Residential Energy Model:* The residential forecast model is made up of three major components: (1) end-use equipment index variables, which capture the long-term net effect of equipment saturation and equipment efficiency improvements; (2) changes in the economy such as household income, household size, and the price of electricity; and, (3) weather variables, which serve to allocate the seasonal impacts of weather throughout the year. The SAE model framework begins by defining energy use for an average customer in year (y) and month (m) as the sum of energy used by heating equipment (XHeat y,m), cooling equipment (XCool y,m), and other equipment (XOther y,m). The XHeat, XCool, and XOther variables are defined as a product of an annual equipment index and a monthly usage multiplier.

$$\text{Average Usage}_{y,m} = (\text{XHeat}_{y,m} + \text{XCool}_{y,m} + \text{XOther}_{y,m})$$

Where:

$$\text{XHeat}_{y,m} = \text{HeatEquipIndex}_{y} \times \text{HeatUse}_{y,m}$$
$$\text{XCool}_{y,m} = \text{CoolEquipIndex}_{y} \times \text{CoolUse}_{y,m}$$
$$\text{XOtherUse}_{y,m} = \text{OtherEquipIndex}_{y} \times \text{OtherUse}_{y,m}$$

The annual equipment variables (HeatEquipIndex, CoolEquipIndex, OtherEquipIndex) are defined as a weighted average across equipment types multiplied by equipment saturation levels normalized by operating efficiency levels. Given a set of fixed weights, the index will change over time with changes in equipment saturations and operating efficiencies. The weights are defined by the estimated energy use per household for each equipment type in the base year.

Where:

$$\textbf{HeatEquipIndex} = \sum_{Tech.} \text{Weight} \times \left(\frac{\text{Saturation}_{y} \;/\; \text{Efficiency}_{y}}{\text{Saturation}_{basey} \;/\; \text{Efficiency}_{basey}} \right)$$

$$\textbf{CoolEquipIndex} = \sum_{Tech.} \text{Weight} \times \left(\frac{\text{Saturation}_{y} \;/\; \text{Efficiency}_{y}}{\text{Saturation}_{basey} \;/\; \text{Efficiency}_{basey}} \right)$$

$$\textbf{OtherEquipIndex} = \sum_{Tech.} \text{Weight} \times \left(\frac{\text{Saturation}_{y} \;/\; \text{Efficiency}_{y}}{\text{Saturation}_{basey} \;/\; \text{Efficiency}_{basey}} \right)$$

Next, the monthly usage multiplier or utilization variables (HeatUse, CoolUse, OtherUse) are defined using economic and weather variables. A customer’s monthly usage level is impacted by several factors, including weather, household size, income levels, electricity prices and the number of days in the billing cycle. The degree day variables serve to allocate the seasonal impacts of weather throughout the year, while the remaining variables serve to capture changes in the economy.

$$\textbf{HeatUse}_{y,m} = \left(\frac{\text{Price}_{y,m}}{\text{Price}_{basey,m}}\right)^{-.10} \times \left(\frac{\text{HH Income}_{y,m}}{\text{HH Income}_{basey,m}}\right)^{.15} \times \left(\frac{\text{HH Size}_{y,m}}{\text{HH Size}_{basey,m}}\right)^{.20} \times \left(\frac{\text{HDD}_{y,m}}{\text{Normal HDD}}\right)$$

$$\textbf{CoolUse}_{y,m} = \left(\frac{\text{Price}_{y,m}}{\text{Price}_{basey,m}}\right)^{-.10} \times \left(\frac{\text{HH Income}_{y,m}}{\text{HH Income}_{basey,m}}\right)^{.15} \times \left(\frac{\text{HH Size}_{y,m}}{\text{HH Size}_{basey,m}}\right)^{.20} \times \left(\frac{\text{CDD}_{y,m}}{\text{Normal CDD}}\right)$$

$$\textbf{OtherUse}_{y,m} = \left(\frac{\text{Price}_{y,m}}{\text{Price}_{basey,m}}\right)^{-.10} \times \left(\frac{\text{HH Income}_{y,m}}{\text{HH Income}_{basey,m}}\right)^{.15} \times \left(\frac{\text{HH Size}_{y,m}}{\text{HH Size}_{basey,m}}\right)^{.20} \times \left(\frac{\text{Billing Days}_{y,m}}{\text{Billing Days}_{basey,m}}\right)$$

The SAE approach to modeling provides a powerful framework for developing short-term and long-term energy forecasts. This approach reflects changes in equipment saturation and efficiency levels and gives estimates of weather sensitivities that vary over time as well as estimate trend adjustments.

2. *Commercial Energy Models:* total commercial energy sales include commercial sales plus temporary service sales (temporary poles on construction sites); therefore, two models are used to forecast total commercial energy sales.

    a. Commercial Energy Model: The model framework for the commercial sector is the same as the residential model. It also has three major components and utilizes the SAE model framework. The differences lie in the type of end-use equipment and in the economic variables used. The end-use equipment variables are based on commercial appliance/equipment saturation and efficiency assumptions. The economic drivers in the commercial model are commercial productivity measured in terms of dollar output and the price of electricity for the commercial sector. The third component, weather variables, is the same as in the residential model.

    b. Temporary Service Energy Model: This model is a subset of the total commercial sector and is a rather small percentage of the total commercial sector. Although small in nature, it is still a component that needs to be included. A simple regression model is used with the primary driver being temporary service customer growth.

3. *Industrial Energy Model (Non-Phosphate):* Non-phosphate industrial energy includes two rate classes that have been modeled individually: General Service and General Service Demand.

    a. The General Service Energy Model utilizes the same SAE model framework as the commercial energy model. The weather component is consistent with the residential and commercial models.

    b. The General Service Demand Energy Model is based on industrial employment, the price of electricity in the industrial sector, cooling degree-days and number of days billed. Unlike the previous models discussed, heating load does not impact this sector.

4. *Public Authority Sector Model:* Within this model, the equipment index is based on the same commercial equipment saturation and efficiency assumptions used in the commercial model. The economic component is based on government sector productivity and the price of electricity in this sector. Weather variables are consistent with the residential and commercial models.

5. *Street & Highway Lighting Sector Model:* The street and highway lighting sector is not impacted by weather; therefore; it is a rather simple model and the SAE modeling approach does not apply. The model is a linear regression model where street and highway lighting energy consumption is a function of the number of billing days in the cycle, and the number of daylight hours in a day for each month.

The seven energy models described above, plus an exogenous interruptible and phosphate forecast, are added together to arrive at the total retail energy sales forecast. A line loss factor is applied to the energy sales forecast to produce the retail net energy for load forecast.

In summary, the SAE approach to modeling provides a powerful framework for developing short-term and long-term energy forecasts. This approach reflects changes in equipment saturation and efficiency levels, gives estimates of weather sensitivity that varies over time, as well as estimates trend adjustments.

4. Peak Demand Multiregression Model

After the retail net energy for load forecast is complete, it is integrated into the peak demand model as an independent variable along with weather variables. The energy variable represents the long-term economic and appliance trend impacts. To stabilize the peak demand data series and improve model accuracy, the volatility of the phosphate load is removed. To further stabilize the data, the peak demand models project on a per customer basis.

The weather variables provide the monthly seasonality to the peaks. The weather variables used are heating and cooling degree-days for both the temperature at the time of the peak and the 24-hour average on the day of the peak and day prior to the peak. By incorporating both temperatures, the model is accounting for the fact that cold/heat buildup contributes to determining the peak day.

The non-phosphate per customer kW forecast is multiplied by the final customer forecast. This result is then aggregated with a phosphate-coincident peak forecast to arrive at the final projected peak demand.

5. Interruptible Demand and Energy Analysis

Tampa Electric's interruptible customers are relatively few in number, which has allowed the company's Sales and Marketing Department to obtain detailed knowledge of industry developments including:

- knowledge of expansion and close-out plans;
- familiarity with historical and projected trends;
- personal contact with industry personnel;
- governmental legislation;
- familiarity with worldwide demand for phosphate products.

This department's familiarity with industry dynamics and their close working relationship with phosphate and other company representatives were used to form the basis for a survey of the interruptible customers to determine their future energy and demand requirements. This survey is the foundation upon which the phosphate forecast and the commercial/industrial interruptible rate class forecasts are based. Further inputs are provided by individual customer trend analysis and discussions with industry experts.

6. *Conservation, Load Management and Cogeneration Programs*

Conservation and Load Management demand and energy savings are forecasted for each individual program. The savings is based on a forecast of the annual number of new participants, estimated annual average energy savings per participant and estimated summer and winter average demand savings per participant. The individual forecasts are aggregated and represent the cumulative amount of Demand-Side Management (DSM) savings throughout the forecast horizon.

Tampa Electric's retail demand and energy forecasts are adjusted downward to reflect the incremental demand and energy savings of these DSM programs.

Tampa Electric has developed conservation, load management and cogeneration programs to achieve five major objectives:

1. Defer expansion, particularly production plant construction
2. Reduce marginal fuel cost by managing energy usage during higher fuel cost periods
3. Provide customers with some ability to control energy usage and decrease energy costs
4. Pursue the cost-effective accomplishment of the Florida Public Service Commission (FPSC) ten-year demand and energy goals for the residential and commercial/industrial sectors
5. Achieve the comprehensive energy policy objectives as required by the Florida Energy Efficiency Conservation Act

The company's current energy efficiency and conservation plan contains a mix of proven, mature programs along with several newly developed programs that focus on the market place demand for their specific offerings. The following is a list that briefly describes the company's programs:

1. <u>Heating and Cooling</u> – a rebate program that encourages residential customers to install high-efficiency residential heating and cooling equipment in existing homes.

2. <u>Load Management</u> – an incentive program that encourages residential, commercial and industrial customers to allow the control for reducing weather-sensitive heating, cooling and water heating through a radio signal control mechanism. The residential program is closed to new participation and is in process of retirement.

3. <u>Energy Audits</u> - a "how to" information and analysis guide for customers. Six types of audits are available to Tampa Electric customers; four types are for residential class customers and two types are for commercial/industrial customers.

4. <u>Residential Building Envelope</u> – a rebate program that encourages existing residential customers to install additional ceiling and wall insulation, window film and window upgrades in existing homes.

5. Commercial Lighting – a rebate program that encourages commercial and industrial customers to invest in more efficient lighting technologies in existing commercial facilities.

6. Standby Generator – an incentive program designed to utilize the emergency generation capacity of commercial/industrial facilities in order to reduce weather sensitive peak demand.

7. Conservation Value – a rebate program that encourages commercial and industrial customers to invest in energy efficiency and conservation measures that are not sanctioned by other commercial and industrial programs.

8. Residential Duct Repair – a rebate program that encourages residential customers to repair leaky duct work of central air conditioning systems in existing homes.

9. Cogeneration – an incentive program whereby large industrial customers with waste heat or fuel resources may install electric generating equipment, meet their own electrical requirements and/or sell their surplus to the company.

10. Commercial Cooling – a rebate program that encourages commercial and industrial customers to install high efficiency direct expansion (DX) commercial and packaged terminal air conditioning cooling equipment.

11. Commercial Chillers – a rebate program that encourages commercial and industrial customers to install high efficiency chiller equipment.

12. Energy Plus Homes – a rebate program that encourages residential customers to construct residential dwellings at efficiency levels greater than current Florida building code baseline practices.

13. Low Income Weatherization – a program that provides for the installation of energy efficient measures for qualified low-income customers.

14. Energy Planner – a program that reduces weather-sensitive loads through an innovative price responsive rate used to encourage residential customers to make behavioral or equipment usage changes by pre-programming HVAC, water heating and pool pumps.

15. <u>Commercial Duct Repair</u> – a rebate program that encourages existing commercial and industrial customers to repair leaky ductwork of central air-conditioning systems in existing commercial facilities.

16. <u>Commercial Building Envelope</u> – a rebate program that encourages commercial and industrial customers to install additional ceiling, wall and attic insulation and window film in existing commercial structures.

17. <u>Energy Efficient Motors</u> – a rebate program that encourages commercial and industrial customers to install high-efficiency motors.

18. <u>Commercial Lighting Occupancy Sensors</u> – a rebate program that encourages commercial and industrial customers to install occupancy sensors to control commercial lighting systems.

19. <u>Commercial Refrigeration (Anti-condensate)</u> – a rebate program that encourages commercial and industrial customers to install anti-condensate equipment sensors and controls within refrigerated door systems.

20. <u>Commercial Water Heating</u> – a rebate program that encourages commercial and industrial customers to install high efficiency water heating systems.

21. <u>Commercial Demand Response</u> – a turn-key incentive program for commercial and industrial customers to reduce their demand for electricity in response to market signals.

22. <u>Residential Electronically Commutated Motor (ECM)</u> – a rebate program that encourages residential customers to replace their existing HVAC air handler motor with an ECM.

23. <u>Residential HVAC Re-commissioning</u> – a rebate program that encourages residential customers to have maintenance and tuning of their existing HVAC equipment performed.

24. <u>Energy Education Outreach</u> - a program that provides opportunities for engaging and educating groups of customers and students on energy-efficiency and conservation in an organized setting. Participants are provided with an energy savings kit which includes energy saving devices and supporting information appropriate for the audience.

25. <u>Commercial Electronically Commutated Motor (ECM)</u> – a rebate program that encourages commercial and industrial customers to replace their existing air handler motors or refrigeration fan motors with an ECM.

26. <u>Commercial HVAC Re-commissioning</u> - a rebate program that encourages commercial and industrial customers to have maintenance and tuning of their existing HVAC equipment performed.

27. Cool Roof – a rebate program that encourages commercial and industrial customers to install a cool roof system above conditioned spaces.

28. Energy Recovery Ventilation (ERV) – a rebate program that encourages commercial and industrial customers to install an ERV within their HVAC system.

The programs listed above were developed to meet FPSC demand and energy goals established in Docket No. 080409-EG, approved on December 30, 2009. In November of 2014, new DSM numeric goals for the period of 2015 – 2024 were established in Docket No. 130201-EI. The supporting plan to support these goals was submitted to the Commission on March 16, 2015, and is expected to be approved in the second half of 2015. The 2014 demand and energy savings achieved by conservation and load management programs are listed in Table III-I.

Tampa Electric developed a Monitoring and Evaluation (M&E) plan in response to FPSC requirements filed in Docket No. 941173-EG. The M&E plan was designed to effectively accomplish the required objective with prudent application of resources.

The M&E plan has its focus on two distinct areas: process evaluation and impact evaluation. Process evaluation examines how well a program has been implemented including the efficiency of delivery and customer satisfaction regarding the usefulness and quality of the services delivered. Impact evaluation is an evaluation of the change in demand and energy consumption achieved through program participation. The results of these evaluations give Tampa Electric insight into the direction that should be taken to refine delivery processes, program standards, and overall program cost-effectiveness.

TABLE III-I
Comparison of Achieved MW and GWh Reductions With Florida Public Service Commission Goals
Savings at the Generator

Residential

	Winter Peak MW Reduction			Summer Peak MW Reduction			GWh Energy Reduction		
Year	Total Achieved	Commission Approved Goal	% Variance	Total Achieved	Commission Approved Goal	% Variance	Total Achieved	Commission Approved Goal	% Variance
2010	11.3	6.4	176.6%	8.1	4.6	176.1%	17.3	9.8	176.5%
2011	21.5	14.9	144.3%	16.7	11.2	149.1%	36.5	23.8	153.4%
2012	32.4	25.1	129.1%	26.4	19.6	134.7%	57.5	41.5	138.6%
2013	45.7	36.6	124.9%	39.2	29.5	132.9%	83.9	62.1	135.1%
2014	62.6	48.8	128.3%	52.2	40.3	129.5%	128.2	84.7	151.4%

Commercial / Industrial

	Winter Peak MW Reduction			Summer Peak MW Reduction			GWh Energy Reduction		
Year	Total Achieved	Commission Approved Goal	% Variance	Total Achieved	Commission Approved Goal	% Variance	Total Achieved	Commission Approved Goal	% Variance
2010[1]	6.6	0.9	733.3%	9.8	2.5	392.0%	16.4	6.5	252.3%
2011	18.4	2.0	920.0%	25.1	6.1	411.5%	49.4	17.1	288.9%
2012	22.0	3.4	647.1%	31.4	10.4	301.9%	59.9	32.5	184.3%
2013	28.8	4.7	612.8%	40.6	15.5	261.9%	83.1	48.7	170.6%
2014	38.5	6.2	621.0%	53.2	20.9	254.5%	105.2	68.2	154.3%

Combined Total

	Winter Peak MW Reduction			Summer Peak MW Reduction			GWh Energy Reduction		
Year	Total Achieved	Commission Approved Goal	% Variance	Total Achieved	Commission Approved Goal	% Variance	Total Achieved	Commission Approved Goal	% Variance
2010	17.9	7.3	245.2%	17.9	7.1	252.1%	33.7	16.3	206.7%
2011	39.9	16.9	236.1%	41.8	17.3	241.6%	85.9	40.9	210.0%
2012	54.4	28.5	190.9%	57.8	30.0	192.7%	117.4	74.0	158.6%
2013	74.5	41.3	180.4%	79.8	45.0	177.3%	167.0	110.8	150.7%
2014	101.1	55.0	183.8%	105.4	61.2	172.2%	233.4	152.9	152.6%

Notes:
[1] 2010 Commercial / Industral Reductions corrected in 2012

BASE CASE FORECAST ASSUMPTIONS

RETAIL LOAD

Numerous assumptions are inputs to the MetrixND models, of which the more significant ones are listed below.

1. Population and Households
2. Commercial, Industrial and Governmental Employment
3. Commercial, Industrial and Governmental Output
4. Real Household Income
5. Price of Electricity
6. Appliance Efficiency Standards
7. Weather

1. Population and Households

Florida and Hillsborough County population forecasts are 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 Analytics supply population projections for Hillsborough County and Florida comparisons. A blend of BEBR’s population growth for Florida and Hillsborough County were used to project future growth patterns in residential customers for the period of 2015-2024. The average annual population growth rate is expected to be 1.7%. Moody’s Analytics provides persons per household projections as an input to the residential average use model.

2. Commercial, Industrial and Governmental Employment

Commercial and industrial employment assumptions are utilized in computing the number of customers in their respective sectors. It is imperative that employment growth be consistent with the expected population expansion and unemployment levels. Over the next ten years (2015-2024), employment is assumed to rise at a 1.4% average annual rate within Hillsborough County. Moody’s Analytics supplies employment projections for the non-residential models.

3. Commercial, Industrial and Governmental Output

In addition to employment, output in terms of real gross domestic product by employment sector is utilized in computing energy in their respective sectors. Output for the entire employment sector within Hillsborough County is assumed to rise at a 2.4% average annual rate from 2015-2024. Moody’s Analytics supplies output projections.

4. Real Household Income

Moody's Analytics supplies the assumptions for Hillsborough County's real household income growth. During 2015-2024, real household income for Hillsborough County is expected to increase at a 2.0% average annual rate.

5. Price of Electricity

Forecasts for the price of electricity by customer class are supplied by Tampa Electric's Regulatory Affairs Department.

6. Appliance Efficiency Standards

Another factor influencing energy consumption is the movement toward more efficient appliances such as heat pumps, refrigerators, lighting and other household appliances. The forces behind this development include market pressures for greater energy-saving devices, legislation, rules, and the appliance efficiency standards enacted by the state and federal governments. Also influencing energy consumption is the customer saturation levels of appliances. The saturation trend for heating appliances is increasing through time; however, overall electricity consumption actually declines over time as less efficient heating technologies (room heating and furnaces) are replaced with more efficient technologies (heat pumps). Similarly, cooling equipment saturation will continue to increase, but be offset by heat pump and central air conditioning efficiency gains.

Improvements in the efficiency of other non-weather related appliances also help to lower electricity consumption. Although there is an increasing saturation trend of electronic equipment and appliances in households throughout the forecast period, it does not offset the efficiency gains from lighting and appliances.

7. Weather

Since weather is the most difficult input to project, historical data is the major determinant in developing temperature profiles. For example, monthly profiles used in calculating energy consumption are based on twenty years of historical data. In addition, the temperature profiles used in projecting the winter and summer system peak are based on an examination of the minimum and maximum temperatures for the past twenty years plus the temperatures on peak days for the past twenty years.

HIGH AND LOW SCENARIO FOCUS ASSUMPTIONS

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 alternatives to the company's base case outlook. Compared to the base case, the expected economic growth rates are 0.5% higher in the high scenario and 0.5% lower in the low scenario.

HISTORY AND FORECAST OF ENERGY USE

A history and forecast of energy consumption by customer classification are shown in Schedules 2.1 - 2.3.

1. *Retail Energy*

For 2015-2024, retail energy sales are projected to rise at a 0.9% annual rate. The major contributors to growth include the residential and commercial categories, increasing at an annual rate of 1.4% and 1.2%, respectively.

2. *Wholesale Energy*

For 2016-2018, Tampa Electric will sell Reedy Creek Improvement District (RCID) 15 MW of firm wholesale power.

HISTORY AND FORECAST OF PEAK LOADS

Historical, base, high, and low scenario forecasts of peak loads for the summer and winter seasons are presented in Schedules 3.1 and 3.2, respectively. For the period of 2015-2024, Tampa Electric's base retail firm peak demand is expected to increase in the summer at an average annual rate of 1.2% and at rate of 1.3% in the winter.

Chapter IV

FORECAST OF FACILITIES REQUIREMENTS

The proposed generating facility additions and changes shown in Schedule 8.1 integrate energy efficiency and conservation programs and generating resources to provide economical, reliable service to Tampa Electric's customers. Various energy resource plan alternatives, comprised of a mixture of generating technologies, purchased power, and cost-effective energy efficiency and conservation programs, are developed to determine this plan. These alternatives are combined with existing resources and analyzed to determine the resource options which best meets Tampa Electric's future system demand and energy requirements. A detailed discussion of Tampa Electric's integrated resource planning process is included in Chapter V.

The results of the integrated resource planning process provide Tampa Electric with a cost-effective plan that maintains system reliability and environmental requirements while considering technology availability, dispatch ability, and lead times for construction. To meet the expected system demand and energy requirements over the next ten years, both peaking and intermediate resources are needed. In 2017, Tampa Electric will meet its intermediate load needs by converting Polk Power Station's simple cycle combustion turbines (Polk Units 2-5) to a waste heat recovery natural gas combined cycle (NGCC) unit. The operating and cost parameters associated with the capacity additions resulting from the analysis are shown in Schedule 9. Beyond 2017, the company foresees the future needs being that of additional peaking capacity in 2021, which it proposes to meet by combustion turbine additions and/or future purchase power agreements.

Tampa Electric will compare viable purchased power options as an alternative and/or enhancements to planned unit additions, conservation, and load management. At a minimum, the purchased power must have firm transmission service and firm fuel transportation to support firm reserve margin criteria for reliability. Assumptions and information that impact the plan are discussed in the following sections and in Chapter V.

COGENERATION

Tampa Electric plans for a total of 23 MW of firm cogeneration capacity, of which all 23 MW (through December 2015) are imported from outside its service area. In 2015, Tampa Electric plans for 484 MW of cogeneration capacity operating in its service area.

Table IV-I 2015 Cogeneration Capacity Forecast	Capacity (MW)
Self-service [1]	249
Firm to Tampa Electric	23
As-available to Tampa Electric	157
Export to other systems	55
Total	484

[1] Capacity and energy that cogenerators produce to serve their own internal load requirements

FIRM INTERCHANGE SALES AND PURCHASES

Currently, Tampa Electric has long-term firm sale and purchase power agreements. Below are the contracts for capacity and energy:

- 15 MW sale to Reedy Creek Improvement District (RCID) begins January 1, 2016 and extends through December 31, 2018.
- 117 MW purchase from Calpine Energy Services through December 2016
- 159 MW purchase (156 MW net to Tampa Electric) from Southern Power Company through December 2015
- 121 MW purchase from Quantum Pasco Power through December 2018

FUEL REQUIREMENTS

A forecast of fuel requirements and energy sources is shown in Schedule 5, Schedule 6.1 and Schedule 6.2. Tampa Electric currently uses a generation portfolio consisting mainly of solid fuels and natural gas for its energy requirements. Tampa Electric has firm transportation contracts with the Florida Gas Transmission Company (FGT) and Gulfstream Natural Gas System LLC for delivery of natural gas to Big Bend, Bayside, and Polk. As shown in Schedule 6.2, in 2015 coal and petcoke will fuel 55.2% of the net energy for load and natural gas will fuel 43.4%. The remaining net energy for load is served by firm, non-firm, and non-utility generator purchases. Some of the company’s natural gas generating units also have dual-fuel (i.e., natural gas or oil) capability, which enhances system reliability. However Tampa Electric’s capacity is roughly evenly split between solid fuels and natural gas.

ENVIRONMENTAL CONSIDERATIONS

Tampa Electric continually strives to reduce emissions from its generating facilities. Since 1998, Tampa Electric has reduced annual sulfur dioxides (SO_2) by 94%, nitrogen oxides (NO_x) by 91%, particulate matter (PM) by 87% and mercury emissions by 90%. These reductions were the result of a December 1999 agreement between the Florida Department of Environmental Protection (DEP) and Tampa Electric. In February 2000, Tampa Electric reached a similar agreement with the U.S. Environmental Protection Agency (EPA) in a Consent Decree (CD).

Tampa Electric’s major activities to increase pollution control and decrease emissions include:

- Improvement of the Big Bend electrostatic precipitators
- Ongoing installation of natural gas-fired igniters that will reduce startup emissions and provide opportunities to augment coal-fired operation and minimize emissions of all pollution

Through a proactive approach, Tampa Electric has achieved significant levels of emission reduction. However, the company recognizes that environmental regulations continue to change. As these regulations evolve, they will impact both cost and operations.

Schedule 7.1

Forecast of Capacity, Demand, and Scheduled Maintenance at Time of Summer Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total * Installed Capacity	Firm ** Capacity Import	Firm Capacity Export	QF ***	Total Capacity Available	System Firm Summer Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance	
Year	MW	MW	MW	MW	MW	MW	MW	% of Peak	MW	MW	% of Peak
2015	4,336	394	0	23	4,753	3,750	1,003	27%	0	1,003	27%
2016	4,336	238	15	0	4,559	3,800	759	20%	0	759	20%
2017	4,795	121	15	0	4,901	3,849	1,052	27%	0	1,052	27%
2018	4,795	121	15	0	4,901	3,895	1,006	26%	0	1,006	26%
2019	4,795	0	0	0	4,795	3,947	848	21%	0	848	21%
2020	4,795	0	0	0	4,795	3,998	797	20%	0	797	20%
2021	4,999	0	0	0	4,999	4,043	955	24%	0	955	24%
2022	4,999	0	0	0	4,999	4,087	912	22%	0	912	22%
2023	4,999	0	0	0	4,999	4,127	872	21%	0	872	21%
2024	4,999	0	0	0	4,999	4,170	829	20%	0	829	20%

Notes:

* Phillips Station and Partnership Station unit capabilities are not included in the Total Installed Capacity

** Includes firm purchase power agreements (PPA) with Southern Power Company of 156 MW through 2015, Calpine Energy Services of 117 MW through 2016, and Quantum Pasco Power of 121 MW through 2018.

*** Accounts for Orange Cogen thru 2015 that will be purchased under firm contract and excludes non-firm purchases

Schedule 7.2

Forecast of Capacity, Demand, and Scheduled Maintenance at Time of Winter Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total * Installed Capacity	Firm ** Capacity Import	Firm Capacity Export	QF ***	Total Capacity Available	System Firm Winter Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance	
Year	MW	MW	MW	MW	MW	MW	MW	% of Peak	MW	MW	% of Peak
2014-15	4,728	394	0	23	5,145	3,878	1,267	33%	0	1,267	33%
2015-16	4,728	238	15	0	4,951	3,926	1,025	26%	0	1,025	26%
2016-17	5,191	121	15	0	5,297	3,986	1,311	33%	0	1,311	33%
2017-18	5,191	121	15	0	5,297	4,041	1,256	31%	0	1,256	31%
2018-19	5,191	0	0	0	5,191	4,100	1,091	27%	0	1,091	27%
2019-20	5,191	0	0	0	5,191	4,160	1,031	25%	0	1,031	25%
2020-21	5,191	0	0	0	5,191	4,217	974	23%	0	974	23%
2021-22	5,411	0	0	0	5,411	4,265	1,146	27%	0	1,146	27%
2022-23	5,411	0	0	0	5,411	4,310	1,102	26%	0	1,102	26%
2023-24	5,411	0	0	0	5,411	4,355	1,056	24%	0	1,056	24%

Notes:

* Phillips Station and Partnership Station unit capabilities are not included in the Total Installed Capacity

** Includes firm purchase power agreements (PPA) with Southern Power Company of 156 MW through 2015, Calpine Energy Services of 117 MW through 2016, and Quantum Pasco Power of 121 MW through 2018.

*** Accounts for Orange Cogen thru 2015 that will be purchased under firm contract and excludes non-firm purchases

Schedule 8.1

Planned and Prospective Generating Facility Additions

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Trans.		Const.	Commercial	Expected	Gen. Max.	Net Capability		
Plant Name	Unit No.	Location	Unit Type	Primary	Alternate	Primary	Alternate	Start Mo/Yr	In-Service Mo/Yr	Retirement Mo/Yr	Nameplate kW	Summer MW	Winter MW	Status
Polk 2 CC	2	Polk	CC	NG	LO	PL	TK	01/14	01/17	*	*	1,063 **	1,195 **	U
Future CT 1	1	*	GT	NG	NA	PL	NA	09/20	05/21	*	*	204	220	P

Notes:

* Undetermined

** Net capability values shown for the Polk 2 CC reflect the conversion of the existing Polk Units 2-5 to a natural gas CC unit in 2017.
Incremental capacity gain from the conversion is 459 MW summer and 463 MW winter.

Tampa Electric Company continually analyzes renewable energy and distributed generation alternatives with the objective to integrate them into its resource portfolio.
The company plans to install its first, utility-scale 2 MW solar facility at Tampa International Airport by the end of 2015.

Schedule 9
(Page 1 of 2)
Status Report and Specifications of Proposed Generating Facilities

(1)	Plant Name and Unit Number	Polk 2 CC
(2)	Net Capability	
	A. Summer	1,063 MW
	B. Winter	1,195 MW
(3)	Technology Type	Combined Cycle
(4)	Anticipated Construction Timing	
	A. Field Construction Start Date	Jan 2014
	B. Commercial In-Service Date	Jan 2017
(5)	Fuel	
	A. Primary Fuel	Natural Gas
	B. Alternate Fuel	Light Oil
(6)	Air Pollution Control Strategy	SCR, DLN Burners
(7)	Cooling Method	Cooling Reservoir
(8)	Total Site Area	Undetermined
(9)	Construction Status	In Progress
(10)	Certification Status	In Progress
(11)	Status with Federal Agencies	All Federal Permits Received
(12)	Projected Unit Performance Data	
	Planned Outage Factor (POF)	3.0 %
	Forced Outage Rate (FOF)	1.0 %
	Equivalent Availability Factor (EAF)	96.0 %
	Resulting Capacity Factor (2017)	52.3 %
	Average Net Operating Heat Rate (ANOHR) [1]	7,049 Btu/kWh
(13)	Projected Unit Financial Data	
	Book Life (Years)	30
	Total Installed Cost (In-Service Year $/kW) [1]	423.60
	Direct Construction Cost ($/kW) [1]	355.17
	AFUDC* Amount ($/kW) [1]	45.65
	Escalation ($/kW) [1]	22.78
	Fixed O&M ($/kW – Yr) [1]	1.23
	Variable O&M ($/MWh) [1]	2.34
	K-Factor	1.5245

[1] Based on In-Service Year.

* Based on the current AFUDC rate of 6.47%

Schedule 9
(Page 2 of 2)
Status Report and Specifications of Proposed Generating Facilities

(1)	Plant Name and Unit Number	Future CT 1
(2)	Net Capability	
	A. Summer	204 MW
	B. Winter	220 MW
(3)	Technology Type	Combustion Turbine
(4)	Anticipated Construction Timing	
	A. Field Construction Start Date	Sep 2020
	B. Commercial In-Service Date	May 2021
(5)	Fuel	
	A. Primary Fuel	Natural Gas
	B. Alternate Fuel	N/A
(6)	Air Pollution Control Strategy	Dry-Low Emission
(7)	Cooling Method	N/A
(8)	Total Site Area	Undetermined
(9)	Construction Status	Proposed
(10)	Certification Status	Undetermined
(11)	Status with Federal Agencies	N/A
(12)	Projected Unit Performance Data	
	Planned Outage Factor (POF)	4.0 %
	Forced Outage Rate (FOF)	2.0 %
	Equivalent Availability Factor (EAF)	94.0 %
	Resulting Capacity Factor (2021)	6.5 %
	Average Net Operating Heat Rate (ANOHR) [1]	10,216 Btu/kWh
(13)	Projected Unit Financial Data	
	Book Life (Years)	25
	Total Installed Cost (In-Service Year $/kW) [1]	755.15
	Direct Construction Cost ($/kW) [1]	569.54
	AFUDC* Amount ($/kW) [1]	56.76
	Escalation ($/kW) [1]	128.85
	Fixed O&M ($/kW – Yr) [1]	13.19
	Variable O&M ($/MWh) [1]	2.13
	K-Factor	1.4600

[1] Based on In-Service Year.
* Based on the current AFUDC rate of 6.47%

Schedule 10

Status Report and Specifications of Proposed Directly Associated Transmission Lines

Units	Point of Origin and Termination	Number of Circuits	Right-of-Way (ROW)	Circuit Length **	Voltage	Anticipated In-Service Date	Anticipated Capital Investment ***	Substations	Participation with Other Utilities
Polk 2 CC	Polk-Aspen; Mines-Aspen; Aspen-FishHawk (2); Big-Aspen (2); Polk-Mines; Polk-Pebbledale (2); Davis-Chapman (2)	11	New ROW not required	63 mi	230 kV	Jan. 2017	$126 million	Switching Station	None
Polk 2 CC	Polk Steam Turbine Interconnect & Upgrade	1	New ROW not required	0.7 mi	230 kV	Jan. 2017	$11 million	No New substations	None
Future CT 1	Unsited *	-	-	-	-	May 2021	-	-	-

Note:

* Specific information related to "Unsited" units unknown at this time.

** Approximate mileage listed is based on construction activity, not overall circuit length.

*** Cumulative capital investment at the in-service date.

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Chapter V

INTEGRATED RESOURCE PLANNING PROCESSES

Tampa Electric's Integrated Resource Planning process was designed to evaluate demand-side and supply-side resources on a comparable and consistent basis to satisfy future energy requirements in a cost-effective and reliable manner, while considering the interests of utility customers and shareholders.

The process incorporates a reliability analysis to determine timing of future needs and an economic analysis to determine what resource alternatives best meet future system demand and energy requirements. Initially, a demand and energy forecast, which excludes incremental energy efficiency and conservation programs, is developed. Then, without any incremental energy efficiency and conservation, an interim supply plan based on the system requirements is developed based upon this new demand and energy forecast. This interim supply plan is used to identify the basis for the next potential avoided unit(s). The date and data from this interim supply plan provides the baseline data that is used to perform a comprehensive cost effectiveness analysis of the energy efficiency and conservation programs.

Once this comprehensive analysis is complete, and the cost-effective energy efficiency and conservation programs are determined, the system demand and energy requirements are revised to include the effects of these programs on reducing system peak and energy requirements. The process is repeated to incorporate the energy efficiency and conservation programs and supply-side resources.

The cost-effectiveness of energy efficiency and demand-response programs is based on the following standard Commission tests: the Rate Impact Measure test (RIM), the Total Resource Cost test (TRC), and the Participants Cost test (PCT). Using the FPSC's standard cost-effectiveness methodology, each measure is evaluated based on different marketing and incentive assumptions. Utility plant avoidance assumptions for generation, transmission, and distribution are used in this analysis. All measures that pass the RIM and PCT tests in the energy efficiency and demand response analysis are considered for utility program adoption.

Each adopted measure is quantified into its coincident summer and winter peak kW reduction contribution and its annual kWh savings and is reflected in the demand and energy forecast. Tampa Electric evaluates and reports energy efficiency and demand response measures that comports with Rule 25-17.008, F.A.C., the FPSC's prescribed cost-effectiveness methodology.

Generating resources to be considered are determined through an alternative technology screening analysis, which is designed to determine the economic viability of a wide range of generating technologies for the Tampa Electric service area.

The technologies that pass the screening are included in a supply-side analysis that examines various supply-side alternatives for meeting future capacity requirements.

Tampa Electric uses a computer model developed by ABB, System Optimizer (SO), to evaluate supply-side resources. SO utilizes a mixed integer linear program (MILP) to develop an estimate of the timing and type of supply-side resources for capacity additions that would most economically meet the system demand and energy requirements. The MILP's objective function is to compare all feasible combinations of generating unit additions, satisfy the specified reliability criteria, and determine the schedule and addition with the lowest revenue requirement.

Detailed cost analyses for each of the top ranked resource plans are performed using the Planning & Risk (PaR) production cost model, also developed by ABB. The capital expenditures associated with each capacity addition are obtained based on the type of generating unit, fuel type, capital spending curve, and in-service year. The fixed charges resulting from the capital expenditures are expressed in present worth dollars for comparison. The fuel and the operating and maintenance costs associated with each scenario are projected based on economic dispatch of all the energy resources in our system. The projected operating expense, expressed in present worth dollars, is combined with the fixed charges to obtain the total present worth of revenue requirements for each alternative plan.

The result of the integrated resource planning process provides Tampa Electric with a plan that is cost-effective while maintaining flexibility and adaptability to a dynamic regulatory and competitive environment. The new capacity additions are shown in Schedule 8.1. To meet the expected system demand and energy requirements over the next ten years and cost-effectively maintain system reliability, Tampa Electric is converting Polk Units 2-5 to a natural gas combined cycle unit with the addition of a steam turbine that will go in-service in 2017. The company is also planning the addition of a simple cycle combustion turbine in 2021.

Tampa Electric will continue to assess competitive purchase power agreements that may replace or delay the scheduled new unit in 2021. Such alternatives would be considered if better suited to the overall objective of providing reliable power in the most cost effective manner.

FINANCIAL ASSUMPTIONS

Tampa Electric makes numerous financial assumptions as part of the preparation for its Ten-Year Site Plan process. These assumptions are based on the current financial status of the company, the market for securities, and the best available forecast of future conditions. The primary financial assumptions include the FPSC-approved Allowance for Funds Used During Construction (AFUDC) rate, capitalization ratios, financing cost rates, tax rates, and FPSC-approved depreciation rates.

- Per the Florida Administrative Code, an amount for AFUDC is recorded by the company during the construction phase of each capital project. This rate is approved by the FPSC and represents the cost of money invested in the applicable project while it is under construction. This cost is capitalized, becomes part of the project investment, and is recovered over the life of the asset. The AFUDC rate assumed in the Ten-Year Site Plan represents the company's currently approved AFUDC rate.

- The capitalization ratios represent the percentages of incremental long-term capital that are expected to be issued to finance the capital projects identified in the Ten-Year Site Plan.
- The financing cost rates reflect the incremental cost of capital associated with each of the sources of long-term financing.
- Tax rates include federal income tax, state income tax, and miscellaneous taxes including property tax.
- Depreciation represents the annual cost to amortize the total original investment in a plant over its useful life less net salvage value. This provides for the recovery of plant investment. The assumed book life for each capital project within the Ten-Year Site Plan represents the average expected life for that type of asset.

EXPANSION PLAN ECONOMICS AND FUEL FORECAST

The overall economics and cost-effectiveness of the plan were analyzed using Tampa Electric's Integrated Resource Planning process. As part of this process, Tampa Electric evaluated various planning and operating alternatives against expected operations, with the objective to: meet compliance requirements in the most cost-effective and reliable manner, maximize operational flexibility, and minimize total costs.

Early in the study process, many alternatives were screened on a qualitative and quantitative basis to determine the options that were the most feasible overall. Those alternatives that failed to meet the qualitative and quantitative considerations were eliminated. This phase of the study resulted in a set of feasible alternatives that were considered in more detailed economic analyses.

Tampa Electric forecasts base case natural gas, coal, and oil fuel commodity prices by analyzing current market prices and price forecasts obtained from various consultants and agencies. These sources include the New York Mercantile Exchange, Wood Mackenzie Energy Group, Coal Daily, Inside FERC, and Platt's Oilgram. For natural gas, coal and oil prices, the company produces both high and low fuel price projections, which represent alternative forecasts to the company's base case outlook.

TAMPA ELECTRIC'S RENEWABLE ENERGY INITIATIVES

Tampa Electric offered a pilot Renewable Energy Program for several years. Due to its success, permanent program status was requested by the company and approved by the Commission in Docket No. 060678-EG, Order No. PSC-06-1063-TRF-EG, issued December 26, 2006.

Through December 2014, Tampa Electric's Renewable Energy Program has over 1,950 customers purchasing over 2,900 blocks of renewable energy each month. With the permanent program status effective December 2006, the company doubled the renewable energy block size from 100 to 200 kWh per month. Furthermore, in 2009, Tampa Electric began offering the ability to purchase one-time blocks of renewable energy to power specific events, starting with Super Bowl XLIII. Since 2009, there have been over 3,600 one-time blocks purchased. Program participation has reached a level where it is necessary to supplement the company's renewable resources with incremental purchases from a biomass facility in south Florida. Through December 2014, participating customers have utilized over 70 GWh of renewable energy since the program inception.

The company's renewable-generation portfolio is a mix of various technologies and renewable fuel sources, including seven company owned photovoltaic (PV) arrays totaling 135 kW-DC. The community-sited PV arrays are installed at the Museum of Science and Industry, Walker Middle and Middleton High schools, Tampa Electric's Manatee Viewing Center, the Florida Aquarium, and most recently, LEGOLAND Florida. To further educate the public on the benefits of renewable energy, the installations at these facilities include interactive displays that were built to provide a hands-on experience to engage visitors' interest in solar technology.

In 2011, Tampa Electric also initiated a five-year renewable energy pilot that will conclude at the end of 2015. The pilot includes utilizing rebates and incentives to encourage the following installations:

1. Solar PV and solar water heating (SWH) technologies on existing and new residential and commercial premises

2. PV on emergency shelter schools, coupled with an educational component for teachers and students

3. SWH on low-income housing done in partnership with local non-profit building organizations

This pilot has annual funding capped at $1.53 million. Through the first four years of this initiative, Tampa Electric has provided rebates that resulted in the installation of over 2 MW of customer owned PV along with 174 residential SWH systems.

Tampa Electric continually analyzes renewable energy alternatives with the objective to integrate them into our resource portfolio. The company plans to install its first, utility-scale solar facility at Tampa International Airport by the end of 2015. The solar PV array sized at 2 MW will produce enough electricity to power up to 250 homes. Tampa Electric will own the solar PV array and the electricity it produces will go to the grid to benefit all 700,000 Tampa Electric customers, including the airport.

As market conditions and technology improvements in the renewable and distributed generation sectors continue to evolve, TEC anticipates developing additional utility scale owned and operated installations.

GENERATING UNIT PERFORMANCE ASSUMPTIONS

Tampa Electric's generating unit performance assumptions are used to evaluate long-range system operating costs associated with integrated resource plans. Generating units are characterized by several different performance parameters. These parameters include capacity, heat rate, unit derations, planned maintenance days, and unplanned outage rates.

The unit performance projections are based on historical data trends, engineering judgment, time since last planned outage, and recent equipment performance. The first five years of planned outages are based on a forecasted outage schedule, and the planned outages for the balance of the years are based on a repetitive pattern.

The forecasted outage schedule is based on unit-specific maintenance needs, material lead-time, labor availability, and the need to supply our customers with power in the most economical manner. Unplanned outage rates are projected based on an average of three years of historical data, future expectations, and any necessary adjustments to account for current unit conditions.

GENERATION RELIABILITY CRITERIA

Tampa Electric currently uses two criteria to measure the reliability of its generating system. The company utilizes a minimum 20% reserve margin with a minimum contribution of 7% supply-side resources. Tampa Electric's approach to calculating percent reserves are consistent with that outlined in the settlement agreement. The calculation of the minimum 20% reserve margin employs an industry accepted method of using total available generating and firm purchased power capacity (capacity less planned maintenance and contracted unit sales) and subtracting the annual firm peak load, then dividing by the firm peak load, and multiplying by 100. Capacity dedicated to any firm unit or station power sales at the time of system peak is subtracted from Tampa Electric's available capacity.

Tampa Electric's supply-side reserve margin is calculated by dividing the difference of projected supply-side resources and projected total peak demand by the forecasted firm peak demand. The total peak demand includes the firm peak demand and interruptible and load management loads.

SUPPLY-SIDE RESOURCES PROCUREMENT PROCESS

Tampa Electric will manage the procurement process in accordance with established policies and procedures. Prospective suppliers of supply-side resources, as well as suppliers of equipment and services, will be identified using various database resources and competitive bid evaluations, and will be used in developing award recommendations to management.

This process will allow for future supply-side resources to be supplied from self-build, purchased power, or asset purchases. Consistent with company practice, bidders will be encouraged to propose incentive arrangements that promote development and implementation of cost savings and process-improvement recommendations.

TRANSMISSION CONSTRAINTS AND IMPACTS

Based on a variety of assessments and sensitivity studies of the Tampa Electric transmission system, using year 2014 Florida Reliability Coordinating Council (FRCC) database models, no transmission constraints that violate the criteria stated in the Generation and Transmission Reliability Criteria section of this document were identified in these studies.

TRANSMISSION RELIABILITY CRITERIA

1. Transmission

The following criteria are used as guidelines for proposing transmission system expansion and/or improvement projects, however they are not absolute. These criteria are used to alert planners of potential transmission system capacity limitations. Engineering analysis is used in all stages of the planning process to weigh the impact of system deficiencies, the likelihood of the triggering contingency, and the viability of any operating options. Only by carefully researching each planning criteria violation can a final evaluation of available transmission capacity be made.

2. Generation Dispatch Modeled

The generation dispatched in the planning models is dictated on an economic basis and is calculated by the Economic Dispatch (ECDI) function of the PSS/E load flow software. The ECDI function schedules the unit dispatch so that the total generation cost required to meet the projected load is minimized. This is the generation scenario contained in the power flow cases submitted to fulfill the requirements of FERC Form 715 and the FRCC.

Since varying load levels and unit outages (planned and unplanned) can result in a system dispatch that varies from a base plan (economic dispatch), bulk transmission planners also investigate several non-economic scenarios that may stress Tampa Electric's transmission system. These additional generation sensitivities are performed to ensure the integrity of the bulk electric system (BES) under maximized bulk power flows.

3. *Transmission System Planning Loading Limits Criteria*

Tampa Electric follows the FRCC planning criteria, as contained in the *FRCC Regional Transmission Planning Process.* The FRCC planning guide is based on the North American Electric Reliability Council (NERC) Planning Reliability Standards, which are used to measure system adequacy. In general, the NERC standards state that the transmission system will remain stable, within the applicable thermal and voltage rating limits, without cascading outages, under normal, single, and multiple contingency conditions. In addition to FRCC criteria, Tampa Electric utilizes company-specific planning criteria for normal system operation and single-contingency operation.

The following table summarizes the thresholds, which alert planners to problematic transmission lines and transformers.

Table V-I
Transmission System Loading Limits

Transmission System Conditions	Maximum Acceptable Loading Limit for Transformers and Transmission Lines
All elements in service	100%
Single Contingency (pre-switching)	Emergency Rating*
Single Contingency (post-switching)	100%
Bus Outages (pre-switching)	Emergency Rating*
Bus Outages (post-switching)	100%

* As determined by FAC-008.

The transmission system is planned to allow voltage control on the 13.2 kV distribution buses between 1.023 and 1.043 per unit. For screening purposes, these criteria can be approximated by the following table that provides transmission system voltage limits.

Table V-II
Transmission System Voltage Limits

Transmission System Conditions	Industrial Substation Buses at point-of-service	69 kV Buses	138 kV Buses	230 kV Buses
Single Contingency (pre-switching)	0.925 - 1.050 p.u.	0.925 - 1.050 p.u.	0.950 – 1.050 p.u.	0.950 - 1.060 p.u.
Single Contingency (post-switching)	0.925 - 1.050 p.u.	0.925 - 1.050 p.u.	0.950 – 1.050 p.u.	0.950 - 1.060 p.u.
Bus Outages	0.925 - 1.050 p.u.	0.925 - 1.050 p.u.	0.950 – 1.050 p.u.	0.950 - 1.060 p.u.

4. Available Transmission Transfer Capability (ATC) Criteria

Tampa Electric adheres to the ATC calculation methodology described in the *Attachment C of Tampa Electric Company Open Access Transmission Tariff FERC Electric Tariff, Fourth Revised Volume No. 4* document, as well as the principles contained in the NERC Reliability Standards relating to ATC calculations. Members of the FRCC, including TEC, have formed the Florida Transmission Capability Determination Group in an effort to provide ATC values to the regional electric market that are transparent, coordinated, timely and accurate.

TRANSMISSION PLANNING ASSESSMENT PRACTICES

1. Base Case Operating Conditions

The Transmission Planning department ensures the Tampa Electric transmission system can support peak and off-peak system load levels without violation of the loading and voltage criteria stated in the Generation and Transmission Reliability Criteria section of this document.

2. Single Contingency Planning Criteria

The Tampa Electric transmission system is designed such that any single branch (transmission line or autotransformer) can be removed from service up to the forecasted peak load level without any violations of the criteria stated in the Generation and Transmission Reliability Criteria section of this document.

3. Multiple Contingency Planning Criteria

Double contingencies (including FRCC studies of C2, C3, C3Gens, C3Lines, and C5 events) involving two branches or more out of service simultaneously are analyzed at a variety of load levels. The Tampa Electric transmission system is designed such that double contingencies do not cause violation of FRCC and NERC Reliability Standards criteria.

4. Transmission Construction and Upgrade Plans

A specific list of the construction projects can be found in Chapter IV, Schedule 10. This list represents the latest BES transmission construction related to the generation expansion plan available. However, due to the timing of this document in relationship to the company's internal planning schedule, this plan may change in the near future.

ENERGY EFFICIENCY, CONSERVATION, AND ENERGY SAVINGS DURABILITY

Tampa Electric verifies the durability of energy savings from its conservation and load management programs by several methods. First, Tampa Electric has established a monitoring and evaluation process where historical analysis validates the energy savings. These include:

1. Periodic system load reduction analysis for residential load management (Prime Time), price responsive load management (Energy Planner), commercial industrial load management and commercial demand response to confirm and verify the accuracy of Tampa Electric's load reduction estimation formulas;

2. Billing energy usage and demand analysis of participants in certain energy efficiency and conservation programs as compared to control groups;

3. Analysis of DOE2 modeling of various program participants;

4. End-use monitoring and evaluation of projects and programs;

5. Specific metering of loads under control to determine the actual demand and energy savings in commercial programs, such as Standby Generator, commercial load management and commercial demand response

Second, the programs are designed to promote the use of high-efficiency equipment having permanent installation characteristics. Specifically, those programs that promote the installation of energy-efficient measures or equipment (heat pumps, hard-wired lighting fixtures, ceiling insulation, wall insulation, window replacements, air distribution system repairs, DX commercial cooling units, chiller replacements, water heating replacements, and motor upgrades) have program standards that require the new equipment to be installed in a permanent manner thus insuring their durability.

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Chapter VI

ENVIRONMENTAL AND LAND USE INFORMATION

The future generating capacity additions identified in Chapter IV could occur at H.L. Culbreath Bayside Power Station, Polk Power Station, or Big Bend Power Station. The H.L. Culbreath Bayside Power Station site is located in Hillsborough County on Port Sutton Road (See Figure VI-I), Polk Power Station site is located in southwest Polk County close to the Hillsborough and Hardee County lines (See Figure VI-II) and Big Bend Power Station is located in Hillsborough County on Big Bend Road (See Figure VI-III). All facilities are currently permitted as existing power plant sites. Additional land use requirements and/or alternative site locations are not currently under consideration.

Figure VI-I: Site Location of H.L. Culbreath Bayside Power Station

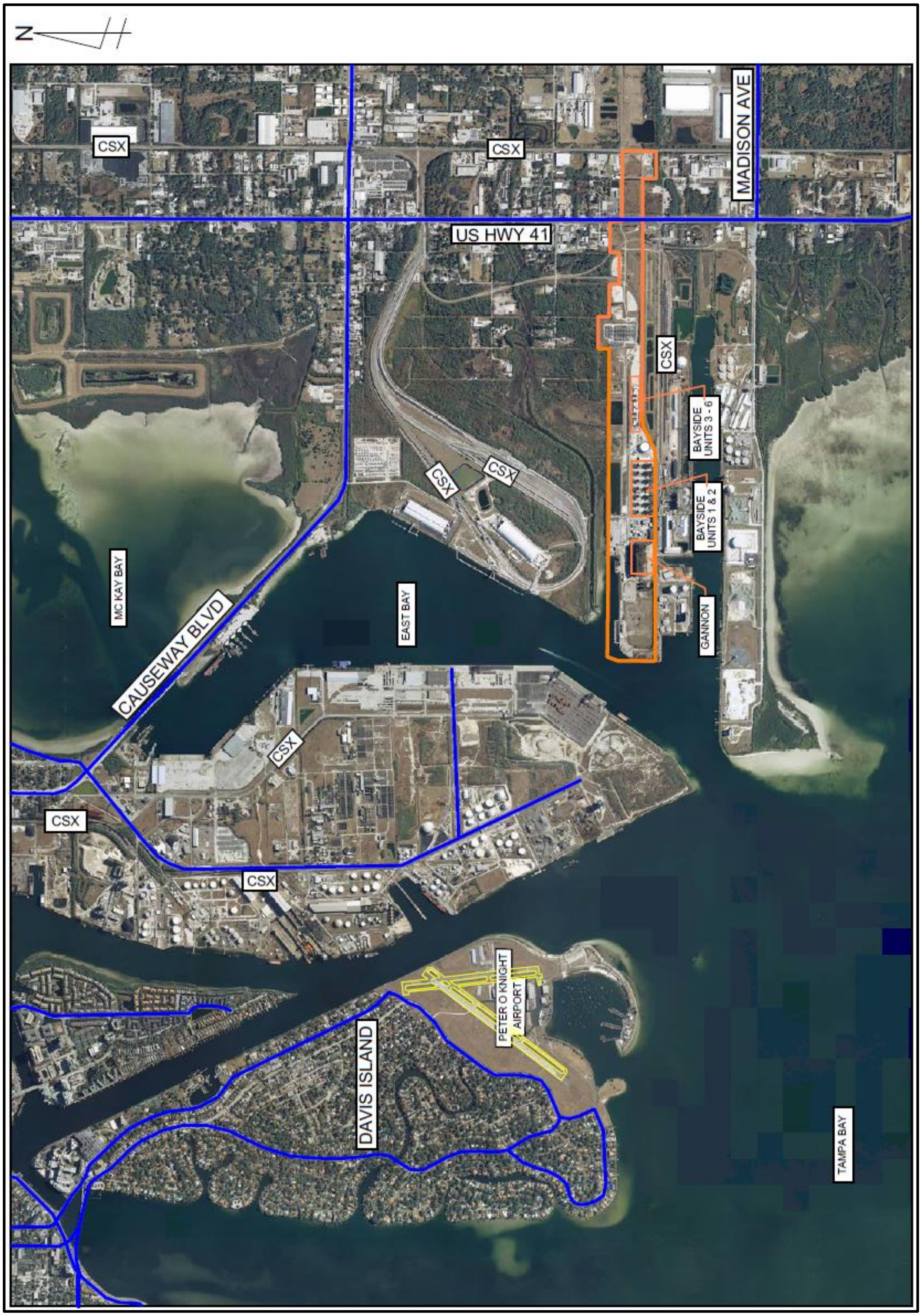

Figure VI-II: Site Location of Polk Power Station

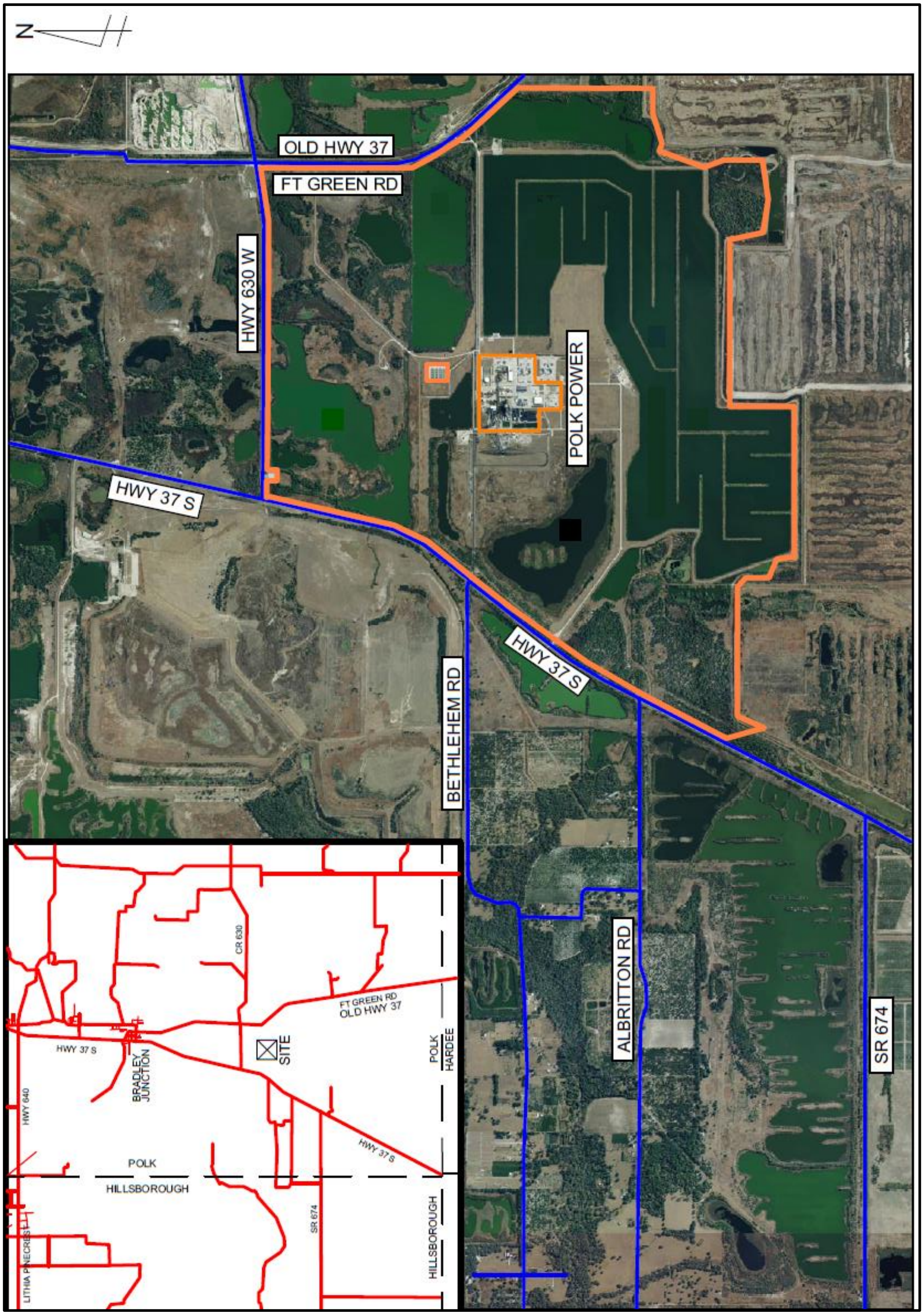

Figure VI-III: Site Location of Big Bend Power Station