REPORT
March 29, 2017

Ten Year Site Plan: 2017-2026

City of Tallahassee Utilities

Photo: 230 kV Loop Project, Line 17 Reconductoring

Report prepared by: City of Tallahassee Electric System Integrated Planning

#1 Public Utility in America

City of Tallahassee
Your Own Utilities℠

CITY OF TALLAHASSEE
TEN YEAR SITE PLAN FOR ELECTRICAL GENERATING FACILITIES
AND ASSOCIATED TRANSMISSION LINES
2017-2026
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Chapter I

Description of Existing Facilities

1.0 INTRODUCTION

The City of Tallahassee ("City") owns, operates, and maintains an electric generation, transmission, and distribution system that supplies electric power in and around the corporate limits of the City. The City was incorporated in 1825 and has operated since 1919 under the same charter. The City began generating its power requirements in 1902 and the City's Electric Utility presently serves approximately 119,000 customers located within a 221 square mile service territory (see Figure A). The Electric Utility operates three generating stations with a total summer season net generating capacity of 746 megawatts (MW).

The City has two fossil-fueled generating stations, which contain combined cycle (CC), steam and combustion turbine (CT) electric generating facilities. The Sam O. Purdom Generating Station, located in the City of St. Marks, Florida has been in operation since 1952; and the Arvah B. Hopkins Generating Station, located on Geddie Road west of the City, has been in commercial operation since 1970. The City has also been generating electricity at the C.H. Corn Hydroelectric Station, located on Lake Talquin west of Tallahassee, since August of 1985.

1.1 SYSTEM CAPABILITY

The City maintains seven points of interconnection with Duke Energy Florida ("Duke", formerly Progress Energy Florida); three at 69 kV, three at 115 kV, and one at 230 kV; and a 230 kV interconnection with Georgia Power Company (a subsidiary of the Southern Company ("Southern")).

As shown in Table 1.1 (Schedule 1), 222 MW (net summer rating) of CC generation and 20 MW (net summer rating) of CT generation facilities are located at the City's Sam O. Purdom Generating Station. The Arvah B. Hopkins Generating Station includes 300 MW (net summer rating) of CC generation, 76 MW (net summer rating) of steam generation and 128 MW (net summer rating) of CT generation facilities.

The City's Hopkins 1 steam generating unit can be fired with natural gas. The CC and CT units can be fired on either natural gas or diesel oil but cannot burn these fuels concurrently. The total capacity of the three units at the C.H. Corn Hydroelectric Station is 11 MW. However, because the hydroelectric generating units are effectively run-of-river (dependent upon rainfall, reservoir and downstream conditions), the City considers these units as “energy only” and not as dependable capacity for planning purposes.

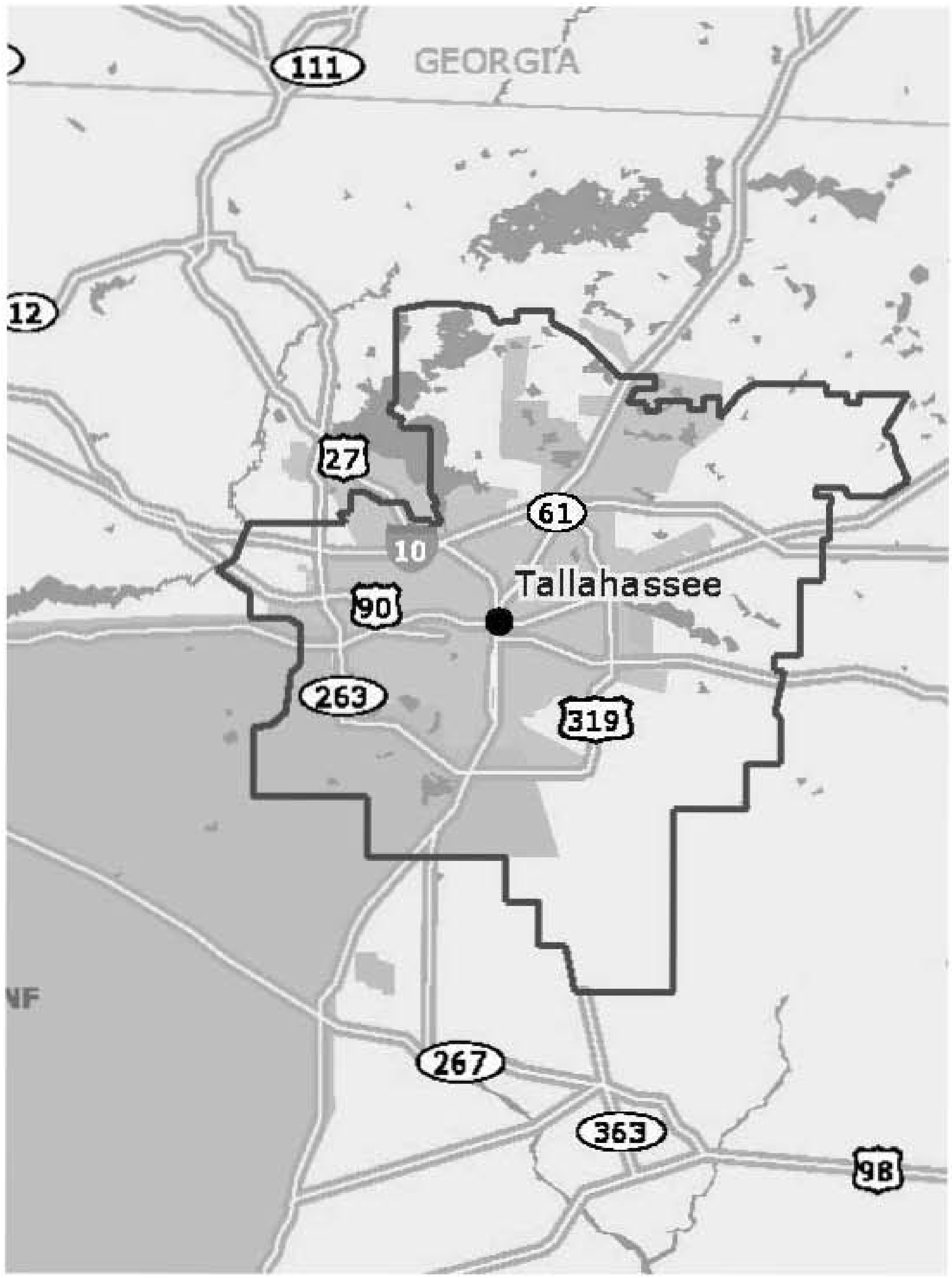
The City’s current total net summer installed generating capability is 746 MW. The corresponding winter net peak installed generating capability is 822 MW. Table 1.1 contains the details of the individual generating units.

1.2 PURCHASED POWER AGREEMENTS

The City has no long-term firm wholesale capacity and energy purchase agreements. Firm retail electric service is purchased from and provided by the Talquin Electric Cooperative (“Talquin”) to City customers served by the Talquin electric system. The projected amounts of electric service to be purchased from Talquin is included in the “Annual Firm Interchange” values provided in Table 2.19 (Schedule 6.1). In accordance with their agreement certain Talquin facilties within the geographic boundaries of the City electric system service territory will be transferred to the City over the coming years. It is anticipated that these transfers will be completed by 2019 at which time all City customers will be served via City facilities. Reciprocal service is provided to Talquin customers served by the City electric system. Payments for electric service provided to and received from Talquin and the transfer of customers and electric facilities is governed by a territorial agreement between the City and Talquin.

City of Tallahassee, Electric Utility

Service Territory Map



City Of Tallahassee

Schedule 1
Existing Generating Facilities
As of December 31, 2016

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
				Fuel		Fuel Transport		Alt. Fuel Days	Commercial In-Service	Expected Retirement	Gen. Max. Nameplate	Net Capability	
Plant	Unit No.	Location	Unit Type	Primary	Alternate	Primary	Alternate	Use	Month/Year	Month/Year	(kW)	Summer (MW)	Winter (MW)
S. O. Purdom	8	Wakulla	CC	NG	FO2	PL	TK	[1, 2]	7/00	12/40	270,100	222	258 [7]
	GT-1		GT	NG	FO2	PL	TK	[1, 2]	12/63	10/18	15,000	10	10
	GT-2		GT	NG	FO2	PL	TK	[1, 2]	5/64	10/18	15,000	10	10
											Plant Total	242	278
A. B. Hopkins	1	Leon	ST	NG	NA	PL	NA	[3]	5/71	10/18	75,000	76	78
	2		CC	NG	FO2	PL	TK	[2]	6/08 [4]	Unknown	458,100 [5]	300	330 [7]
	GT-1		GT	NG	FO2	PL	TK	[2]	2/70	4/17	16,320	12	14
	GT-2		GT	NG	FO2	PL	TK	[2]	9/72	4/17	27,000	24	26
	GT-3		GT	NG	FO2	PL	TK	[2]	9/05	Unknown	60,500	46	48
	GT-4		GT	NG	FO2	PL	TK	[2]	11/05	Unknown	60,500	46	48
											Plant Total	504	544
C. H. Corn	1	Leon	HY	WAT	NA	WAT	NA	NA	9/85	Unknown	4,440	0	0
Hydro Station	2		HY	WAT	NA	WAT	NA	NA	8/85	Unknown	4,440	0	0
[6]	3		HY	WAT	NA	WAT	NA	NA	1/86	Unknown	3,430	0	0
											Plant Total	0	0
									Total System Capacity as of December 31, 2016			746	822

Notes

[1] Due to the Purdom facility-wide emissions caps, utilization of liquid fuel at this facility is limited.

[2] The City maintains a minimum distillate fuel oil storage capacity sufficient to operate the Purdom plant approximately 9 days and the Hopkins plant and approximately 3 days at maximum output.

[3] Hopkins 1 is a "gas only" unit.

[4] Reflects the commercial operations date of Hopkins 2 repowered to a combined cycle generating unit with a new General Electric Frame 7A combustion turbine. The original commercial operations date of the existing steam turbine generator was October 1977.

[5] Hopkins 2 nameplate rating is the sum of the combustion turbine generator (CTG) nameplate rating of 198.9 MW and steam turbine generator (STG) nameplate rating of 259.2 MW. However, in the current 1x1 combined cycle (CC) configuration with supplemental duct firing the repowered STG's maximum output is steam limited to about 150 MW.

[6] Because the C. H. Corn hydroelectric generating units are effectively run-of-river (dependent upon rainfall, reservoir and downstream conditions), the City considers these units as "energy only" and not as dependable capacity for planning purposes.

[7] Summer and winter ratings are based on 95 °F and 29 °F ambient temperature, respectively.

CHAPTER II

Forecast of Energy/Demand Requirements and Fuel Utilization

2.0 INTRODUCTION

Chapter II includes the City's forecasts of demand and energy requirements, energy sources and fuel requirements. This chapter also explains the impacts attributable to the City's current Demand Side Management (DSM) plan. The City is not subject to the requirements of the Florida Energy Efficiency and Conservation Act (FEECA) and, therefore, the Florida Public Service Commission (FPSC) does not set numeric conservation goals for the City. However, the City expects to continue its commitment to the DSM programs that prove beneficial to the City's ratepayers.

2.1 SYSTEM DEMAND AND ENERGY REQUIREMENTS

Historical and forecast energy consumption and customer information are presented in Tables 2.1, 2.2 and 2.3 (Schedules 2.1, 2.2, and 2.3). Figure B1 shows the historical total energy sales and forecast energy sales by customer class. Figure B2 shows the percentage of energy sales by customer class (excluding the impacts of DSM) for the base year of 2016 and the horizon year of 2025. Tables 2.4 through 2.12 (Schedules 3.1.1 - 3.3.3) contain historical and base, high, and low forecasts of seasonal peak demands and net energy for load. Table 2.13 (Schedule 4) compares actual and two-year forecast peak demand and energy values by month for the 2015-2017 period.

2.1.1 SYSTEM LOAD AND ENERGY FORECASTS

The peak demand and energy forecasts contained in this plan are the results of the load and energy forecasting study performed by the City. The forecast is developed utilizing a methodology that the City first employed in 1980, and has since been updated and revised every one or two years. The methodology consists of nine multi-variable linear regression models and four models that utilize subjective escalation assumptions and known incremental additions. All models are based on detailed examination of the system's historical growth, usage patterns and population statistics. Several key regression formulas utilize econometric variables.

Table 2.14 lists the econometric-based linear regression forecasting models that are used as predictors. Note that the City uses regression models with the capability of separately predicting commercial customers and consumption by rate sub-class: general service non-demand (GS), general service demand (GSD), and general service large demand (GSLD). These, along with the residential class, represent the major classes of the City's electric customers. In addition to these customer class models, the City's forecasting methodology also incorporates into the demand and energy projections estimated reductions from interruptible and curtailable customers. The key explanatory variables used in each of the models are indicated by an "X" on the table.

Table 2.15 documents the City's internal and external sources for historical and forecast economic, weather and demographic data. These tables summarize the details of the models used to generate the system customer, consumption and seasonal peak load forecasts. In addition to those explanatory variables listed, a component is also included in the models that reflect the acquisition of certain Talquin Electric Cooperative (Talquin) customers over the study period consistent with the territorial agreement negotiated between the City and Talquin and approved by the FPSC.

The customer models are used to predict the number of customers by customer class, some of which in turn serve as input into their respective customer class consumption models. The customer class consumption models are aggregated to form a total base system sales forecast. The effects of DSM programs and system losses are incorporated in this base forecast to produce the system net energy for load (NEL) requirements.

Since 1992, the City has used two econometric models to separately predict summer and winter peak demand. Table 2.14 also shows the key explanatory variables used in the demand models. The seasonal peak demand forecasts are developed first by forecasting expected system load factor. Based on the historical relationship of seasonal peaks to annual NEL, system load factors are projected separately relative to both summer and winter peak demand. The predictive variables for projected load factors versus summer peak demand include maximum summer temperature, maximum temperature on the day prior to the peak and real residential price of electricity. For projected load factors versus winter peak demand minimum winter temperature, degree-days heating the day prior to the winter peak day, deviation from a base minimum temperature of 22 degrees and annual degree-days cooling are used as input. The projected load factors are then applied to the forecast of NEL to obtain the summer and winter peak demand forecasts.

Some of the most significant input assumptions for the forecast are the incremental load modifications at Florida State University (FSU), Florida A&M University (FAMU), Tallahassee Memorial Hospital (TMH) and the State Capitol Center. These four customers represented approximately 17% of the City's 2016 energy sales. Their incremental additions are highly dependent upon annual economic and budget constraints, which would cause fluctuations in their demand projections if they were projected using a model. Therefore, each entity submits their proposed incremental additions/reductions to the City and these modifications are included as submitted in the load and energy forecast.

The rate of growth in residential and commercial customers is driven by the projected growth in Leon County population. While population growth projections decreased in the years immediately following the 2008-2009 recession the current projection shows a slightly higher growth in population versus last year. Leon County population is projected to grow from 2017-2036 at an average annual growth rate (AAGR) of 0.77%. This growth rate is below that for the state of Florida (1.15%) but is higher than that for the United States (0.69%).

Total and per customer demand and energy requirements have also decreased in recent years. There are several reasons for this decrease including but not limited to the issuance of new or updated federal appliance and equipment efficiency standards since 2009 and the 2010 modifications to the State of Florida Energy Efficiency Code for Building Construction. The City's energy efficiency and demand-side management (DSM) programs (discussed in Section 2.1.3) and the economic conditions during and following the 2008-2009 recession have also contributed to these decreases. The decreases in per customer residential and commercial demand and energy requirements are projected to somewhat offset the increased growth rate in residential and commercial customers. Therefore, it is not expected that base demand and energy growth will return to pre-recession levels in the near future.

The City believes that the routine update of forecast model inputs, coefficients and other minor model refinements continue to improve the accuracy of its forecast so that they are more consistent with the historical trend of growth in seasonal peak demand and energy consumption.

The changes made to the forecast models for load and energy requirements have resulted in 2017 base forecasts for summer peak demand and annual sales/net energy for load that are generally comparable to the corresponding 2016 base forecasts.

2.1.2 LOAD FORECAST UNCERTAINTY & SENSITIVITIES

To provide a sound basis for planning, forecasts are derived from projections of the driving variables obtained from reputable sources. However, there is significant uncertainty in the future level of such variables. To the extent that economic, demographic, weather, or other conditions occur that are different from those assumed or provided, the actual load can be expected to vary from the forecast. For various purposes, it is important to understand the amount by which the forecast can be in error and the sources of error.

To capture this uncertainty, the City produces high and low range results that address potential variance in driving population and economic variables from the values assumed in the base case. The base case forecast relies on a set of assumptions about future population and economic activity in Leon County. However, such projections are unlikely to exactly match actual experience.

Population and economic uncertainty tends to result in a deviation from the trend over the long term. Accordingly, separate high and low forecast results were developed to address population and economic uncertainty. These ranges are intended to capture approximately 80% of occurrences (i.e., +/- 1.3 standard deviations). The high and low forecasts shown in this year's report use statistics provided by Woods & Poole Economics, Inc. (Woods & Poole) to develop a range of potential outcomes. Woods & Poole publishes several statistics that define the average amount by which various projections they have provided in the past are different from actual results. The City's load forecasting consultant, Leidos Engineering, interpreted these statistics to develop ranges of the trends of economic activity and population representing approximately 80% of potential outcomes. These statistics were then applied to the base case to develop the high and low load forecasts presented in Tables 2.5, 2.6, 2.8, 2.9, 2.11 and 2.12 (Schedules 3.1.2, 3.1.3, 3.2.2, 3.2.3, 3.3.2 and 3.3.3).

Sensitivities on the peak demand forecasts are useful in planning for future power supply resource needs. The graph shown in Figure B3 compares summer peak demand (multiplied by 117% for reserve margin requirements) for the three forecast sensitivity cases with reductions from proposed DSM portfolio and the base forecast without proposed DSM reductions against the City's existing and planned power supply resources. This graph allows for the review of the effect of load growth and DSM performance variations on the timing of new resource additions. The highest probability weighting, of course, is placed on the base case assumptions, and the low and high cases are given a smaller likelihood of occurrence.

2.1.3 ENERGY EFFICIENCY AND DEMAND SIDE MANAGEMENT PROGRAMS

The City currently offers a variety of conservation and DSM measures to its residential and commercial customers, which are listed below:

Residential Measures	Commercial Measures
Energy Efficiency Loans	Energy Efficiency Loans
Gas New Construction Rebates	Demonstrations
Gas Appliance Conversion Rebates	Information and Energy Audits
Information and Energy Audits	Commercial Gas Conversion Rebates
Ceiling Insulation Grants	Ceiling Insulation Grants
Low Income Ceiling Insulation Grants	Solar Water Heater Rebates
Low Income HVAC/Water Heater Repair Grants	Solar PV Net Metering
Low Income Duct Leak Repair Grants	Demand Response (PeakSmart)
Neighborhood REACH Weatherization Assistance	
Energy Star Appliance Rebates	
High Efficiency HVAC Rebates	
Energy Star New Home Rebates	
Solar Water Heater Rebates	
Solar PV Net Metering	
Variable Speed Pool Pump Rebates	
Nights & Weekends Pricing Plan	

The City has a goal to improve the efficiency of customers' end-use of energy resources when such improvements provide a measurable economic and/or environmental benefit to the customers and the City utilities. During the City's last Integrated Resource Planning (IRP) Study completed in 2006 potential DSM measures (conservation, energy efficiency, load management, and demand response) were tested for cost-effectiveness utilizing an integrated approach that is based on projections of total achievable load and energy reductions and their associated annual costs developed specifically for the City. The measures were combined into bundles affecting similar end uses and /or having similar costs per kWh saved.

In 2012 the City contracted with a consultant to review its efforts with DSM and renewable resources with a focus on adjusting resource costs for which additional investment and overall market changes impacted the estimates used in the IRP Study. DSM and renewable resource alternatives were evaluated on a levelized cost basis and prioritized on geographic and demographic suitability, demand savings potential and cost. From this prioritized list the consultant identified a combination of DSM and renewable resources that could be cost-effectively placed into service by 2016. The total demand savings potential for the resources identified compared well with that identified in the IRP Study providing some assurance that the City's ongoing DSM and renewable efforts remained cost-effective.

In early 2017 the City contracted with an engineering consultant to build upon the 2006 and 2012 studies and recommend DSM opportunities that are cost-effective alternatives to the City's evolving supply-side resources. DSM technologies under review include demand response, customer solar photovoltaics, non-solar distributed generation, energy storage, electric vehicles and charging infrastructure, and energy efficiency. The study assesses the technical, economic and achievable potential for these DSM resources. Initial findings will be available later in the year.

An energy services provider (ESP) had been under contract from 2010-2016 to assist staff in deploying a portion of the City's DSM program. Staff had worked with the ESP and consultants to develop and implement the Neighborhood REACH and commercial PeakSmart programs. REACH is a popular weatherization assistance program serving neighborhoods with older housing stock. REACH is now administered and operated by City staff. PeakSmart is a demand response/direct load control (DR/DLC) program. The ESP enrolled nearly 3 MW of commercial DR before their contract expired. PeakSmart has been inactive since then. In late 2016, the City issued a request for proposals (RFP) for continued DR implementation to build on the current PeakSmart program and expand it to residential and small commercial customers. An implementation vendor is expected to be under contract by summer 2017. The balance of DSM programs, including energy audits, rebates, loans, outreach and education continue to be managed in-house by City staff.

As discussed in Section 2.1.1 the growth in customers and energy use has slowed in recent years due in part to the economic conditions observed during and following the 2008-2009 recession as well as due to changes in the federal appliance/equipment efficiency standards and state building efficiency code. It appears that many customers have taken steps on their own to reduce their energy use and costs in response to the changing economy - without taking advantage of the incentives provided through the City's DSM program – as well as in response to the aforementioned standards and code changes. These "free drivers" effectively reduce potential participation in the DSM program in the future. It is uncertain whether these customers' energy use reductions will persist beyond the economic recovery. History has shown that post-recession energy use generally rebounds to pre-recession levels. In the meantime, however, demand and energy reductions achieved as a result of these voluntary customer actions as well as those achieved by customer participation in City-sponsored DSM measures appear to have had a considerable impact on forecasts of future demand and energy requirements.

Estimates of the actual demand and energy savings realized from 2007-2016 attributable to the City's DSM efforts are below those projected in the last IRP study. Due to reduced load and energy forecasts, the latest projections reflect a gradual true-up of DSM need over the coming years. Future DSM activities will be based in part on the upcoming findings of the 2017 DSM study. The City will provide further updates regarding progress with and any changes in future expectations of its DSM program in subsequent TYSP reports.

Energy and demand reductions attributable to the DSM portfolio have been incorporated into the future load and energy forecasts. Tables 2.16 and 2.17 display, respectively, the cumulative potential impacts of the proposed DSM portfolio on system annual energy and seasonal peak demand requirements. Based on the anticipated limits on annual control events it is expected that DR/DLC will be predominantly utilized in the summer months. Therefore, Tables 2.7-2.9 and 2.17 reflect no expected utilization of DR/DLC capability to reduce winter peak demand.

2.2 ENERGY SOURCES AND FUEL REQUIREMENTS

Tables 2.18 (Schedule 5), 2.19 (Schedule 6.1), and 2.20 (Schedule 6.2) present the projections of fuel requirements, energy sources by resource/fuel type in gigawatt-hours, and energy sources by resource/fuel type in percent, respectively, for the period 2017-2026. Figure B4 displays the percentage of energy by fuel type in 2017 and 2026.

The City's generation portfolio includes combustion turbine/combined cycle, combustion turbine/simple cycle, conventional steam and hydroelectric units. The City's combustion turbine/combined cycle and combustion turbine/simple cycle units are capable of generating energy using natural gas or distillate fuel oil. This mix of generation types coupled with opportunities for firm and economy purchases from neighboring systems provides allows the City to satisfy its total energy requirements consistent with our energy policies that seek to balance the cost of power with the environmental quality of our community.

The projections of fuel requirements and energy sources are taken from the results of computer simulations using the PROSYM production simulation model and are based on the resource plan described in Chapter III.

City Of Tallahassee

Schedule 2.1
History and Forecast of Energy Consumption and Number of Customers by Customer Class

Base Load Forecast

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Rural & Residential				Commercial [3]		
Year	Population [1]	Members Per Household	(GWh) [2]	Average No. of Customers	Average kWh Consumption Per Customer	(GWh) [2]	Average No. of Customers	Average kWh Consumption Per Customer
2007	273,684	-	1,099	93,569	11,745	1,657	18,583	89,168
2008	274,926	-	1,054	94,640	11,137	1,625	18,597	87,380
2009	275,059	-	1,050	94,827	11,073	1,611	18,478	87,185
2010	275,783	-	1,136	95,268	11,924	1,618	18,426	87,811
2011	276,799	-	1,113	95,794	11,619	1,598	18,418	86,763
2012	277,935	-	1,021	96,479	10,583	1,572	18,445	85,226
2013	279,468	-	1,014	97,145	10,438	1,544	18,558	83,199
2014	282,471	-	1,089	97,985	11,119	1,548	18,723	82,690
2015	285,651	-	1,088	99,007	10,989	1,567	18,820	83,263
2016	288,972	-	1,080	100,003	10,801	1,559	19,002	82,065
2017	292,426	-	1,078	101,396	10,628	1,591	19,207	82,852
2018	295,851	-	1,086	102,671	10,579	1,619	19,409	83,401
2019	299,316	-	1,094	103,960	10,522	1,638	19,614	83,536
2020	302,600	-	1,101	105,183	10,466	1,654	19,808	83,488
2021	305,551	-	1,107	106,281	10,412	1,668	19,983	83,465
2022	308,533	-	1,113	107,391	10,360	1,678	20,159	83,261
2023	311,544	-	1,119	108,511	10,308	1,689	20,337	83,059
2024	314,585	-	1,125	109,643	10,258	1,700	20,517	82,860
2025	317,414	-	1,130	110,696	10,210	1,710	20,684	82,680
2026	319,861	-	1,134	111,607	10,161	1,719	20,829	82,521

[1] Population data represents Leon County population.
[2] Values include DSM Impacts.
[3] As of 2007 "Commercial" includes General Service Non-Demand, General Service Demand, General Service Large Demand, Interruptible (FSU and Goose Pond), Curtailable (TMH), Traffic Control, Security Lights and Street & Highway Lights.

City Of Tallahassee

Schedule 2.2
History and Forecast of Energy Consumption and Number of Customers by Customer Class

Base Load Forecast

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Industrial						
Year	(GWh)	Average No. of Customers [1]	Average kWh Consumption Per Customer	Railroads and Railways (GWh)	Street & Highway Lighting (GWh) [2]	Other Sales to Public Authorities (GWh)	Total Sales to Ultimate Consumers (GWh) [3]
2007	-	-	-		0		2,756
2008	-	-	-		0		2,679
2009	-	-	-		0		2,661
2010	-	-	-		0		2,754
2011	-	-	-		0		2,711
2012	-	-	-		0		2,593
2013	-	-	-		0		2,558
2014	-	-	-		0		2,638
2015	-	-	-		0		2,655
2016	-	-	-		0		2,640
2017	-	-	-		0		2,669
2018	-	-	-		0		2,705
2019	-	-	-		0		2,732
2020	-	-	-		0		2,755
2021	-	-	-		0		2,774
2022	-	-	-		0		2,791
2023	-	-	-		0		2,808
2024	-	-	-		0		2,825
2025	-	-	-		0		2,840
2026	-	-	-		0		2,853

[1] Average end-of-month customers for the calendar year.
[2] As of 2007 Security Lights and Street & Highway Lighting use is included with Commercial on Schedule 2.1.
[3] Values include DSM Impacts.

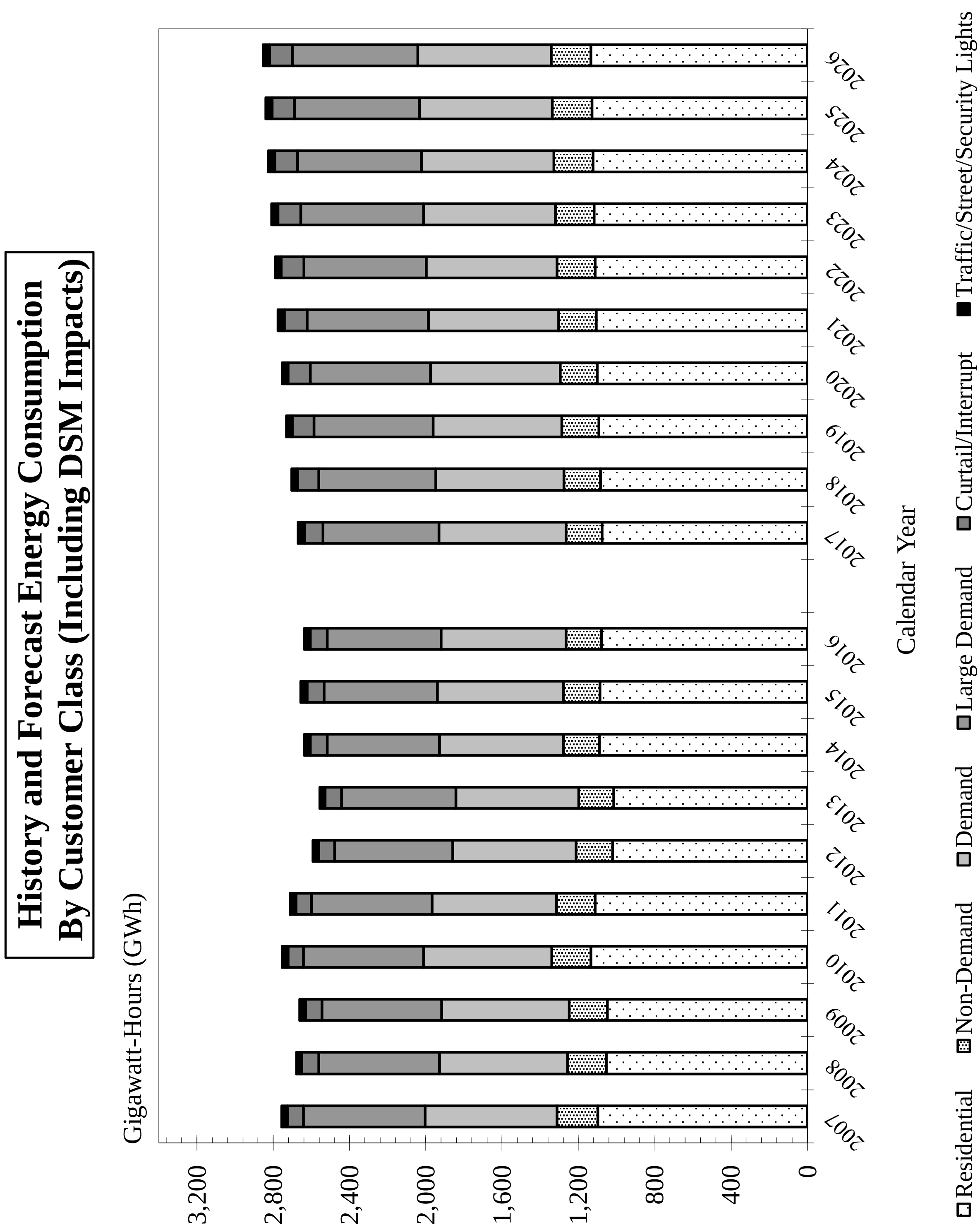
City Of Tallahassee

Schedule 2.3
History and Forecast of Energy Consumption and Number of Customers by Customer Class

Base Load Forecast

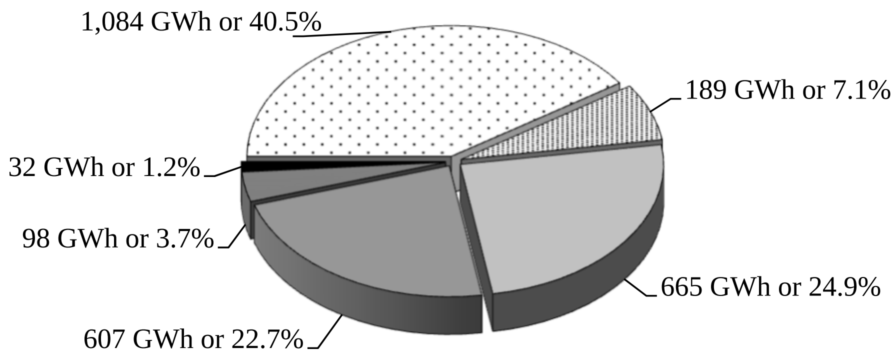
(1)	(2)	(3)	(4)	(5)	(6)
Year	Sales for Resale (GWh)	Utility Use & Losses (GWh)	Net Energy for Load (GWh) [1]	Other Customers (Average No.)	Total No. of Customers [2]
2007	0	158	2,914	0	112,152
2008	0	155	2,834	0	113,237
2009	0	140	2,801	0	113,305
2010	0	177	2,931	0	113,694
2011	0	88	2,799	0	114,212
2012	0	117	2,710	0	114,924
2013	0	126	2,684	0	115,703
2014	0	114	2,751	0	116,708
2015	0	121	2,776	0	117,827
2016	0	139	2,779	0	119,005
2017	0	146	2,815	0	120,603
2018	0	148	2,853	0	122,080
2019	0	150	2,882	0	123,575
2020	0	151	2,906	0	124,991
2021	0	152	2,927	0	126,264
2022	0	153	2,944	0	127,550
2023	0	154	2,962	0	128,848
2024	0	155	2,980	0	130,160
2025	0	156	2,996	0	131,380
2026	0	156	3,009	0	132,436

[1] Values include DSM Impacts.
[2] Average number of customers for the calendar year.


History and Forecast Energy Consumption
By Customer Class (Including DSM Impacts)
Gigawatt-Hours (GWh)
3,200
2,800
2,400
2,000
1,600
1,200
800
400
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
Calendar Year
Residential
Non-Demand
Demand
Large Demand
Curtail/Interrupt
Traffic/Street/Security Lights

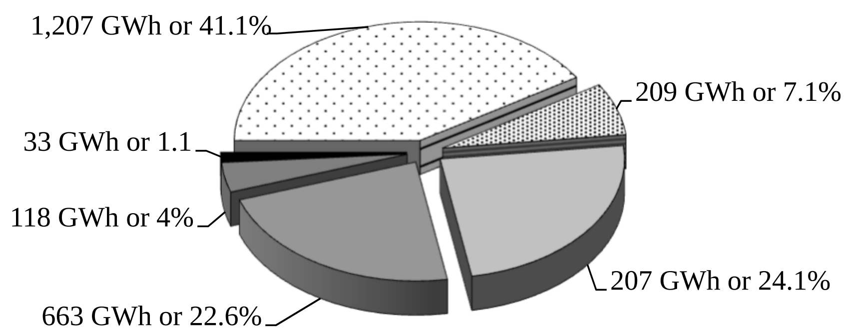
Energy Consumption By Customer Class
(Excluding DSM Impacts)

Calendar Year 2017



Total 2017 Sales = 2,676 GWh

Calendar Year 2026



Total 2026 Sales = 2,939 GWh

Residential
Non-Demand
Demand
Large Demand
Curtail/Interrupt
Traffic/Street/Security Lights

City Of Tallahassee

Schedule 3.1.1
History and Forecast of Summer Peak Demand
Base Forecast
(MW)

(1) Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Residential Load Management [2]	(7) Residential Conservation [2], [3]	(8) Comm./Ind Load Management [2]	(9) Comm./Ind Conservation [2], [3]	(10) Net Firm Demand [1]
2007	621		621						621
2008	587		587						587
2009	605		605						605
2010	601		601						601
2011	590		590						590
2012	557		557						557
2013	543		543						543
2014	565		565						565
2015	600		600						600
2016	598		598		0	1	0	0	597
2017	609		609		0	1	3	1	604
2018	619		619		5	3	5	2	604
2019	627		627		10	4	6	4	603
2020	634		634		13	5	8	6	602
2021	640		640		16	6	10	7	601
2022	647		647		18	8	10	9	602
2023	653		653		20	9	10	10	604
2024	658		658		20	10	10	11	607
2025	664		664		20	11	10	12	611
2026	669		669		20	13	10	13	613

[1] Values include DSM Impacts.
[2] Reduction estimated at busbar. 2016 DSM is actual at peak.
[3] 2016 values reflect incremental increase from 2015.

City Of Tallahassee

Schedule 3.1.2
History and Forecast of Summer Peak Demand
High Forecast
(MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total	Wholesale	Retail	Interruptible	Residential Load Management [2]	Residential Conservation [2], [3]	Comm./Ind Load Management [2]	Comm./Ind Conservation [2], [3]	Net Firm Demand [1]
2007	621		621						621
2008	587		587						587
2009	605		605						605
2010	601		601						601
2011	590		590						590
2012	557		557						557
2013	543		543						543
2014	565		565						565
2015	600		600						600
2016	598		598		0	1	0	0	597
2017	624		624		0	1	3	1	619
2018	637		637		5	3	5	2	623
2019	648		648		10	4	6	4	625
2020	659		659		13	5	8	6	627
2021	670		670		16	6	10	7	631
2022	679		679		18	8	10	9	635
2023	690		690		20	9	10	10	641
2024	698		698		20	10	10	11	648
2025	709		709		20	11	10	12	655
2026	717		717		20	13	10	13	662

[1] Values include DSM Impacts.
[2] Reduction estimated at busbar. 2016 DSM is actual at peak.
[3] 2016 values reflect incremental increase from 2015.

City Of Tallahassee

Schedule 3.1.3
History and Forecast of Summer Peak Demand
Low Forecast
(MW)

(1) Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Residential Load Management [2]	(7) Residential Conservation [2], [3]	(8) Comm./Ind Load Management [2]	(9) Comm./Ind Conservation [2], [3]	(10) Net Firm Demand [1]
2007	621		621						621
2008	587		587						587
2009	605		605						605
2010	601		601						601
2011	590		590						590
2012	557		557						557
2013	543		543						543
2014	565		565						565
2015	600		600						600
2016	598		598		0	1	0	0	597
2017	595		595		0	1	3	1	590
2018	601		601		5	3	5	2	586
2019	605		605		10	4	6	4	581
2020	609		609		13	5	8	6	577
2021	612		612		16	6	10	7	573
2022	614		614		18	8	10	9	570
2023	616		616		20	9	10	10	568
2024	618		618		20	10	10	11	567
2025	620		620		20	11	10	12	567
2026	620		620		20	13	10	13	565

[1] Values include DSM Impacts.
[2] Reduction estimated at busbar. 2016 DSM is actual at peak.
[3] 2016 values reflect incremental increase from 2015.

City Of Tallahassee

Schedule 3.2.1
History and Forecast of Winter Peak Demand
Base Forecast
(MW)

(1) Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Residential Load Management [2], [3]	(7) Residential Conservation [2], [4]	(8) Comm./Ind Load Management [2], [3]	(9) Comm./Ind Conservation [2], [4]	(10) Net Firm Demand [1]
2007 -2008	526		526						526
2008 -2009	579		579						579
2009 -2010	633		633						633
2010 -2011	584		584						584
2011 -2012	516		516						516
2012 -2013	480		480						480
2013 -2014	574		574						574
2014 -2015	556		556						556
2015 -2016	511		511						511
2016 -2017	535		535		0	1	0	0	533
2017 -2018	558		558		0	4	0	1	553
2018 -2019	565		565		0	5	0	1	559
2019 -2020	571		571		0	7	0	1	563
2020 -2021	578		578		0	9	0	2	567
2021 -2022	583		583		0	11	0	2	570
2022 -2023	588		588		0	12	0	3	573
2023 -2024	593		593		0	14	0	3	576
2024 -2025	598		598		0	15	0	4	579
2025 -2026	603		603		0	17	0	4	582
2026 -2027	607		607		0	18	0	5	584

[1] Values include DSM Impacts.
[2] Reduction estimated at busbar. 2016-2017 DSM is actual at peak.
[3] Reflects no expected utilization of demand response (DR) resources in winter.
[4] 2016-2017 values reflect incremental increase from 2015-2016.

City Of Tallahassee

Schedule 3.2.2
History and Forecast of Winter Peak Demand
High Forecast
(MW)

(1) Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Residential Load Management [2], [3]	(7) Residential Conservation [2], [4]	(8) Comm./Ind Load Management [2], [3]	(9) Comm./Ind Conservation [2], [4]	(10) Net Firm Demand [1]
2007 -2008	526		526						526
2008 -2009	579		579						579
2009 -2010	633		633						633
2010 -2011	584		584						584
2011 -2012	516		516						516
2012 -2013	480		480						480
2013 -2014	574		574						574
2014 -2015	556		556						556
2015 -2016	511		511						511
2016 -2017	535		535		0	1	0	0	533
2017 -2018	574		574		0	4	0	1	570
2018 -2019	585		585		0	5	0	1	579
2019 -2020	594		594		0	7	0	1	586
2020 -2021	604		604		0	9	0	2	593
2021 -2022	612		612		0	11	0	2	600
2022 -2023	621		621		0	12	0	3	606
2023 -2024	630		630		0	14	0	3	613
2024 -2025	638		638		0	15	0	4	620
2025 -2026	647		647		0	17	0	4	626
2026 -2027	655		655		0	18	0	5	632

[1] Values include DSM Impacts.
[2] Reduction estimated at busbar. 2016-2017 DSM is actual at peak.
[3] Reflects no expected utilization of demand response (DR) resources in winter.
[4] 2016-2017 values reflect incremental increase from 2015-2016.

City Of Tallahassee

Schedule 3.2.3
History and Forecast of Winter Peak Demand
Low Forecast
(MW)

(1) Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Residential Load Management [2], [3]	(7) Residential Conservation [2], [4]	(8) Comm./Ind Load Management [2], [3]	(9) Comm./Ind Conservation [2], [4]	(10) Net Firm Demand [1]
2007 -2008	526		526						526
2008 -2009	579		579						579
2009 -2010	633		633						633
2010 -2011	584		584						584
2011 -2012	516		516						516
2012 -2013	480		480						480
2013 -2014	574		574						574
2014 -2015	556		556						556
2015 -2016	511		511						511
2016 -2017	535		535		0	1	0	0	533
2017 -2018	541		541		0	4	0	1	537
2018 -2019	545		545		0	5	0	1	539
2019 -2020	549		549		0	7	0	1	540
2020 -2021	551		551		0	9	0	2	541
2021 -2022	553		553		0	11	0	2	540
2022 -2023	555		555		0	12	0	3	540
2023 -2024	557		557		0	14	0	3	540
2024 -2025	559		559		0	15	0	4	540
2025 -2026	559		559		0	17	0	4	539
2026 -2027	560		560		0	18	0	5	537

[1] Values include DSM Impacts.
[2] Reduction estimated at busbar. 2016-2017 DSM is actual at peak.
[3] Reflects no expected utilization of demand response (DR) resources in winter.
[4] 2016-2017 values reflect incremental increase from 2015-2016.

City Of Tallahassee

Schedule 3.3.1
History and Forecast of Annual Net Energy for Load
Base Forecast
(GWh)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Total Sales	Residential Conservation [2], [3]	Comm./Ind Conservation [2], [3]	Retail Sales [1]	Wholesale	Utility Use & Losses	Net Energy for Load [1]	Load Factor % [1]
2007	2,756			2,756		158	2,914	54
2008	2,679			2,679		155	2,834	55
2009	2,661			2,661		140	2,801	53
2010	2,754			2,754		177	2,931	53
2011	2,711			2,711		88	2,799	54
2012	2,593			2,593		117	2,710	56
2013	2,558			2,558		126	2,684	56
2014	2,638			2,638		114	2,751	55
2015	2,655			2,655		121	2,776	53
2016	2,646	6	0	2,640		139	2,779	53
2017	2,676	7	0	2,669		146	2,815	53
2018	2,719	13	1	2,705		148	2,853	54
2019	2,755	21	2	2,732		150	2,882	55
2020	2,786	28	4	2,755		151	2,906	55
2021	2,815	36	5	2,774		152	2,927	56
2022	2,841	43	7	2,791		153	2,944	56
2023	2,867	51	8	2,808		154	2,962	56
2024	2,893	58	10	2,825		155	2,980	56
2025	2,917	66	11	2,840		156	2,996	56
2026	2,939	73	13	2,853		156	3,009	56

[1] Values include DSM Impacts.
[2] Reduction estimated at customer meter. 2016 DSM is actual.
[3] 2016 values reflect incremental increase from 2015.

City Of Tallahassee

Schedule 3.3.2
History and Forecast of Annual Net Energy for Load
High Forecast
(GWh)

(1) Year	(2) Total Sales	(3) Residential Conservation [2], [3]	(4) Comm./Ind Conservation [2], [3]	(5) Retail Sales [1]	(6) Wholesale	(7) Utility Use & Loss's	(8) Net Energy for Load [1]	(9) Load Factor % [1]
2007	2,756			2,756		158	2,914	54
2008	2,679			2,679		155	2,834	55
2009	2,661			2,661		140	2,801	53
2010	2,754			2,754		177	2,931	53
2011	2,711			2,711		88	2,799	54
2012	2,593			2,593		117	2,710	56
2013	2,558			2,558		126	2,684	56
2014	2,638			2,638		114	2,751	55
2015	2,655			2,655		121	2,776	53
2016	2,646	6	0	2,640		139	2,779	53
2017	2,740	7	0	2,733		150	2,883	53
2018	2,800	13	1	2,786		153	2,939	54
2019	2,851	21	2	2,828		155	2,984	55
2020	2,898	28	4	2,867		157	3,024	55
2021	2,944	36	5	2,904		159	3,063	55
2022	2,986	43	7	2,937		161	3,098	56
2023	3,030	51	8	2,971		163	3,134	56
2024	3,072	58	10	3,004		165	3,169	56
2025	3,114	66	11	3,037		167	3,204	56
2026	3,154	73	13	3,068		168	3,237	56

[1] Values include DSM Impacts.
[2] Reduction estimated at customer meter. 2016 DSM is actual.
[3] 2016 values reflect incremental increase from 2015.

City Of Tallahassee

Schedule 3.3.3
History and Forecast of Annual Net Energy for Load
Low Forecast
(GWh)

(1) Year	(2) Total Sales	(3) Residential Conservation [2], [3]	(4) Comm./Ind Conservation [2], [3]	(5) Retail Sales [1]	(6) Wholesale	(7) Utility Use & Losses	(8) Net Energy for Load [1]	(9) Load Factor % [1]
2007	2,756			2,756		158	2,914	54
2008	2,679			2,679		155	2,834	55
2009	2,661			2,661		140	2,801	53
2010	2,754			2,754		177	2,931	53
2011	2,711			2,711		88	2,799	54
2012	2,593			2,593		117	2,710	56
2013	2,558			2,558		126	2,684	56
2014	2,638			2,638		114	2,751	55
2015	2,655			2,655		121	2,776	53
2016	2,646	6	0	2,640		139	2,779	53
2017	2,612	7	0	2,605		143	2,748	53
2018	2,638	13	1	2,624		144	2,768	54
2019	2,660	21	2	2,637		145	2,782	55
2020	2,676	28	4	2,644		145	2,789	55
2021	2,688	36	5	2,647		145	2,793	56
2022	2,698	43	7	2,648		145	2,793	56
2023	2,706	51	8	2,648		145	2,793	56
2024	2,716	58	10	2,649		145	2,794	56
2025	2,724	66	11	2,647		145	2,793	56
2026	2,728	73	13	2,642		145	2,787	56

[1] Values include DSM Impacts.
[2] Reduction estimated at customer meter. 2016 DSM is actual.
[3] 2016 values reflect incremental increase from 2015.

City Of Tallahassee

Schedule 4
Previous Year and 2-Year Forecast of Retail Peak Demand and Net Energy for Load by Month

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2016 Actual		**2017 Forecast [1][2]**		**2018 Forecast [1]**	
Month	Peak Demand (MW)	NEL (GWh)	Peak Demand (MW)	NEL (GWh)	Peak Demand (MW)	NEL (GWh)
January	511	228	547	211	553	214
February	505	204	538	223	544	226
March	402	197	431	211	437	214
April	471	201	464	205	469	208
May	496	234	526	216	532	219
June	560	267	588	250	594	254
July	563	288	604	277	604	281
August	597	290	589	281	596	285
September	526	250	564	282	570	286
October	469	227	481	242	487	244
November	423	192	457	212	463	214
December	390	201	422	205	428	208
TOTAL		2,779		2,815		2,853

[1] Peak Demand and NEL include DSM Impacts.
[2] Represents forecast values for 2017.

City of Tallahassee, Florida

2017 Electric System Load Forecast

Key Explanatory Variables

Ln. No.	Model Name	Leon County Population	Residential Customers	Cooling Degree Days	Heating Degree Days	Tallahassee Per Capita Taxable Sales	Price of Electricity	Minimum Winter Peak day Temp.	Prior Winter Peak day HDD	Maximum Summer Peak day Temp.	Prior Summer Peak day Temp.	Appliance Saturation	R Squared[1]
1	Residential Customers	X											0.998
2	Residential Consumption		X	X	X	X	X					X	0.940
3	General Service Non-Demand Customers		X										0.965
4	General Service Demand Customers		X										0.959
5	General Service Non-Demand Consumption	X		X	X	X							0.884
6	General Service Demand Consumption	X		X	X								0.956
7	General Service Large Demand Consumption	X		X	X								0.846
8	Summer Peak Demand						X			X	X		0.901
9	Winter Peak Demand			X				X	X				0.918

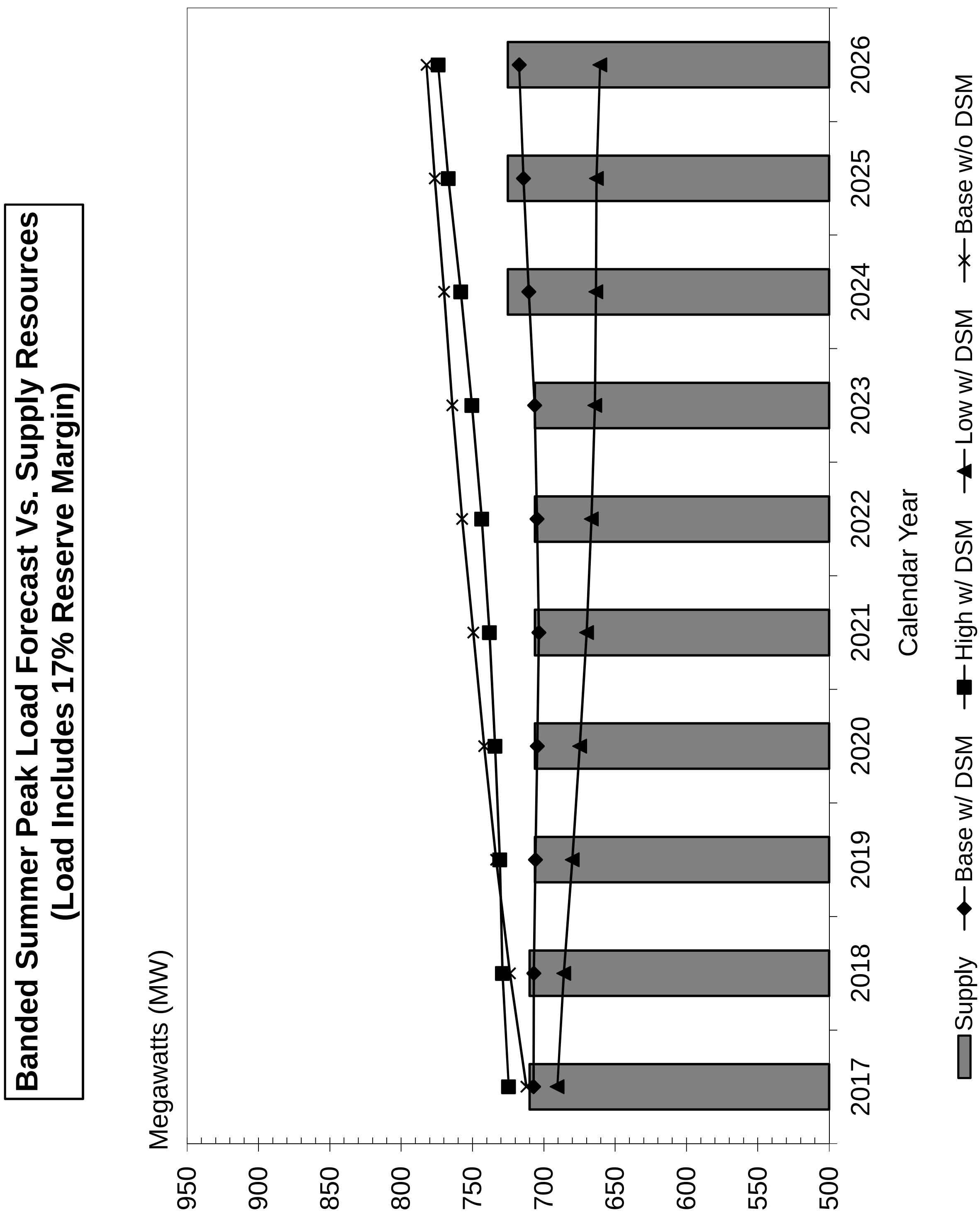
[1] R Squared, sometimes called the coefficient of determination, is a commonly used measure of goodness of fit of a linear model. If the observations fall on the model regression line, R Squared is 1. If there is no linear relationship between the dependent and independent variable, R Squared is 0. A reasonably good R Squared value could be anywhere from 0.6 to 1.

City of Tallahassee

2017 Electric System Load Forecast

Sources of Forecast Model Input Information

Energy Model Input Data	Source
1. Leon County Population	Bureau of Economic and Business Research
2. Cooling Degree Days	NOAA reports
3. Heating Degree Days	NOAA reports
4. AC Saturation Rate	Appliance Saturation Study
5. Heating Saturation Rate	Appliance Saturation Study
6. Real Tallahassee Taxable Sales	Florida Department of Revenue, CPI
7. Florida Population	Bureau of Economic and Business Research
8. State Capitol Incremental	Department of Management Services
9. FSU Incremental Additions	FSU Planning Department
10. FAMU Incremental Additions	FAMU Planning Department
11. GSLD Incremental Additions	City Utility Services
12. Other Commercial Customers	City Utility Services
13. Tall. Memorial Curtailable	System Planning/ Utilities Accounting.
14. System Peak Historical Data	City System Planning
15. Historical Customer Projections by Class	System Planning & Customer Accounting
16. Historical Customer Class Energy	System Planning & Customer Accounting
17. GDP Forecast	Blue Chip Economic Indicators
18. CPI Forecast	Blue Chip Economic Indicators
19. Interruptible, Traffic Light Sales, & Security Light Additions	System Planning & Customer Accounting
20. Historical Residential Real Price of Electricity	Calculated from Revenues, kWh sold, CPI
21. Historical Commercial Real Price Of Electricity	Calculated from Revenues, kWh sold, CPI


Banded Summer Peak Load Forecast Vs. Supply Resources
(Load Includes 17% Reserve Margin)
Megawatts (MW)
950
900
850
800
750
700
650
600
550
500
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
Calendar Year
Supply
Base w/ DSM
High w/ DSM
Low w/ DSM
Base w/o DSM

City Of Tallahassee

2017 Electric System Load Forecast

Projected Demand Side Management Energy Reductions [1]

Calendar Year Basis

Year	Residential Impact (MWh)	Commercial Impact (MWh)	Total Impact (MWh)
2017	6,857	53	6,909
2018	13,713	844	14,557
2019	21,624	2,426	24,051
2020	29,536	4,008	33,544
2021	37,447	5,591	43,038
2022	45,359	7,173	52,532
2023	53,270	8,755	62,025
2024	61,181	10,338	71,519
2025	69,093	11,920	81,013
2026	77,004	13,502	90,506

[1] Reductions estimated at generator busbar.

City Of Tallahassee

2017 Electric System Load Forecast

Projected Demand Side Management Seasonal Demand Reductions [1]

Year		Residential Energy Efficiency Impact		Commercial Energy Efficiency Impact		Residential Demand Response Impact		Commercial Demand Response Impact		Demand Side Management Total	
Summer	Winter	Summer (MW)	Winter (MW)	Summer (MW)	Winter (MW)	Summer (MW)	Winter [2] (MW)	Summer (MW)	Winter [2] (MW)	Summer (MW)	Winter (MW)
2017	2017-2018	1	4	1	1	0	0	3	0	4	4
2018	2018-2019	3	5	2	1	5	0	5	0	14	6
2019	2019-2020	4	7	4	1	10	0	6	0	24	8
2020	2020-2021	5	9	6	2	13	0	8	0	32	11
2021	2021-2022	6	11	7	2	16	0	10	0	39	13
2022	2022-2023	8	12	9	3	18	0	10	0	44	15
2023	2023-2024	9	14	10	3	20	0	10	0	48	17
2024	2024-2025	10	15	11	4	20	0	10	0	51	19
2025	2025-2026	11	17	12	4	20	0	10	0	53	21
2026	2026-2027	13	18	13	5	20	0	10	0	56	23

[1] Reductions estimated at busbar.

[2] Represents projected winter peak reduction capability associated with demand response (DR) resource. However, as reflected on Schedules 3.1.1-3.2.3 (Tables 2.4-2.9), DR utilization expected to be predominantly in the summer months.

City Of Tallahassee

Schedule 5
Fuel Requirements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Fuel Requirements		Units	Actual 2015	Actual 2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(1)	Nuclear		Billion Btu	0	0	0	0	0	0	0	0	0	0	0	0
(2)	Coal		1000 Ton	0	0	0	0	0	0	0	0	0	0	0	0
(3)	Residual	Total	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(4)		Steam	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)		CT	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(7)		Diesel	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(8)	Distillate	Total	1000 BBL	0	2	0	0	0	0	0	0	0	0	0	0
(9)		Steam	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(10)		CC	1000 BBL	0	2	0	0	0	0	0	0	0	0	0	0
(11)		CT	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(12)		Diesel	1000 BBL	0	0	0	0	0	0	0	0	0	0	0	0
(13)	Natural Gas	Total	1000 MCF	21,649	21,081	21,586	21,920	21,337	20,866	21,006	21,225	21,328	21,372	21,573	21,663
(14)		Steam	1000 MCF	1,921	2,240	1,185	1,201	0	0	0	0	0	0	0	0
(15)		CC	1000 MCF	18,386	16,434	19,825	19,557	20,575	19,873	19,288	20,544	20,628	19,911	20,721	20,789
(16)		CT	1000 MCF	1,342	2,408	576	1,162	762	993	1,717	680	700	1,461	852	874
(17)		Diesel	1000 MCF	0	0	0	0	0	0	0	0	0	0	0	0
(18)	Other (Specify)		Trillion Btu	0	0	0	0	0	0	0	0	0	0	0	0

City Of Tallahassee

Schedule 6.1
Energy Sources

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Energy Sources		Units	Actual 2015	Actual 2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(1)	Annual Firm Interchange		GWh	0	0	19	17	16	15	13	12	11	9	7	6
(2)	Coal		GWh	0	0	0	0	0	0	0	0	0	0	0	0
(3)	Nuclear		GWh	0	0	0	0	0	0	0	0	0	0	0	0
(4)	Residual	Total	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(5)		Steam	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)		CT	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(8)		Diesel	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(9)	Distillate	Total	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(10)		Steam	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(11)		CC	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(12)		CT	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(13)		Diesel	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(14)	Natural Gas	Total	GWh	2,704	2562	2,812	2,810	2,842	2,781	2,802	2,829	2,846	2,858	2,881	2,894
(15)		Steam	GWh	155	181	101	105	0	0	0	0	0	0	0	0
(16)		CC	GWh	2,414	2,145	2,651	2,581	2,747	2,657	2,595	2,744	2,759	2,677	2,774	2,785
(17)		CT	GWh	135	236	60	124	95	124	207	85	87	181	107	109
(18)		Diesel	GWh	0	0	0	0	0	0	0	0	0	0	0	0
(19)	Hydro		GWh	16	21	14	14	14	14	14	14	14	14	14	14
(20)	Economy Interchange[1]		GWh	55	196	-39	-29	-31	-27	-24	-32	-30	-21	-25	-24
(21)	Renewables		GWh	0	0	9	41	41	123	122	121	121	120	119	119
(22)	Net Energy for Load		GWh	2,776	2,779	2,815	2,853	2,882	2,906	2,927	2,944	2,962	2,980	2,996	3,009

[1] Negative values reflect expected need to sell off-peak power to satisfy generator minimum load requirements, primarily in winter and shoulder mont

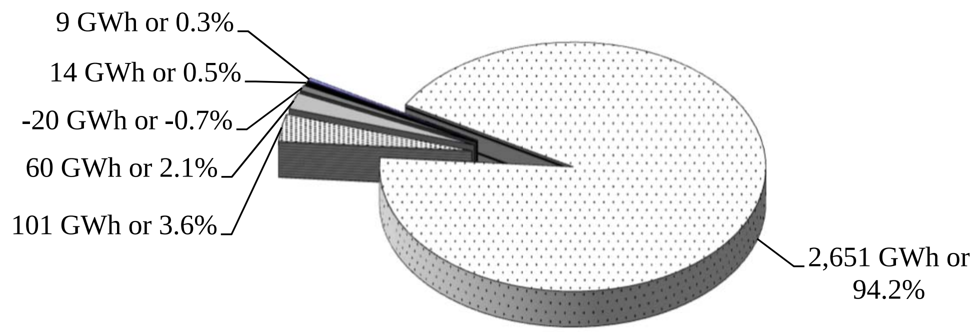
City Of Tallahassee

Schedule 6.2
Energy Sources

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Energy Sources		Units	Actual 2015	Actual 2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(1)	Annual Firm Interchange		%	0.0	0.0	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.3	0.2	0.2
(2)	Coal		%	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)	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
(4)	Residual	Total	%	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)		Steam	%	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)		CT	%	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)		Diesel	%	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	Total	%	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)		Steam	%	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)		CT	%	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)		Diesel	%	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	Total	%	97.4	92.2	99.9	98.5	98.6	95.7	95.7	96.1	96.1	95.9	96.2	96.2
(15)		Steam	%	5.6	6.5	3.6	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(16)		CC	%	87.0	77.2	94.2	90.5	95.3	91.4	88.7	93.2	93.1	89.8	92.6	92.6
(17)		CT	%	4.9	8.5	2.1	4.3	3.3	4.3	7.1	2.9	2.9	6.1	3.6	3.6
(18)		Diesel	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(19)	Hydro		%	0.6	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
(20)	Economy Interchange		%	2.0	7.0	-1.4	-1.0	-1.1	-0.9	-0.8	-1.1	-1.0	-0.7	-0.8	-0.8
(21)	Renewables		%	0.0	0.0	0.3	1.4	1.4	4.2	4.2	4.1	4.1	4.0	4.0	4.0
(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

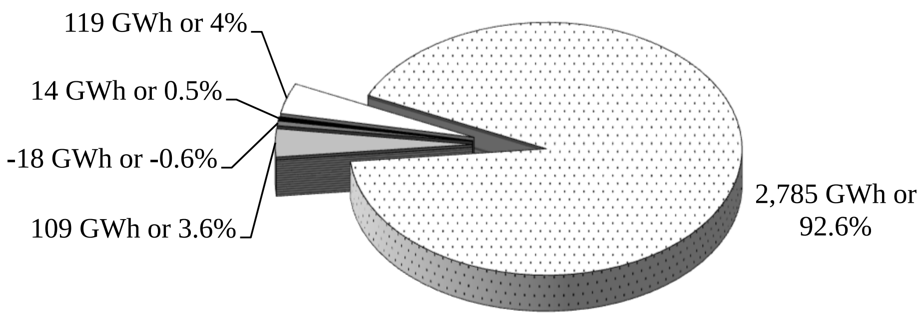
Generation By Resource/Fuel Type

Calendar Year 2017

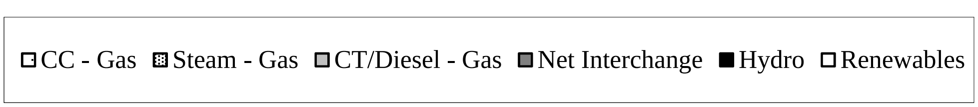


Total 2017 NEL = 2,815 GWh

Calendar Year 2026



Total 2026 NEL = 3,009 GWh



Chapter III

Projected Facility Requirements

3.1 PLANNING PROCESS

In December 2006 the City completed its last comprehensive IRP Study. The purpose of this study was to review future DSM and power supply options that are consistent with the City's policy objectives. Included in the IRP Study was a detailed analysis of how the DSM and power supply alternatives perform under base and alternative assumptions. Since that time the City has made revisions to its resource plan. These revisions will be discussed in this chapter.

3.2 PROJECTED RESOURCE REQUIREMENTS

3.2.1 TRANSMISSION LIMITATIONS

The City's projected transmission import capability continues to be a major determinant of the need for future power supply resource additions. The City's internal transmission studies have reflected a gradual deterioration of the system's transmission import (and export) capability into the future, due in part to the lack of investment by neighboring utilities in the regional transmission system around Tallahassee as well as the impact of unscheduled power flow-through on the City's transmission system. The City has worked with its neighboring utilities, Duke and Southern, to plan and maintain, at minimum, sufficient transmission import capability to allow the City to make emergency power purchases in the event of the most severe single contingency, the loss of the system's largest generating unit.

The prospects for significant expansion of the regional transmission system around Tallahassee hinges on the City's ongoing discussions with Duke and Southern, the Florida Reliability Coordinating Council's (FRCC) regional transmission planning process, and the evolving set of mandatory reliability standards issued by the North American Electric Reliability Corporation (NERC). Unfortunately, none of these efforts is expected to produce substantive improvements to the City's transmission import/export capability in the short-term. In consideration of the City's limited transmission import capability the results of the IRP Study and other internal analysis of options tend to favor local generation alternatives as the means to satisfy future power supply requirements. To satisfy load, planning reserve and operational requirements in the reporting period, the City may need to advance the in-service date of new power supply resources to complement available transmission import capability.

3.2.2 RESERVE REQUIREMENTS

For the purposes of this year's TYSP report the City uses a load reserve margin of 17% as its resource adequacy criterion. This margin was established in the 1990s then re-evaluated via a loss of load probability (LOLP) analysis of the City's system performed in 2002. The City periodically conducts LOLP analyses to determine if conditions warrant a change to its resource adequacy criteria. The results of recent LOLP analyses suggest that reserve margin may no longer be suitable as the City's sole resource adequacy criterion. This issue is discussed further in Section 3.2.4.

3.2.3 RECENT AND NEAR TERM RESOURCE CHANGES

There are several generating unit retirements scheduled in the near term (2017-2021). A total of 56 MW (summer net rating) of generating capacity provided by four (4) small combustion turbines (Hopkins CTs 1 & 2 and Purdom CTs 1 & 2) are planned for retirement. Hopkins CTs 1 & 2 will be retired by the summer of 2017 and Purdom CTs 1 & 2 are planned for retirement by the fall of 2018. Though the retirement dates of these units have been postponed several times in the past the City believes it would not be prudent to consider them as dependable capacity beyond their currently planned retirement dates. In addition, the City's Hopkins Unit 1, which first went into service in 1971, is also planned for retirement by the fall of 2018. All of these generating units are in excess of 40 years old. Expected future resource additions are discussed in Section 3.2.6, "Future Power Supply Resources".

The City currently operates the C. H. Corn Hydroelectric facility located on Lake Talquin. This facility is an 11 MW run-of-river hydroelectric facility that is considered an energy only resource by the City. The facility is owned by the State of Forida and leased to the City under a 30-year lease with two 10-year renewal options. The City is in the first of the two renewal option periods. The facility operates under an operating license issued by the Federal Energy Regulatory Commission (FERC). The FERC license is set to expire in June 2022.

Following a review of potential options for the facility, the City has elected to not seek a renewal of the FERC license. The City has been in discussions with the State about potential transfer of the facility to another entity that will operate the facility. The State is in the process of performing a competitive solicitation for an operator for the facility. This solicitation may or may not maintain the rights to operate the facility for the purposes of generating electricity. Should the State not be successful in the competitive solicitation, the City intends to pursue surrendering the FERC license.

3.2.4 POWER SUPPLY DIVERSITY

Resource diversity, particularly with regard to fuels, has long been a priority concern for the City because of the system's heavy reliance on natural gas as its primary fuel source. This issue has received even greater emphasis due to the historical volatility in natural gas prices. The City has addressed this concern in part by implementing an Energy Risk Management (ERM) program to limit the City's exposure to energy price fluctuations. The ERM program established an organizational structure of interdepartmental committees and working groups and included the adoption of an Energy Risk Management Policy. This policy identifies acceptable risk mitigation products to prevent asset value losses, ensure price stability and provide protection against market volatility for fuels and energy to the City's electric and gas utilities and their customers.

Other important considerations in the City's planning process are the diversity of power supply resources in terms of their number, sizes and expected duty cycles as well as expected transmission import capabilities. To satisfy expected electric system requirements the City currently assesses the adequacy of its power supply resources versus the 17% load reserve margin criterion. But the evaluation of reserve margin is made only for the annual electric system peak demand and assuming all power supply resources are available. Resource adequacy must also be evaluated during other times of the year to determine if the City is maintaining the appropriate amount and mix of power supply resources.

Currently, about two-thirds of the City's power supply comes from two generating units, Purdom 8 and Hopkins 2. The outage of either of these units can present operational challenges especially when coupled with transmission limitations (as discussed in Section 3.2.1). Further, the projected retirement of older generating units will reduce the number of power supply resources available to ensure resource adequacy throughout the reporting period. For these reasons the City has evaluated alternative and/or supplemental probabilistic metrics to its current load reserve margin criterion, such as loss of load expectation (LOLE), that may better balance resource adequacy and operational needs with utility and customer costs. The results of this evaluation confirmed that the City's current capacity mix and limited transmission import capability are the biggest determinants of the City's resource adequacy and suggest that there are risks of potential resource shortfalls during periods other than at the time of the system peak demand. Therefore, the City's current deterministic load reserve margin criterion may need to be increased and/or supplemented by a probabilistic criterion that takes these issues into consideration.

Purchase contracts can provide some of the diversity desired in the City's power supply resource portfolio. The City's last IRP Study evaluated both short and long-term purchased power options based on conventional sources as well as power offers based on renewable resources. A consultant-assisted study completed in 2008 evaluated the potential reliability and economic benefits of prospectively increasing the City's transmission import (and export) capabilities. The results of this study indicate the potential for some electric reliability improvement resulting from the addition of facilities to achieve more transmission import capability. However, the study's model of the Southern and Florida markets reflects, as with the City's generation fleet, natural gas-fired generation on the margin the majority of the time. Therefore, the cost of increasing the City's transmission import capability would not likely be offset by the potential economic benefit from increased power purchases from conventional sources.

As an additional strategy to address the City's lack of power supply diversity, planning staff has investigated options for a significantly enhanced DSM portfolio. Commitment to this expanded DSM effort (see Section 2.1.3) and an increase in customer-sited renewable energy projects (primarily solar panels) improve the City's overall resource diversity. However, due to limited availability and uncertain performance, studies indicate that DSM and solar projects would not improve resource adequacy (as measured by LOLE) as much as the addition of conventional generation resources.

3.2.5 RENEWABLE RESOURCES

The City believes that offering green power alternatives to its customers is a sound business strategy: it will provide for a measure of supply diversification, reduce dependence on fossil fuels, promote cleaner energy sources, and enhance the City's already strong commitment to protecting the environment and the quality of life in Tallahassee. The City continues to seek suitable projects that utilize the renewable fuels available within the Florida Big Bend and panhandle regions. As part of its continuing commitment to explore clean energy alternatives, the City has continued to invest in opportunities to develop viable solar photovoltaic (PV) projects as part of our efforts to offer "green power" to our customers.

On July 24, 2016, the City executed a PPA for 20 MW_{ac} of solar PV with Origis Energy USA ("Origis"). The project will be located adjacent to the Tallahassee International Airport and will deliver power to City-owned distribution facility. The commercial operations date for this facility will be near the end of the third quarter of 2017. In an effort to continue the increased use of renewables, the City Commission authorized the Electric Utlitity to enter into negotiations with Origis for a second project with an output of 40 MW_{ac}. If the negotiations are successful this would bring the City's total utility scale solar capacity to 60 MW_{ac} . The 40 MW_{ac} project will be sited on additional property adjacent to the Tallahassee International Airport, but not electrically connected to the 20 MW_{ac} project. The project commercial operations date for the 40 MW_{ac} facility will be at the end of the third quarter of 2019.

One of the negatives of the having both projects located adjacent to each other is that both systems will likely experience cloud cover at the same time. Due to the intermittent nature of solar PV, the PPAs for both projects are for energy only and will not be considered firm capacity. Although there are potential impacts on service reliability associated with reliance on a significant amount of intermittent resources like PV on the City's relatively small electric system, the City will continue to monitor the proliferation of PV and other intermittent resources and work to integrate them so that service reliability is not jeopardized. One action being taken by the City is the replacement generation project (see below) that will result in 92 MW of quick start generating resources being installed on the system. In addition to the ongoing modernization of the City's generation fleet, these units will provide reliability back up for the intermittent resources on the system.

As of the end of calendar year 2016 the City has a portfolio of 232 kW of solar PV operated and maintained by the Electric Utility and a cumulative total of 1,564 kW of solar PV has been installed by customers. The City promotes and encourages environmental responsibility in our community through a variety of programs available to citizens. The commitment to renewable energy sources (and particularly to solar PV) by its customers is made possible through the Go Green Tallahassee initiative, that includes many options related to becoming a greener community such as the City's Solar PV Net Metering offer. Solar PV Net Metering promotes customer investment in renewable energy generation by allowing residential and commercial customers with small to moderate sized PV installations to return excess generated power back to the City at the full retail value.

The City has commissioned a study to determine the impacts of additional intermittent renewable resources being added to the City's system. The study will determine the maximum expected intermittent resource penetration the system can handle without adversely impacting the reliability of the system from both a bulk power and distribution perspective. In addition, the study will identify potential system modifications that may be available to increase the amount of intermittent resources that can be reliably added to the system.

3.2.6 FUTURE POWER SUPPLY RESOURCES

The City currently projects that replacement power supply resources will be needed to maintain electric system adequacy and reliability through the 2026 horizon year. This is being driven by the scheduled retirements of several generating units on the City's system discussed in Section 3.2.3. To support this need, the City Commission has authorized two replacement generation projects for a total of 92 MW.

The first generation project is being developed at the City's Substation 12. Standard industry practice is to have to have at least two transmission lines serving each substation to ensure electric service reliability. However, Substation 12 is currently only served via a single transmission line. Substation 12 serves a number of critical loads within the City's service territiory including, but not limited to, Tallahassee Memorial Hospital (TMH), a large number of community medical offices/facilities adjacent to TMH, and the Tallahassee Police Department. Due to the density of businesses, residences and roadways in the area, it is not cost feasible to interconnect another transmission line with this substation. As an alternative, a generation project located at the substation will provide 18 MW (in the form of two 9.2 MW natural gas fueled reciprocating internal combustion engines (RICE or IC)). These units will provide back up for the critical loads served from this substation in the event of a loss of the single transmission line. While this project is primarily intended as a solution to a transmission constraint, it will also provide firm, quick start resources available for dispatch to meet customer demand and load on the system..

In addition to the generating capacity to be added at Substation 12 new generating capacity will also be added at the Hopkins facility to offset the planned retirement of the City's Hopkins Unit 1 (76 MW). On September 28, 2016, the City Commission authorized staff to move forward with the purchase and installation of four (4) 18.5 MW RICE generators, similar to those being installed at Subsation 12, at the City's existing Hopkins plant site.

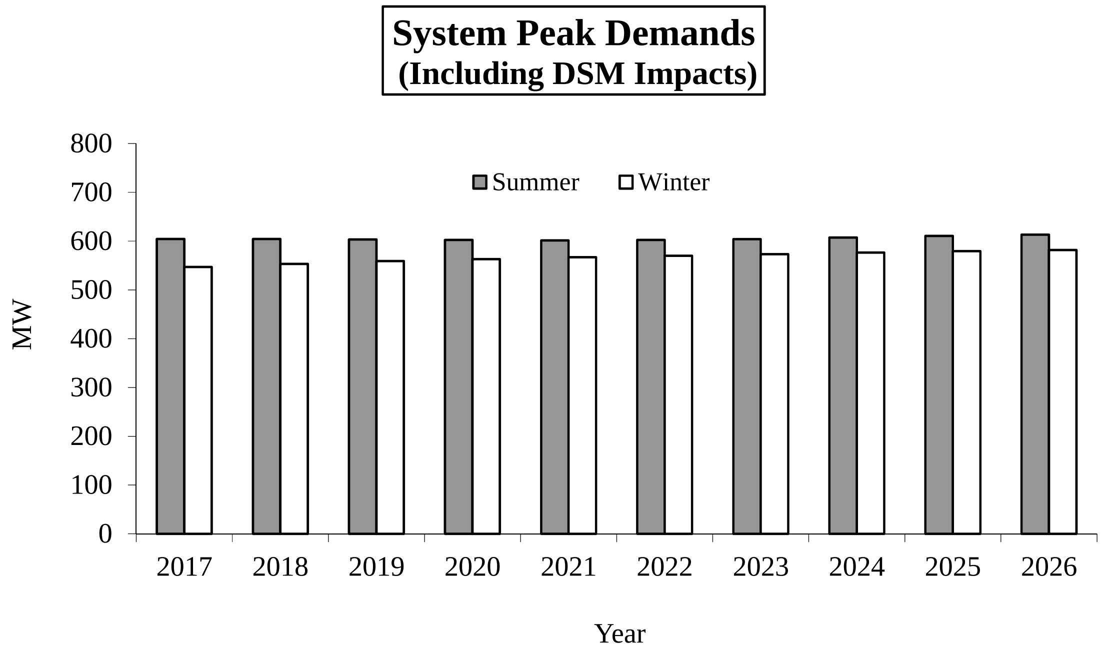
The RICE generators provide additional benefits including but not necessarily limited to:

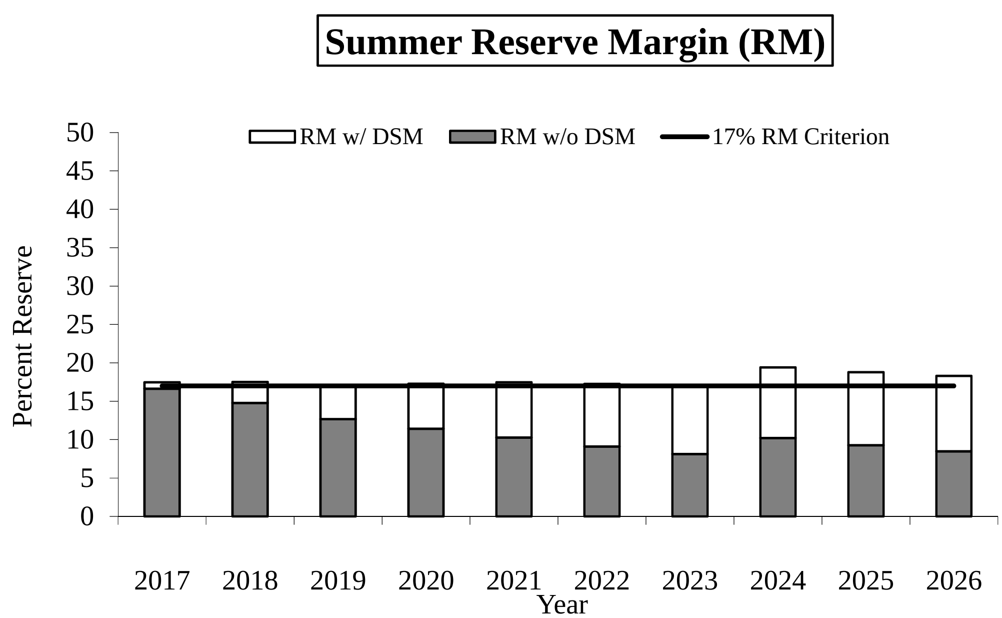
- Multiple RICE generators provide greater dispatch flexibility.
- Additional RICE generators can be installed at either the City's Hopkins plant or split between the Hopkins plant and Purdom plant.
- The RICE generators are more efficient than the units that are being retired providing significant potential fuel savings.
- The RICE generators can be started and reach full load within 5-10 minutes. In addition, their output level can be changed very rapidly. This, coupled with the number and size of each unit, makes them excellent for responding to the changes in output from intermittent resources such as solar energy systems and may enable the addition of more solar resources in the future.
- The CO_2 emissions from the RICE generators are much lower than the units scheduled to be retired.
- Hopkins Unit 1 currently has a minimum up time requirement of 100 hours. This may at times require the unit to remain on line during daily off-peak periods when the unit's generation is not needed and/or may represent excess generation that must be sold, possibly at a loss. Replacing Hopkins Unit 1 with the smaller, "quick start" RICE generators would allow the City to avoid this uneconomic operating practice.
- By retiring Hopkins Unit 1 earlier and advancing the in-service dates of these RICE generators analyses indicate that some of the associated debt service could be offset by the fuel savings from the efficiency gains achieved.

Because of the slight increase in forecast summer peak demand associated with the City's 2017 load forecast update, it is anticipated that additional capacity will be needed by the summer of 2024. For the purposes of this report it is assumed that another 18.5 MW RICE generator would be installed at the Hopkins site. The timing, site, type and size of this new power supply resource may vary dependent upon the metric(s) used to determine resource adequacy and as the nature of the need becomes better defined. Any proposed addition could be a generator or a peak season purchase.

The suitability of this resource plan is dependent on the performance of the City's DSM portfolio (described in Section 2.1.3 of this report) and the City's projected transmission import capability. If only 50% of the projected annual DSM peak demand reductions are achieved, the City would require about 25 MW of additional power supply resources to meet its load and planning reserve requirements through the horizon year of 2026. The City continues to monitor closely the performance of the DSM portfolio and, as mentioned in Section 2.1.3, will be revisiting and, where appropriate, updating assumptions regarding and re-evaluating cost-effectiveness of our current and prospective DSM measures. This will also allow a reassessment of expected demand and energy savings attributable to DSM.

Tables 3.1 and 3.2 (Schedules 7.1 and 7.2) provide information on the resources and reserve margins during the next ten years for the City's system. The City has specified its planned capacity changes on Table 3.3 (Schedule 8). These capacity resources have been incorporated into the City's dispatch simulation model in order to provide information related to fuel consumption and energy mix (see Tables 2.18, 2.19 and 2.20). Figure C compares seasonal net peak load and the system reserve margin based on summer peak load requirements. Table 3.4 provides the City's generation expansion plan for the period from 2017 through 2026.


System Peak Demands
(Including DSM Impacts)
Summer
Winter
MW
800
700
600
500
400
300
200
100
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
Year


Summer Reserve Margin (RM)
RM w/ DSM
RM w/o DSM
17% RM Criterion
Percent Reserve
50
45
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
Year

City Of Tallahassee

Schedule 7.1
Forecast of Capacity, Demand, and Scheduled Maintenance at Time of Summer Peak [1]

(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
2017	710	0	0	0	710	604	106	17	0	106	17
2018	710	0	0	0	710	604	106	18	0	106	18
2019	706	0	0	0	706	603	103	17	0	103	17
2020	706	0	0	0	706	602	104	17	0	104	17
2021	706	0	0	0	706	601	105	17	0	105	17
2022	706	0	0	0	706	602	104	17	0	104	17
2023	706	0	0	0	706	604	102	17	0	102	17
2024	725	0	0	0	725	607	118	19	0	118	19
2025	725	0	0	0	725	611	115	19	0	115	19
2026	725	0	0	0	725	613	112	18	0	112	18

[1] All installed and firm import capacity changes are identified in the proposed generation expansion plan (Table 3.4).

City Of Tallahassee

Schedule 7.2
Forecast of Capacity, Demand, and Scheduled Maintenance at Time of Winter Peak [1]

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Installed Capacity	Firm Capacity Import	Firm Capacity Export		Total Capacity Available	System Firm Winter Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance	
Year	(MW)	(MW)	(MW)	QF (MW)	(MW)	(MW)	(MW)	% of Peak	(MW)	(MW)	% of Peak
2017/18	782	0	0	0	782	553	229	41	0	229	41
2018/19	776	0	0	0	776	559	217	39	0	217	39
2019/20	776	0	0	0	776	563	213	38	0	213	38
2020/21	776	0	0	0	776	567	210	37	0	210	37
2021/22	776	0	0	0	776	570	207	36	0	207	36
2022/23	776	0	0	0	776	573	203	35	0	203	35
2023/24	776	0	0	0	776	576	200	35	0	200	35
2024/25	795	0	0	0	795	579	215	37	0	215	37
2025/26	795	0	0	0	795	582	213	37	0	213	37
2026/27	795	0	0	0	795	584	211	36	0	211	36

[1] All installed and firm import capacity changes are identified in the proposed generation expansion plan (Table 3.4).

City Of Tallahassee

Schedule 8
Planned and Prospective Generating Facility Additions and Changes

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
								Const.	Commercial	Expected	Gen. Max.	Net Capability		
	Unit		Unit	Fuel		Fuel Transportation		Start	In-Service	Retirement	Nameplate	Summer	Winter	
Plant Name	No.	Location	Type	Pri	Alt	Pri	Alt	Mo/Yr	Mo/Yr	Mo/Yr	(kW)	(MW)	(MW)	Status
Hopkins	CT-1	Leon	GT	NG	DFO	PL	TK	NA	2/70	4/17	16,320	-12	-14	RT
Hopkins	CT-2	Leon	GT	NG	DFO	PL	TK	NA	9/72	4/17	27,000	-24	-26	RT
Purdom	CT-1	Wakulla	GT	NG	DFO	PL	TK	NA	12/63	10/18	15,000	-10	-10	RT
Purdom	CT-2	Wakulla	GT	NG	DFO	PL	TK	NA	5/64	10/18	15,000	-10	-10	RT
Hopkins	1	Leon	ST	NG	NA	PL	NA	NA	5/71	10/18	75,000	-76	-78	RT
Sub 12 DG	IC 1-2 [1]	Leon	IC	NG	NA	PL	NA	5/17	7/18	NA	9,341 [2]	18	18	P
Hopkins	IC 1-4 [1]	Leon	IC	NG	NA	PL	NA	7/17	10/18	NA	18,759 [2]	74	74	P
Hopkins	IC 5 [1]	Leon	IC	NG	NA	PL	NA	6/24	6/24	NA	18,759	18	18	P

Acronyms

GT	Gas Turbine	Pri	Primary Fuel	kW	Kilowatts
ST	Steam Turbine	Alt	Alternate Fuel	MW	Megawatts
IC	Internal Combustion	NG	Natural Gas	RT	Existing generator scheduled for retirement.
		DFO	Diesel Fuel Oil	P	Planned for installation but not utility authorized. Not under construction.
		RFO	Residual Fuel Oil		
		PL	Pipeline		
		TK	Truck		

[1] For the purposes of this report, the City has identified the addition of two (2) 9.2 MW reciprocating internal combustion engine (RICE) generating units to be located at its existing Substation 12, and five (5) 18.4 MW RICE units at its existing Hopkins Plant site. TAL has commenced engineering work associated with the 2018 resource additions. The number, timing, site, type and size of the 2024 resource addition may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different locations or a peak season purchase.

City Of Tallahassee

Generation Expansion Plan

	Load Forecast & Adjustments									
Year	Forecast Peak Demand (MW)	DSM [1] (MW)	Net Peak Demand (MW)	Existing Capacity Net (MW)		Firm Imports (MW)	Firm Exports (MW)	Resource Additions (Cumulative) (MW) [4]	Total Capacity (MW)	Res %
2017	609	4	604	710	[2]	0	0		710	17
2018	619	14	604	710	[3]	0	0	92	802	33
2019	627	24	603	614		0	0	92	706	17
2020	634	32	602	614		0	0	92	706	17
2021	640	39	601	614		0	0	92	706	17
2022	647	44	602	614		0	0	92	706	17
2023	653	48	604	614		0	0	92	706	17
2024	658	51	607	614		0	0	111	725	19
2025	664	53	611	614		0	0	111	725	19
2026	669	56	613	614		0	0	111	725	18

Notes

[1] Demand Side Management includes energy efficiency and demand response/control measures.

[2] Hopkins CTs 1 and 2 official retirement currently scheduled for April 2017.

[3] Hophins ST 1, Purdom CTs 1 and 2 official retirement currently scheduled for October 2018.

[4] For the purposes of this report, the City has identified the addition of two (2) 9.2 MW reciprocating internal combustion engine (RICE) generating units to be located at its existing Substation 12, and five (5) 18.4 MW RICE units at its existing Hopkins Plant site. TAL has commenced engineering work associated with the 2018 resource additions. The number, timing, site, type and size of the 2024 resource addition may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different locations or a peak season purchase.

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Chapter IV

Proposed Plant Sites and Transmission Lines

4.1 PROPOSED PLANT SITE

As discussed in Chapter 3 the City currently expects that additional power supply resources will be required in the reporting period to meet future system needs (see Table 4.1). The City Commission has approved the addition of two (2) 9.2 MW natural gas fueled reciprocating internal combustion engines (RICE or IC) at its Substation 12 and four (4) 18.5 MW RICE units its existing Hopkins Plant. It is anticipated that all of these units will be placed into service during 2018.

To augment these approved additions more generating capacity will be needed by the summer of 2024 to satisfy load and reserve requirements through the 2026 horizon year of this reporting cycle. For the purposes of this report it is assumed that another 18.5 MW RICE generator would be installed at the Hopkins site. The timing, site, type and size of this new power supply resource may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different location or a peak season purchase.

4.2 TRANSMISSION LINE ADDITIONS/UPGRADES

Internal studies of the transmission system have identified a number of system improvements and additions that will be required to reliably serve future load. The majority of these improvements are planned for the City's 115 kV transmission network.

As discussed in Section 3.2, the City has been working with its neighboring utilities, Duke and Southern, to identify improvements to assure the continued reliability and commercial viability of the transmission systems in and around Tallahassee. At a minimum, the City attempts to plan for and maintain sufficient transmission import capability to allow for emergency power purchases in the event of the most severe single contingency, the loss of the system's largest generating unit. The City's internal transmission studies have reflected a gradual deterioration of the system's transmission import (and export) capability into the future. This reduction in capability is driven in part by the lack of investment in facilities in the panhandle region as well as the impact of unscheduled power flow-through on the City's transmission system. The City is committed to continue to work with Duke and Southern as well as existing and prospective regulatory bodies in an effort to pursue improvements to the regional transmission systems that will allow the City to continue to provide reliable and affordable electric service to the citizens of Tallahassee in the future. The City will provide the FPSC with information regarding any such improvements as it becomes available.

Beyond assessing import and export capability, the City also conducts annual studies of its transmission system to identify further improvements and expansions to provide increased reliability and respond more effectively to certain critical contingencies both on the system and in the surrounding grid in the panhandle. These evaluations indicate that additional infrastructure projects are needed to address (i) improvements in capability to deliver power from the Hopkins Plant (on the west side of the City's service territory) to the load center, and (ii) the strengthening of the system on the east side of the City's service territory to improve the voltage profile in that area and enhance response to contingencies.

The City's transmission expansion plan includes a 230 kV loop around the City to be completed by Summer 2018 to address these needs and ensure continued reliable service consistent with current and anticipated FERC and NERC requirements. As the first phase of this transmission project, the City tapped its existing Hopkins-Duke Crawfordville 230 kV transmission line and extended a 230 kV transmission line to the east terminating at the existing Substation BP-5. The City next upgraded its existing 115 kV line from Substation BP-5 to Substation BP-4 to 230 kV and additional 230/115 kV transformation was placed in service at BP-4. The final phase of the project is an upgrade of the existing 115 kV line from Substation BP-4 to Substation BP-7 to 230 kV thereby completing the loop. This work is underway and expected to be completed by Summer 2018. This new 230 kV loop will address a number of potential line overloads for the single contingency loss of other key transmission lines in the City's system. Table 4.2 summarizes the proposed new facilities or improvements from the transmission planning study that are within this Ten Year Site Plan reporting period.

The City's budget planning cycle for FY 2018 is currently ongoing, and any revisions to project budgets in the electric utility will not be finalized until the summer of 2017. Some of the construction of the aforementioned 230 kV transmission projects is currently underway. If these improvements do not remain on schedule the City has prepared operating solutions to mitigate adverse system conditions that might occur as a result of the delay in the in-service date of these improvements.

City Of Tallahassee

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1)	Plant Name and Unit Number:	Substation 12 IC 1-2	[1]
(2)	Capacity		
	a.) Summer:	9.2	
	b.) Winter:	9.2	
(3)	Technology Type:	IC	
(4)	Anticipated Construction Timing		
	a.) Field Construction start - date:	May-17	
	b.) Commercial in-service date:	Jul-18	
(5)	Fuel		
	a.) Primary fuel:	NG	
	b.) Alternate fuel:		
(6)	Air Pollution Control Strategy:	BACT compliant	
(7)	Cooling Status:	Radiators	
(8)	Total Site Area:	Unknown	
(9)	Construction Status:	Not started	
(10)	Certification Status:	Not started	
(11)	Status with Federal Agencies:	Not started	
(12)	Projected Unit Performance Data		
	Planned Outage Factor (POF):	1.38	
	Forced Outage Factor (FOF):	2.18	
	Equivalent Availability Factor (EAF):	93.4	
	Resulting Capacity Factor (%):	1.9	[2]
	Average Net Operating Heat Rate (ANOHR):	8,296	[3]
(13)	Projected Unit Financial Data		
	Book Life (Years)	30	
	Total Installed Cost (In-Service Year $/kW)	1,669	[4]
	Direct Construction Cost ($/kW):	1,629	[5]
	AFUDC Amount ($/kW):	NA	
	Escalation ($/kW):	40	
	Fixed O & M ($kW-Yr):	32.29	[5]
	Variable O & M ($/MWH):	10.12	[5]
	K Factor:	NA	

Notes

[1] The generator "Capacity", "Projected Unit Performance Data" and "Projected Unit Financial Data" reflect those for a single unit. For the purposes of this report, the City has identified the addition of two (2) 9.2 MW reciprocating internal combustion engine (RICE) generating units to be located at its existing Substation 12, and five (5) 18.4 MW RICE units at its existing Hopkins Plant site. TAL has commenced engineering work associated with the 2018 resource additions. The number, timing, site, type and size of the 2024 resource addition may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different locations or a peak season purchase.

[2] Expected 2019 capacity factor for prospective Substation 12 additions.

[3] Expected 2019 net average heat rate for prospective Substation 12 additions.

[4] Estimated 2018 dollars for prospective Substation 12 additions.

[5] Estimated 2016 dollars.

City Of Tallahassee

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1)	Plant Name and Unit Number:	Hopkins IC 1-4	[1]
(2)	Capacity		
	a.) Summer:	18.492	
	b.) Winter:	18.492	
(3)	Technology Type:	IC	
(4)	Anticipated Construction Timing		
	a.) Field Construction start - date:	Jun-16	
	b.) Commercial in-service date:	Jun-18	
(5)	Fuel		
	a.) Primary fuel:	NG	
	b.) Alternate fuel:		
(6)	Air Pollution Control Strategy:	BACT compliant	
(7)	Cooling Status:	Radiators	
(8)	Total Site Area:	Unknown	
(9)	Construction Status:	Not started	
(10)	Certification Status:	Not started	
(11)	Status with Federal Agencies:	Not started	
(12)	Projected Unit Performance Data		
	Planned Outage Factor (POF):	1.38	
	Forced Outage Factor (FOF):	2.18	
	Equivalent Availability Factor (EAF):	93.4	
	Resulting Capacity Factor (%):	11.5	[2]
	Average Net Operating Heat Rate (ANOHR):	8,138	[3]
(13)	Projected Unit Financial Data		
	Book Life (Years)	30	
	Total Installed Cost (In-Service Year $/kW)	1,669	[4]
	Direct Construction Cost ($/kW):	1,629	[5]
	AFUDC Amount ($/kW):	NA	
	Escalation ($/kW):	40	
	Fixed O & M ($kW-Yr):	32.29	[5]
	Variable O & M ($/MWH):	10.12	[5]
	K Factor:	NA	

<u>Notes</u>

[1] The generator "Capacity", "Projected Unit Performance Data" and "Projected Unit Financial Data" reflect those for a single unit. For the purposes of this report, the City has identified the addition of two (2) 9.2 MW reciprocating internal combustion engine (RICE) generating units to be located at its existing Substation 12, and five (5) 18.4 MW RICE units at its existing Hopkins Plant site. TAL has commenced engineering work associated with the 2018 resource additions. The number, timing, site, type and size of the 2024 resource addition may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different locations or a peak season purchase.

[2] Expected 2019 capacity factor for prospective Hopkins IC 1-4 additions.

[3] Expected 2019 net average heat rate for prospective Hopkins IC 1-4 additions.

[4] Estimated 2018 dollars for prospective Hopkins IC 1-4 additions.

[5] Estimated 2017 dollars.

City Of Tallahassee

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1)	Plant Name and Unit Number:	Hopkins IC 5	[1]
(2)	Capacity		
	a.) Summer:	18.492	
	b.) Winter:	18.492	
(3)	Technology Type:	IC	
(4)	Anticipated Construction Timing		
	a.) Field Construction start - date:	Jun-24	
	b.) Commercial in-service date:	Jun-28	
(5)	Fuel		
	a.) Primary fuel:	NG	
	b.) Alternate fuel:		
(6)	Air Pollution Control Strategy:	BACT compliant	
(7)	Cooling Status:	Unknown	
(8)	Total Site Area:	Unknown	
(9)	Construction Status:	Not started	
(10)	Certification Status:	Not started	
(11)	Status with Federal Agencies:	Not started	
(12)	Projected Unit Performance Data		
	Planned Outage Factor (POF):	1.38	
	Forced Outage Factor (FOF):	2.18	
	Equivalent Availability Factor (EAF):	93.4	
	Resulting Capacity Factor (%):	11.4	[2]
	Average Net Operating Heat Rate (ANOHR):	8,139	[3]
(13)	Projected Unit Financial Data		
	Book Life (Years)	30	
	Total Installed Cost (In-Service Year $/kW)	1,936	[4]
	Direct Construction Cost ($/kW):	1,629	[5]
	AFUDC Amount ($/kW):	NA	
	Escalation ($/kW):	307	
	Fixed O & M ($kW-Yr):	32.29	[5]
	Variable O & M ($/MWH):	10.12	[5]
	K Factor:	NA	

Notes

[1] The generator "Capacity", "Projected Unit Performance Data" and "Projected Unit Financial Data" reflect those for a single unit. For the purposes of this report, the City has identified the addition of two (2) 9.2 MW reciprocating internal combustion engine (RICE) generating units to be located at its existing Substation 12, and five (5) 18.4 MW RICE units at its existing Hopkins Plant site. TAL has commenced engineering work associated with the 2018 resource additions. The number, timing, site, type and size of the 2024 resource addition may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different locations or a peak season purchase.

[2] Expected 2025 capacity factor for prospective Hopkins IC 5 addition.

[3] Expected 2025 net average heat rate for prospective Hopkins IC 5 addition.

[4] Estimated 2024 dollars for prospective Hopkins IC 5 addition.

[5] Estimated 2017 dollars.

Figure D-1 – Hopkins Plant Site

Figure D-2 – Purdom Plant Site

City Of Tallahassee

Planned Transmission Projects, 2017-2026

		From Bus		To Bus		Expected In-Service	Voltage	Line Length
Project Type	Project Name	Name	Number	Name	Number	Date	(kV)	(miles)
New Lines	Line 55	Sub 14	7514	Sub 7	7507	12/1/18	115	6.0
Reconductor	Line 17 [1]	Sub 4	7604	Sub 7	7607	6/1/18	230	4.0
Substations	Sub 22 (Bus 7522)	NA	NA	NA	NA	7/31/19	115	NA

[1] The final phase of the 230 kV loop project. Current 115 kV line 17 will be operated at 230 kV after the respective in-service date.

City Of Tallahassee

Schedule 10
Status Report and Specifications of Proposed Directly Associated Transmission Lines

(1)	Point of Origin and Termination:	Substation 4 - Substation 7 [1]
(2)	Number of Lines:	1
(3)	Right-of -Way:	TAL Owned
(4)	Line Length:	4.0 miles
(5)	Voltage:	230 kV
(6)	Anticipated Capital Timing:	See note [2]; target in service 6/1/2018
(7)	Anticipated Capital Investment:	See note [2]
(8)	Substations:	See note [3]
(9)	Participation with Other Utilities:	None

Notes

[1] Rebuilding/reconductoring existing Line 17 and changing operating voltage from 115 kV to 230 kV.

[2] Anticipated capital investment associated with rebuilding/reconductoring associated existing transmission and substation facilities has not been segregated from that related to other improvements being made to these facilities for purposes other than that of establishing this 230 kV transmission line.

[3] North terminus will be existing Substation 7; south terminus will be existing Substation 4.

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