March 25, 2020

Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850
Attn: Adam Teitzman

Re: 2020 Ten Year Site Plan

Dear Mr. Teitzman,

Pursuant to Section 186.801, Florida Statutes and Rules 25-22.070-072 of Florida Administrative Code, Lakeland Electric submitted its 2020 Ten Year Site Plan via the Commissions electronic platform.

If it is acceptable to you, we will submit the hard copies at a later time when coronavirus transmission concerns subside.

If you have questions please contact me at 863-834-6595.

Sincerely,

Cynthia Clemmons
City of Lakeland
Manager of Legislative and Regulatory Relations
Lakeland Electric
863-834-6595 Work
Cindy.Clemmons@LakelandElectric.com
501 E Lemon St.
Lakeland, Florida 33801

Enclosure

Intentionally Blank

Lakeland Electric
Ten-Year Site Plan 2020-2029

April 2020

Submitted to:
Florida Public Service Commission

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

1.0 Introduction [SECTION 1]

This report contains the 2020 Lakeland Electric Ten-Year Site Plan (TYSP) pursuant to Florida Statutes and as adopted by Order No. PSC-97-1373-FOF-EU on October 30, 1997. The Lakeland TYSP reports the status of the utility's existing resources and identifies one new resource to be added and one existing resource to be retired after December 31, 2019 . TYSPs are non-binding in Florida, but they do provide state, regional, and local agencies a notice of proposed plants and transmission facilities in near future.

The TYSP 2020 is divided into the following eight sections:

- Section 1: Introduction
- Section 2: General Description of Utility
- Section 3: Forecast of Electric Demand and Energy
- Section 4: Energy Conservation & Management Programs
- Section 5: Forecasting Methods and Procedures
- Section 6: Forecast of New Capacity Requirements
- Section 7: Environmental and Land Use Information
- Section 8 Ten-Year Site Plan Schedules

The contents of each section are summarized briefly in the remainder of this Introduction.

1.1 General Description of the Utility [SECTION 2]

Section 2 of the TYSP discusses a historical overview of Lakeland Electric's system and a description of the existing power generating and transmission system. This section includes tables which show the source of the utility's current 890 MW of net winter generating capacity and 844 MW of net summer generating capacity (as of the end of calendar year 2019).

1.2 Forecast of Electric Demand and Energy [SECTION 3]

Section 3 of the TYSP provides a summary of Lakeland's load and energy forecast process. The forecasts included in this section are on population, customer classes, energy sales, net energy requirement, and system peak demand in an hourly basis in its service territory. In addition, sensitivity cases are developed for customers, energy sales and system net energy for peak load.

1.3 Energy Conservation & Management Programs [SECTION 4]

Section 4 provides the description of the existing energy conservation & management programs as adopted by Lakeland Electric. Additional details regarding Lakeland Electric's energy conservation & management programs are on file with the Florida Public Service Commission (FPSC).

Lakeland Electric's existing energy conservation & management programs include the following programs which promote cost-effective measures for both electric demand and energy savings, especially during peak hours:

- Residential Programs:
  - Insulation rebate
  - Energy Savings Kits
  - HVAC Maintenance Incentive
  - Heat Pump Rebates
  - LED Lighting
  - On-Line Energy Audit
  - Energy Star Appliance Rebate

- Commercial Programs:
  - Conservation Rebate
  - Commercial Lighting Rebate

Section 4 also contains discussions on Lakeland Electric's solar programs. While these types of programs are not traditionally thought of as DSM, they have the same effect of conserving energy normally generated by fossil fuels as DSM programs do by virtue of their avoidance of fossil fuels through the use of renewable energy. Lakeland Electric has the capability to generate more than 14 MW of power from solar, sufficient to supply power for more than 7000 households during a sunny day in the summer. Lakeland Electric is determined to continuously increase the solar power for its customers with additional solar farms and customer's roof top program.

1.4 Forecasting Methods and Procedures [SECTION 5]

Forecasting long-term electric load and energy is the first step in planning future generation. Based on future energy requirements, Lakeland Electric coordinates and manages its existing resources to meet the future energy requirements at the lowest cost possible for its customers.

Section 5 summarizes the Integrated Resource Planning process utilized by Lakeland Electric and explains Lakeland Electric's participation in the Florida Municipal Power Pool (FMPP).

While Section 3 discusses the forecast methods used for the TYSP, Section 5 outlines the economic and fuel assumptions applied to planning capacity and energy resources.

1.5 Forecast of New Capacity Requirements [SECTION 6]

Section 6 describes the process Lakeland Electric uses to assess the need for additional capacity to serve Lakeland Electric's customers. This section concludes by stating that Lakeland Electric's Reserve Margins are greater than 20% during the current ten-year planning period and complies with the Florida Reliability Coordinating Council's (FRCC) minimum reserve margin criteria for the FRCC Region.

1.6 Environmental and Land Use Information [SECTION 7]

Section 7 addresses environmental and land use issues related to Lakeland Electric's planned new 135 MW gas turbine in 2020 at Lakeland Electric's McIntosh Power Plant (see Table 7-1). This section also provides Table 7-2 which summarizes different control strategies adopted to comply with various environmental emissions for existing major generating units.

1.7 Ten-Year Site Plan Schedules [SECTION 8]

Section 8 presents the schedules required by the Florida Public Service Commission (FPSC) for the TYSP.

Tables 8-1 and 8-1a summarize the detailed information on existing generating units owned by Lakeland Electric. Tables 8-2 through 8-5 provide information by customer class. Tables 8-2 through 8-8 provide demand and energy history and forecasts. Table 8-9 provides a history and forecast of fuel requirements by fuel type. Tables 8-10 and 8-11 provide a history and forecast of energy produced by fuel type. Tables 8-12 and 8-13 provide comparisons of Lakeland Electric resources to Lakeland Electric demand. These tables demonstrate that Lakeland Electric's Reserve Margin forecast exceeds 20% each year included in this Ten-Year-Site Plan. Tables 8-14 and 8-15 provide information related to Lakeland Electrics planned new gas turbine.

2.0 General Description of the Utility

2.1 City of Lakeland: Historical Background

2.1.1 Generation

The City of Lakeland was incorporated on January 1, 1885, when 27 citizens approved and signed the city charter. Shortly thereafter, the original light plant was built by Lakeland Light and Power Company at the corner of Cedar Street and Massachusetts Avenue. This plant had an original capacity of 50 kW. On May 26, 1891, plant manager Harry Sloan threw the switch to light Lakeland by electricity for the first time with five arc lamps. Incandescent lights were first installed in 1903.

Public power in Lakeland was established in 1904, when foresighted citizens and municipal officials purchased the small private 50 kW electric light plant from owner Bruce Neff for $7,500. The need for an expansion led to the construction of a new power plant on the north side of Lake Mirror in 1916. The initial capacity of the Lake Mirror Power Plant was 500 kW. The plant was expanded three times. The first expansion occurred in 1922 with the addition of 2,500 kW; in 1925, 5,000 kW additional capacity was added, followed by another 5,000 kW in 1938. With the final expansion, the removal of the initial 500 kW unit was required to make room for the addition of the 5,000 kW generating unit, resulting in a total peak plant capacity of 12,500 kW.

As the community continued to grow, the need for a new power plant emerged and the Charles Larsen Memorial Power Plant was constructed on the south-east shore of Lake Parker in 1949. The initial capacity of the Larsen Plant Steam was Unit No. 4 (20,000kW) and it was completed in 1950. The first addition to the Larsen Plant was Steam Unit No. 5 (1956) which had a capacity of 25,000 kW. In 1959, Steam Unit No. 6 was added and increased the plant capacity by another 25,000 kW. Three gas turbines, each with a nominal rating of 11,250 kW, were installed as peaking units in 1962. In 1966, a third steam unit capacity addition was made to the Larsen Plant. This was Steam Unit No.7 having a nominal 44,000 kW capacity and an estimated cost of $9.6 million. This brought the total Larsen Plant nameplate capacity up to a nominal 147,750 kW.

In the meantime, the Lake Mirror Plant, with its old and obsolete equipment, became relatively inefficient and hence was no longer in active use. It was kept in cold standby and then retired in 1971.

As the city continued to grow during the late 1960's, the demand for power and energy grew at a rapid rate, making evident the need for a new power plant site. A site was purchased on the north side of Lake Parker and construction commenced during 1970. Initially, two diesel units with a peaking capacity of a nominal rating 2,500 kW each were placed into commercial operation in 1970.

Steam Unit No. 1, with a nominal rating of 90 MW, was put into commercial operation in February 1971, for a total cost of $15.22 million. In June of 1976, Steam Unit No. 2 was placed into commercial operation, with a nominal rated capacity of 115 MW and at a cost of $25.77 million. This addition increased the total capacity of the Lakeland system to approximately 360 MW. At this time, the new plant site on the on the north shore of Lake Parker was renamed the C. D. McIntosh, Jr. Power Plant in recognition of the former Electric and Water Department Director.

On January 2, 1979, construction was started on McIntosh Unit No. 3, a nominal 334 MW coal fired steam generating unit which became commercial on September 1, 1982. The unit was designed to use low sulfur oil as an alternate fuel, but this feature was later decommissioned. McIntosh Unit No. 3 was later modified so that its nominal gross output was increased to 365 MW. The unit uses a minimal amount of natural gas for flame stabilization during startups. The plant utilizes sewage effluent for cooling tower makeup water. This unit is jointly owned with the Orlando Utilities Commission (OUC) which has a 40 percent undivided interest in the unit.

Larsen Unit No. 8, a natural gas fired combined cycle unit. Larsen Unit No. 8 has a nameplate generating capability of 114 MW. Larsen Unit No. 8 began its simple cycle operation in July 1992, and combined cycle operation in November of that year.

In 1994, Lakeland made the decision to retire the first unit at the Larsen Plant, Steam Unit No. 4. This unit, put in service in 1950 with a capacity of 20 MW, had reached the end of its economic life. In March of 1997, Lakeland retired Larsen Unit No. 6, a 25 MW oil fired unit that was also nearing the end of its economic life. In October of 2004, Lakeland retired Larsen Unit 7, a 50 MW oil fired steam unit.

In 1999, the construction of McIntosh Unit No. 5, a simple cycle, natural gas fired combustion turbine was completed, having a summer nominal capacity of 225MW. The unit was released for commercial operation in May 2001. Beginning in September 2001, the unit underwent conversion to a combined cycle unit through the addition of a nominal 120 MW steam turbine generator. Construction was completed in spring 2002 with the unit being declared commercial in May 2002. The resulting combined cycle gross capacity of the unit is 345 MW summer and 360 MW winter.

During the summer of 2001, Lakeland took its first step into the world of distributed generation with the groundbreaking of its Winston Peaking Station. The Winston Peaking Station consists of 20 quick start reciprocating engines each driving a 2.5 MW electric generator. This provides Lakeland with 50 MW of peaking capacity that can be started and put on line at full load in ten minutes. The Station was declared commercial in late December 2002.

In 2009, Lakeland Electric installed selective catalytic reduction (SCR) on the McIntosh Unit 3 for NO_x control to provide full flexibility in implementing the Federal Cap and Trade program for nitrogen oxides (NOx) required under the Clean Air Interstate Rule (CAIR).

Steam Unit No. 1 at the McIntosh Plant was retired from service on December 31, 2015. This unit had a nominal rating of 90 MW and had been in service since 1971.

2.1.2 Transmission

The first phase of the Lakeland 69 kV transmission system was placed in operation in 1961 with a step-down transformer at the Lake Mirror Plant to feed the 4 kV bus, nine 4 kV feeders, and a new substation in the southwest section of the town with two step-down transformers feeding four 12 kV feeders.

In 1966, a 69 kV line was completed from the North west substation to the Southwest substation, completing the loop around the town. At the same time, the old tie to Bartow was reinsulated for a 69 kV line and went into operation, feeding a new step-down substation in Highland City with four 12 kV feeders. In addition, a 69 kV line was completed from Larsen Plant around the South east section of the town to the Southwest substation. By 1972, 20 sections of 69 kV lines, feeding a total of nine step-down substations, with a total of 41 distribution feeders, were completed and placed in service. By the fall of 1996, all of the original 4 kV equipment and feeders had been replaced and/or upgraded to 12 kV service. By 1998, 29 sections of 69 kV lines were in service feeding 20 distribution substations.

As the Lakeland system continued to grow, the need for additional and larger transmission facilities grew as well. In 1981, Lakeland's first 230 kV facilities went into service to accommodate Lakeland's McIntosh Unit No. 3 and to tie Lakeland into the State transmission grid at the 230 kV level. A 230 kV line was built from McIntosh Plant to Lakeland's West substation. A 230/69 kV autotransformer was installed at each of those substations to tie the 69 kV and 230 kV transmission systems together. In 1988, a second 230 kV line was constructed from the McIntosh Plant to Lakeland's Eaton Park substation along with a 230/69 kV autotransformer at Eaton Park. That line was the next phase of the long-range goal to electrically circle the Lakeland service territory with 230 kV transmission to serve as the primary backbone of the system.

In 1999, Lakeland added a generation unit at its McIntosh Power Plant that resulted in a new 230/69/12kV substation being built and energized in March of that year. The Tenoroc substation replaced the switching station called North McIntosh. In addition to Tenoroc, another new 230/69/12kV substation was built. The substation, Interstate, went into operation in June of 1999 and is connected by what was the McIntosh West 230 kV line. This station was built to address concerns on load growth in the areas adjacent to the I-4 corridor which were causing problems at both the 69kV and distribution levels in this area.

In 2001, Lakeland began its next phase of its 230kV transmission system with the construction of the Crews Lake 230/69kV substation. The substation was completed and placed in service in 2001. This project includes two 230kV ties and one 69kV tie with Tampa Electric Company (TECO), a 150MVA 230/69kV autotransformer and a 230kV line from Lakeland's Eaton Park 230kV substation to the Crews Lake substation.

Early transmission interconnections with other systems included a 69 kV tie at Larsen Plant with TECO, was established in mid-1960s. A second tie with TECO was later established at Lakeland's Highland City substation. A 115 kV tie was established in the 1970s with Progress Energy of Florida (PEF), now Duke Energy Florida (DEF) and Lakeland's West substation and was subsequently upgraded and replaced with the current two 230 kV lines to PEF in 1981. At the same time, Lakeland was interconnected with OUC at Lakeland's McIntosh Power Plant. In August 1987, the 69 kV TECO tie at Larsen Power Plant was taken out of service and a new

69 kV TECO tie was put in service connecting Lakeland's Orangedale substation to TECO's Polk City substation. In mid-1994, a new 69 kV line was energized connecting Larsen Plant to the Ridge Generating Station (Ridge), an independent power producer. Lakeland had a 30-year firm power-wheeling contract with Ridge to wheel up to 40 MW of their power to DEF. In early 1996, a new substation, East, was installed in the Larsen Plant to the Ridge 69 kV transmission line. However, as of January 31, 2019, Ridge Generating Station was permanently shut down. As a result, the 69 kV East to Ridge tie line is no longer in use. Later in 1996, the third tie line to TECO was built from East to TECO's Gapway substation. As mentioned above, in August of 2001, Lakeland completed two 230kV ties and one 69kV tie with TECO at Lakeland's Crews Lake substation. The multiple 230 kV interconnection configuration of Lakeland is also tied into the bulk transmission grid and provides access to the 500 kV transmission network via DEF, providing greater reliability. At present, Lakeland has a total of about 128 miles of 69 kV and 28 miles of 230 kV transmission lines in service along with six 150 MVA 230/69 kV autotransformers.

2.2 General Description: Lakeland Electric

2.2.1 Existing Generating Units

This section provides additional detail on Lakeland Electric's existing generating plants. Lakeland Electric's existing generating units are located at two different plant sites: Charles Larsen Memorial (Larsen) and C.D. McIntosh Jr. (McIntosh). Both plant sites are located at Lake Parker in Polk County, Florida. The two plants have multiple units with different technologies and fuel types. Table 2-1 provides technical and other general characteristics of all Lakeland Electric generating units.

The Larsen site is located on the south east shore of Lake Parker in Lakeland. The site has three units. The total net winter (summer) capacity of the plant is 151 MW (124 MW).

Larsen Units 2 and 3, General Electric combustion turbines, have a combined net winter (summer) rating of 27 MW (19 MW). The units burn natural gas as the primary fuel with diesel as the backup.

Historically, Larsen Unit No. 5 consisted of a boiler for steam generation and steam turbine generator to convert the steam to electrical power. When the boiler began to show signs of degradation beyond economical repair, a gas turbine with a heat recovery steam generator, Larsen Unit No. 8, was added to the facility. This allowed the gas turbine (Larsen Unit No. 8) to generate electricity and the waste heat from the gas turbine to repower the former Larsen Unit No. 5 steam turbine in a combined cycle configuration.

The former Larsen Unit No. 5 steam turbine currently has a net winter (summer) rating of 31 MW (29 MW) and is referred to as Larsen Unit No. 8 Steam Turbine from this point on in this document and in the reporting of this unit. The Larsen Unit No. 8 combustion turbine has a net winter (summer) rating of 93 MW (76 MW).

The McIntosh site is located in the City of Lakeland along the northeastern shore of Lake Parker and encompasses 513 acres. Electricity generated by the McIntosh units is stepped up in voltage by generator step-up transformers to 69 kV and 230 kV for transmission via the power grid. The McIntosh site currently includes six (6) units in commercial operation having a total net winter (summer) rating of 689 MW (670 MW).

McIntosh Gas Turbine 1 consists of a General Electric combustion turbine with a net winter (summer) output rating of 19 MW (16 MW).

McIntosh Unit No. 2 is a natural gas/oil fired Westinghouse steam turbine with a net winter and summer output of 106 MW. McIntosh Unit No. 3 is a net 342 MW pulverized coal fired steam unit owned 60 percent by Lakeland and 40 percent by OUC. Lakeland's share of the unit yields net winter and summer output of 205 MW. Two small internal combustion engines with a net output of 2.5 MW each are also located at the McIntosh site.

McIntosh Unit No. 3 includes a wet flue gas scrubber for SO_2 removal, uses treated sewage water for cooling water, and treats all waste water that it doesn't otherwise reuse before it leaves the plant site.

McIntosh Unit No. 5, a Siemens 501G combined cycle unit, was initially built and operated as a simple cycle combustion turbine that was placed into commercial operation in May 2001. The unit was taken off line for conversion to combined cycle starting in mid-September 2001 and was returned to commercial service in May 2002 as a combined cycle unit with a net winter (summer) rating of 354 MW (338 MW). The unit is equipped with Selective Catalytic Reduction (SCR) for NO_x control.

Lakeland Electric constructed a 50 MW electric peaking station adjacent to its Winston Substation in 2001. The purpose of the peaking plant is to provide additional quick start generation capability for Lakeland's system during times of peak loads.

The Winston station consists of twenty (20) cylinder reciprocating engines driving 2.5 MW of generation each. Altogether, 20 diesel engines provide 50 MW of installed Capacity. The units are currently fueled by #2 fuel oil but have the capability to burn a mix of 5% #2 oil and 95% natural gas. Lakeland Electric currently does not have natural gas service to the site.

The plant has remote start/run capability for extreme emergencies at times when the plant is unmanned. The station does not use open cooling towers. This results in minimal water or wastewater requirements.

The engines are equipped with hospital grade noise suppression equipment on the exhausts. Emission control is achieved by Selective Catalytic Reduction (SCR) using 19% aqueous ammonia. The SCR system will allow the plant to operate within the Minor New Source levels permitted by the Florida Department of Environmental Protection (DEP).

Winston Peaking Station (WPS) was constructed adjacent to Lakeland's Winston Distribution Load Substation. Power generated at WPS goes directly into Winston Substation at 12.47kV distribution level of the substation and has sufficient capacity to serve the substation loads. Winston Substation serves several of Lakeland Electric's largest and most critical accounts. Should the Winston Substation lose all three 69kV circuits to the substation, the WPS can be on line and serving load within ten minutes. In addition to increasing the substation's reliability, this arrangement allows Lakeland to delay the installation of a third 69kV to 12.47kV transformer by several years and also contributes to lowering loads on Lakeland's transmission system.

2.2.2 Capacity and Power Sales Contracts

Lakeland Electric currently has no long-term firm power sales contract in place as of December 31, 2019.

Lakeland Electric shares ownership of the C. D. McIntosh Unit 3 with OUC. The ownership breakdown is a 60 percent share for Lakeland Electric and a 40 percent share for OUC. The energy and capacity delivered to OUC from McIntosh Unit No. 3 is not considered a power sales contract because of OUC's ownership share.

2.2.3 Capacity and Power Purchase Contracts

Lakeland Electric currently has no long-term firm power purchase contracts in place as of December 31, 2019. However, Lakeland Electric makes capacity and energy contracts with neighboring utilities and other pool members on an as needed basis when its major units are on planned/forced outages.

2.2.4 Planned Unit Retirements

Lakeland plans to retire McIntosh Unit # 2, after McIntosh Unit GT2 becomes commercial. As of 12-31-2019, Lakeland Electric plans for McIntosh Unit GT2 to become commercial in April 2020.

2.2.5 Load and Electrical Characteristics

Lakeland Electric's electrical load variation has many similarities with those of other peninsular Florida utilities. Winter peaks typically occur between January and March. Lakeland Electric's actual total peak demand (Net Integrated) in the winter of 2018/2019 was 545 MW which occurred on January 29 , 2019. Summer peaks have typically occurred between June and August. In 2019, a summer peak of 667 MWs occurred on June 25. Load factor of Lakeland Electric in 2019 was about 55% - which is typical for electric utilities in Florida. Lakeland Electric's historical and projected summer and winter peak demands are presented in Tables 8.5 and 8.6.

Lakeland Electric is a member of the Florida Municipal Power Pool (FMPP), along with Orlando Utilities Commission (OUC) and the Florida Municipal Power Agency's (FMPA) All-Requirements Power Supply Project. The FMPP operates as an energy pool, where all units are economically dispatched together, whereas capacity and reserves are the responsibility of each utility member. Each member of the FMPP retains the responsibility of adequately planning its own system capacity to meet its native load obligation and reserve requirements.

2.3 Service Area

Lakeland Electric's electric service area is shown on Figure 2-1 and is entirely located in Polk County. Lakeland Electric serves approximately 246 square miles, with approximately 174 square miles outside of Lakeland's city limits.

Table 2-1
Lakeland Electric Existing Generating Facilities

				Fuel[4]		Fuel Transport[5]						Net Capability[2]	
Plant Name	Unit No.	Location	Unit Type	Pri	Alt	Pri	Alt	Alt Fuel Days Use[1]	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate kW	Summer MW	Winter MW
Charles Larsen Memorial	GT2	16-17/28S/24E	GT	NG	DFO	PL	TK	NR	11/62	Unknown	11,250	10	14
	GT3		GT	NG	DFO	PL	TK	NR	12/62	Unknown	11,250	9	13
	8		CA	WH	---	---			04/56	Unknown	26,000	29	31
	8		CT	NG	DFO	PL	TK	NR	07/92	Unknown	88,000	76	93
Plant Total												124	151

[1]Lakeland does not maintain records of the number of days that alternative fuel was used.

[2]Net Normal.

Source: Lakeland Electric Energy Production

[3]Unit Type
CA Combined Cycle Steam Part
CT Combined Cycle Combustion Turbine
GT Combustion Gas Turbine
ST Steam Turbine

[4]Fuel Type
DFO Distillate Fuel Oil
RFO Residual Fuel Oil
BIT Bituminous Coal
WH Waste Heat
NG Natural Gas

[5]Fuel Transportation Method
PL Pipeline
TK Truck
RR Railroad

Table 2-1a

Lakeland Electric Existing Generating Facilities

Plant Name	Unit No.	Location	Unit Type[3]	Fuel[4] Pri	Fuel[4] Alt	Fuel Transport[5] Pri	Fuel Transport[5] Alt	Alt Fuel Days Use[2]	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate kW	Net Capability Summer MW	Net Capability Winter MW
Winston Peaking Station	1-20	21/28S/23E	IC	DFO	---	TK	---	NR	12/01	Unknown	2,500 each	50	50
Plant Total												50	50
C.D. McIntosh, Jr.	D1	4-5/28S/24E	IC	DFO	---	TK	---	NR	01/70	Unknown	2,500	2.5	2.5
	D2		IC	DFO	---	TK	---	NR	01/70	Unknown	2,500	2.5	2.5
	GT1		GT	NG	DFO	PL	TK	NR	05/73	Unknown	20,000	16	19
	2		ST	NG	RFO	PL	TK	NR	06/76	Unknown	114,700	106	106
	3[1]		ST	BIT	---	RR	TK	NR	09/82	Unknown	219,000	205	205
	5		CT	NG	---	PL	---	NR	05/01	Unknown	245,000	213	233
	5		CA	WH	---	---	---	NR	05/02	Unknown	120,000	125	121
Plant Total												670	689
System Total												**844**	**890**

[1]Lakeland's 60 percent portion of joint ownership with Orlando Utilities Commission.

[2]Lakeland does not maintain records of the number of days that alternate fuel is used.

[3]**Unit Type**	[4]**Fuel Type**	[5]**Fuel Transportation Method**
CA Combined Cycle Steam Part	DFO Distillate Fuel Oil	PL Pipeline
CT Combined Cycle Combustion Turbine	RFO Residual Fuel Oil	TK Truck
GT Combustion Gas Turbine	BIT Bituminous Coal	RR Railroad
ST Steam Turbine	WH Waste Heat	
	NG Natural Gas	

Figure 2-1

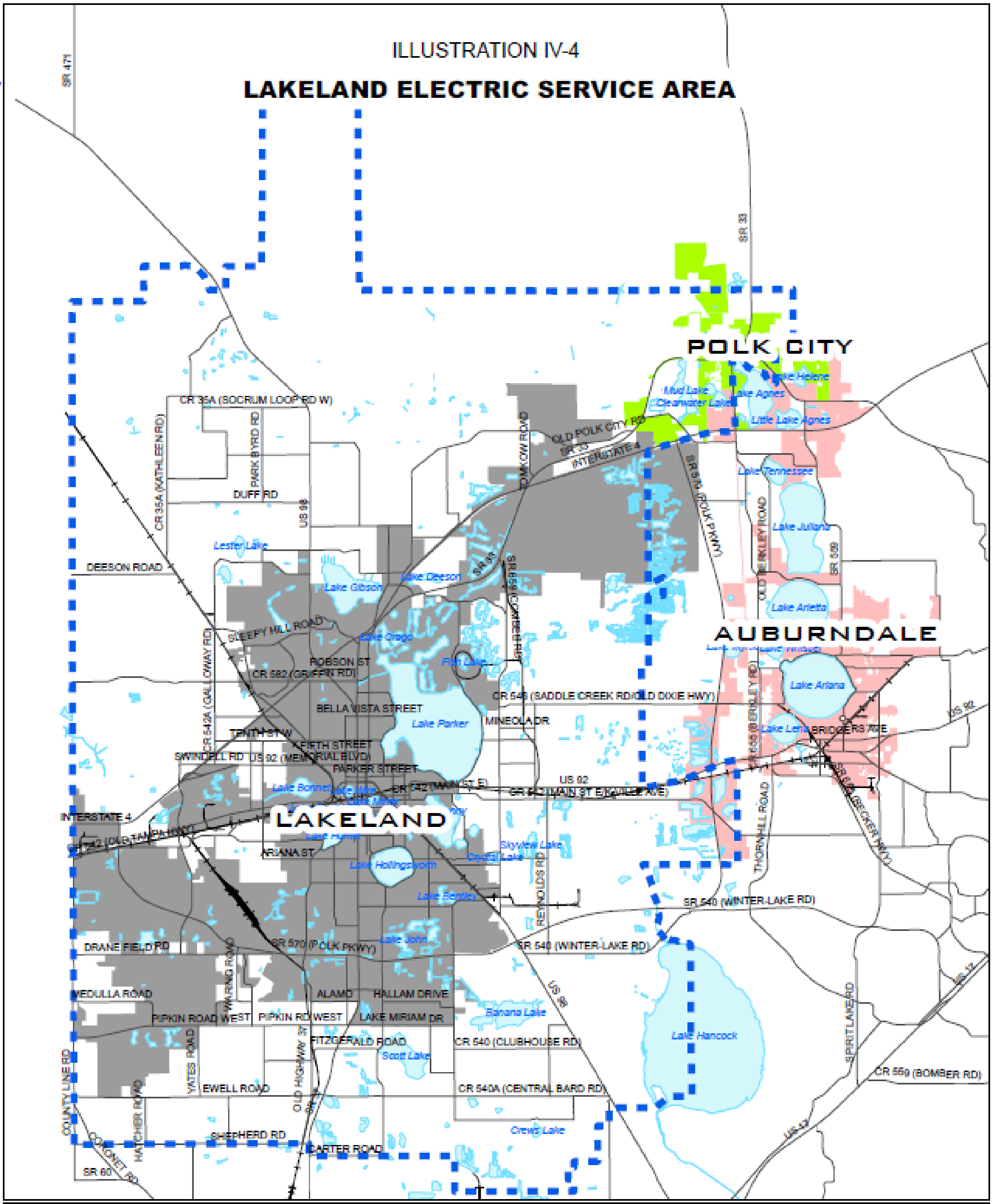


ILLUSTRATION IV-4

LAKELAND ELECTRIC SERVICE AREA

Source: Lakeland Electric, 2010

Electric Service Area

City of Lakeland Community Development

k:\cd\maps\esri\comp_plan\infrastructure\Electric SA.mxd

3.0 Forecast of Electric Demand and Energy

Annually, Lakeland Electric (LE) develops a detailed short-term (1 year) electric load and energy forecast for budget purposes and short-term operational studies. An annual long-term forecast is developed for the Utility's long-term planning studies (i.e., TYSP).

Sales and customer forecasts of monthly data are prepared by rate classification. Separate forecast models are developed for inside and outside the City of Lakeland corporate limits for the Residential, Commercial, Industrial and Other (municipal departments and outdoor lighting) rate classifications. Monthly forecasts are summarized annually using fiscal period ending September 30th for the short term budget forecast and by calendar year for long-term studies and reporting.

Lakeland Electric uses MetrixND, an advanced statistical forecasting software tool, developed by Itron, to assist with the development of LE's number of customers, energy and demand forecasts. Lakeland Electric uses MetrixLT, another Itron software tool, which integrates with MetrixND to develop the long-term system hourly load forecast.

The modeling techniques used to generate the forecasts include multiple regression, study of historical relationships and growth rates, trend analysis, and exponential smoothing. Lakeland Electric utilizes Itron's Statistically Adjusted End-Use (SAE) econometric modeling approach for the residential and commercial sectors. The SAE approach is designed to capture the impact of changing end-use saturation and efficiency trends, by building type, as well as economic conditions on long-term residential and commercial energy sales and demand.

Many variables are evaluated for the development of the forecasts. The variables that have proven to be significant and are included in the forecasts are weather, gross regional product, disposable personal income per household, persons per household, number of households, local population, electricity price, building type, appliance saturation and efficiency. Binary variables are used to explain outliers in historical billing discrepancies, trend shifts, monthly seasonality, rate migration between classes and other issues that could affect the accuracy of forecast models.

Weather variables

Heating and cooling degree days are weather variables that attempt to explain a customer's usage behavior as influenced by either hot or cold weather. Heating Degree Days (HDD) occur when the average daily temperature is less than Lakeland Electric's established base temperature of 65 degrees Fahrenheit. Cooling Degree Days (CDD) occur when the average daily temperature is greater than 65 degrees. The formulas used to determine the number of degree days are:

HDD = Base Temperature (65) – Average Daily Temperature

CDD = Average Daily Temperature – Base Temperature (65)

These HDD and CDD variables are used in the forecasting process to correlate electric consumption with weather. The HDD and CDD variables are weighted to capture the impacts of weather on revenue from monthly billed consumption.

Lakeland Electric uses weather data from its own weather stations, which are strategically placed throughout the electric service territory to provide the best estimate of overall temperature for the Lakeland Electric service area.

The most recent 20 years of historical normal weather is used as an input into the sales forecast models.

Normal peak-producing weather is also developed using historical 20 year weather. A weighted average of temperatures on both the day of historical monthly peak and day prior to peak is used to create the HDD and CDD variables.

Economic and demographic variables

The economic and demographic projections used in the forecasts are purchased from Moody's Analytics.

Price variables

A real price forecast by month and rate class is created based on Lakeland Electric historical price data, projections from the Lakeland Electric Rates and Fuel teams, the U.S. Energy Information Administration (EIA) Annual Energy Outlook (AEO) forecasted price of electricity, historical and projected Net Energy for Load, and the projected Consumer Price Index. The 12 month moving average of projected real price of electricity is the price variable used in the sales and demand SAE models.

Structural Indices

The end-use saturation and efficiency indices used in the models are purchased from Itron. Itron's Energy Forecasting Group (EFG) offers end-use data services and forecasting support. EFG's projections are based on data derived from the EIA's AEO forecast for the South Atlantic Census Division. Itron is also contracted to further calibrate the indices based on Lakeland Electric's service area using average square feet by building type for the Commercial Sector and average use by dwelling type for the Residential Sector.

Lakeland Electric reviews the forecasts for reasonableness, compares projections to historical patterns, and modifies the results as needed using informed judgment.

Historical monthly data is available and is analyzed for the 20 year period. Careful evaluation of the data and model statistics is performed; this often results in most models being developed using less than a 10 year estimation period.

Lakeland Electric currently does not have any specific energy savings goals through Demand Side Management (DSM) programs, therefore, Lakeland Electric does not assume any deductions in peak load for the forecast period.

3.1 Service Territory Population Forecast

Electric Service Territory Population Estimate

Lakeland Electric's service area encompasses approximately 246 square miles, approximately 174 square miles of which are outside the City of Lakeland's corporate limits. The estimated electric service territory population for Lakeland Electric in 2019 was 292,465 persons.

Population Forecast

Lakeland Electric's service territory population is projected to increase at an estimated 1.27% average annual growth rate (AAGR) for years 2020 – 2029.

Polk County's population (Lakeland / Winter Haven MSA) is expected to grow at 1.53% AAGR for the same 10 year period. Historically, Polk County's population has grown faster than LE's service territory population.

3.2 Accounts Forecast

Lakeland Electric forecasts the number of monthly electric accounts for the following categories and subcategories:

- Residential, Inside and Outside City Limits
- Commercial, Inside and Outside City Limits
- Industrial, Inside and Outside City Limits
- Other, Inside and Outside City Limits

3.2.1 Residential Accounts

A regression model is used to develop the Residential account forecast using monthly customer data. Total Residential accounts are projected as a function of number of households in the Lakeland / Winter Haven Metropolitan Statistical Area (MSA). Binary variables are used to explain outliers in historical billing data and to account for seasonality.

3.2.2 Commercial Accounts

Commercial accounts consist of the General Service (GS), General Service Business Demand (GSBD) and General Service Demand (GSD) rate classes.

Due in large part to energy efficiency, Lakeland Electric is experiencing a long-term trend of General Service Large Demand (GSLD) customers migrating to Commercial rate classes. For this reason, a regression model combining both Commercial and GSLD rate classes is being used. The number of Commercial and GSLD accounts is projected as a function of the moving average of projected residential accounts.

A ratio of the Commercial and GSLD rate classes is then applied to generate the Commercial and GSLD account forecasts.

3.2.3 Industrial Accounts

Industrial accounts consist of General Service Large Demand (GSLD), Interruptible (INT) and Extra Large Demand Customer (ELDC) rate classes.

The GSLD rate class consists of customers with a billing demand greater than 500 Kw, at least three times, over the past 12 months. As noted in section 3.2.2, the GSLD account forecast is a ratio of the combined Commercial and GSLD account forecast.

The INT rate class consists of customers with a billing demand greater than 1000 kW, at least three times, over the past 12 months.

The ELDC rate class consists of customers with a billing demand greater than 5000 kW at least three times over the past 12 months.

Projections for INT and ELDC accounts are modeled independently of MetrixND. Special consideration is given to account for new major commercial and industrial development projects that may impact future demand and energy requirements.

3.2.4 Other Accounts

The Other account category consists of Municipal, Electric and Water Department accounts within the City of Lakeland, as well as private area lighting and roadway lighting.

Historical data for these classes is inconsistent and difficult to model. Therefore, account projections for this category are based on time trends and historical growth rates. Lakeland Electric also takes into consideration any future projects and potential developments. These forecasts are developed outside of MetrixND.

3.2.5 Total Accounts Forecast

The Total Account Forecast for Lakeland Electric is the sum of all the individual forecasts mentioned above.

3.3 Energy Sales Forecast

Lakeland Electric’s Energy Sales Forecast is the sum of the following forecasts:

- Residential, Inside and Outside City Limits
- Commercial, Inside and Outside City Limits
- Industrial, Inside and Outside City Limits
- Other, Inside and Outside City Limits

3.3.1 Residential Energy Sales Forecast

The Residential energy sales forecast is developed using the Statistically Adjusted End-Use (SAE) econometric modeling approach.

The residential sales models are estimated with historical monthly energy sales data. They are average use models based on the following equation:

$$AvgUse_{y,m} = b_0 + b_1\,XCool_{y,m} + b_2\,XHeat_{y,m} + b_3\,XOther_{y,m} + \varepsilon_{y,m}$$

Where $XCool_{y,m}$, $XHeat_{y,m}$ and $XOther_{y,m}$ are explanatory variables constructed from weather data, end use equipment efficiency and saturation trends, economic and demographic data, dwelling type (single family, multi family or mobile home) and square footage.

For example, *XCool* incorporates cooling equipment saturation levels, cooling equipment efficiency, thermal efficiency, thermal integrity and square footage by dwelling type, household income, persons per household, price of electricity and CDDs.

This cooling variable is represented by the product of an end use equipment index and a monthly usage multiplier.

That is,

$$XCool_{y,m} = CoolIndex_y \times CoolUse_{y,m}$$

Where

$XCool_{y,m}$ is the estimated cooling energy use in year (y) and month (m)

$CoolIndex_y$ is the annual index of cooling equipment

$CoolUse_{y,m}$ is the monthly usage multiplier

The $CoolIndex_{y,m}$ is calculated as follows:

$$CoolIndex_y = Structural\ Index_y \times \sum_{Type} Weight^{Type} \times \frac{\left(Saturation_y^{Type} \big/ Efficiency_y^{Type} \right)}{\left(Sataturation_Y^{Type} \big/ Efficiency_Y^{Type} \right)}$$

Where

The *StructuralIndex* is constructed by combining the EIA's building shell efficiency index trends with surface area estimates, indexed to the base year value:

$$StructuralIndex_y = \frac{BuildingShellEfficiencyIndex_y \times SurfaceArea_y}{BuildingShellEfficiencyIndex_Y \times SurfaceArea_Y}$$

Type is the cooling equipment type (Room Air Conditioning, Central Air Conditioning, Air Source Heat Pump, Ground Source Heat pump).

Currently, the base year *Y* in the EFG residential end use energy projections is 2009.

$CoolUse_{y,m}$ is defined as follows:

$$CoolUse_{y,m} = \left(\frac{CDD_{\ y,m}}{CDD_{\ Y}}\right) \times \left(\frac{HHSize_{\ y,m}}{HHSize_{\ Y}}\right)^{\alpha} \times \left(\frac{HHIncome_{\ y,m}}{HHIncome_{\ Y}}\right)^{\beta} \times \left(\frac{Price_{y,m}}{Price_{\ Y}}\right)^{\gamma}$$

Where

HHSize is average household size (persons per household)

HHIncome is average income per household

α , β , γ are the elasticities

Y is the Base Year

The *XHeat* variable is constructed in the same manner as the XCool variable, with cooling equipment replaced by heating equipment and CDDs replaced by HDDs. The heating equipment types used to construct the XHeat variable are furnace, air-source heat pump, ground-source heat pump, secondary heating and furnace fans.

The corresponding $HeatUse_{y,m}$ variable is defined as follows:

$$HeatUse_{y,m} = \left(\frac{HDD_{\ y,m}}{HDD_{\ Y}}\right) \times \left(\frac{HHSize_{\ y,m}}{HHSize_{\ Y}}\right)^{\alpha} \times \left(\frac{HHIncome_{\ y,m}}{HHIncome_{\ Y}}\right)^{\beta} \times \left(\frac{Price_{y,m}}{Price_{\ Y}}\right)^{\gamma}$$

The *XOther* variable includes the equipment types that are not influenced by weather and constitute the base load portion of residential energy consumption. The equipment types included are electric water heating, electric cooking, refrigerator, freezer, dishwasher, electric clothes washer, electric clothes dryer, television, lighting and miscellaneous electric appliances.

The corresponding $OtherUse_{y,m}$ variable is defined as follows:

$$OtherUse_{y,m} = \left(\frac{BDays_{y,m}}{30.44}\right) \times \left(\frac{HHSize_{y,m}}{HHSize_{Y}}\right)^{\alpha} \times \left(\frac{HHIncome_{y,m}}{HHIncome_{Y}}\right)^{\beta} \times \left(\frac{Price_{y,m}}{Price_{Y}}\right)^{\gamma}$$

Instead of a weather variable, the OtherUse formula contains a BDays variable, which represents the number of billing days in year (y) and month (m). These values are normalized by 30.44, the average number of days in a month.

The equation used to develop the total residential energy sales forecast is:

$$ResidentialSales_{y,m} = ResidentialCustomer_{y,m} \times AverageUsePerCustomer_{y,m}$$

3.3.2 Commercial Energy Sales

As mentioned in section 3.2.2, there is an increase in rate migration between the GSLD and Commercial rate classes due to energy efficiency. Therefore, a combined Commercial and GSLD energy sales model is generated. This model is developed using the SAE modeling approach for Commercial building types using EFG projections derived from EIA data. The Commercial sales model is driven by Gross Regional Product, price of electricity, number of households, weather, commercial building type, appliance saturations and efficiencies. Binary variables are used to help explain fluctuations in historical billing data due to rate migrations, billing discrepancies, seasonality and other factors that may affect the accuracy of the forecast models.

The Commercial SAE model framework defines energy use in a year as the sum of energy used by the heating equipment, cooling equipment and other equipment. The formal model equation is:

$$USE_{y,m} = b_0 + b_1 \; x \; XCool_{y,m} + b_2 \; x \; XHeat_{y,m} + b_3 \; x \; XOther_{y,m} + \varepsilon_{y,m}$$

Where $XCool_{y,m}$, $XHeat_{y,m}$ and $XOther_{y,m}$ are explanatory variables constructed from weather data, end use equipment efficiency and saturation trends, economic projections, commercial building type and square footage.

The $XCool_{y,m}$ variable is the amount of energy used by cooling systems and is defined as:

$$XCool_{y,m} = CoolIndex_y \; x \; CoolUse_{y,m}$$

Where

$XCool_{y,m}$	is the estimated cooling energy use in year (y) and month (m)
$CoolIndex_y$	is the annual index of cooling equipment
$CoolUse_{y,m}$	is the monthly usage multiplier

The cooling equipment index depends on equipment saturation levels (*CoolShare*) normalized by operating efficiency levels (*Efficiency*):

$$CoolIndex_y = CoolSales_Y \times \frac{\left({CoolShare_y}/{Efficiency_y} \right)}{\left({CoolShare_Y}/{Efficiency_Y} \right)}$$

Base year cooling sales are defined as:

$$CoolSales_Y = \left(\frac{kWh}{Sqft}\right)_{Cooling} \times \left(\frac{CommercialSales_Y}{\sum_e^{kWh}/Sqft_e}\right)$$

Base-year cooling sales are the product of the average space cooling intensity value and the ratio of the total commercial sales in the base year over the sum of the end use intensity values.

The monthly Commercial *CoolUse* variable is computed as:

$$CoolUse_{y,m} = \left(\frac{CDD_{\ y,m}}{CDD_{\ Y}}\right) \times \left(\frac{EconVar_{\ y,m}}{EconVar_{\ Y}}\right)^{\alpha} \times \left(\frac{Price_{\ y,m}}{Price_{\ Y}}\right)^{\beta}$$

Where

EconVar is a function of Household growth and Gross Regional Product

α, β are elasticities

The *XHeat* variable has the same structure as the *XCool* variable, with cooling equipment replaced by heating equipment, and CDDs replaced by HDDs. The corresponding monthly $HeatUse_{y,m}$ variable is defined as:

$$HeatUse_{y,m} = \left(\frac{HDD_{\ y,m}}{HDD_{\ Y}}\right) \times \left(\frac{EconVar_{\ y,m}}{EconVar_{\ Y}}\right)^{\alpha} \times \left(\frac{Price_{\ y,m}}{Price_{\ Y}}\right)^{\beta}$$

The *XOther* variable is also similar in struture to the XCool variable, and replaces cooling equipment with other equipment (ventilation, electric water heating, cooking equipment, refrigeration, lighting, office equipment and miscellaneous equipment). Instead of a weather variable there is a *BDays* variable, which represents the number billing days in year (y) and month (m), normalized by 30.44 days (the average number of billing days in a month.)

The corresponding $OtherUse_{y,m}$ variable is defined as:

$$OtherUse_{y,m} = \left(\frac{BDays_{\ y,m}}{30.44}\right) \times \left(\frac{EconVar_{\ y,m}}{EconVar_{\ Y}}\right)^{\alpha} \times \left(\frac{Price_{\ y,m}}{Price_{\ Y}}\right)^{\beta}$$

3.3.3 Industrial Energy Sales

While the GSLD demand and energy sales are forecast in combination with Commercial energy sales, the remainder of the Industrial class – the INT and ELDC rate classes - are modeled independently of the SAE methodology. Each INT and ELDC customer is evaluated individually to account for their expected future energy and demand consumption, using average historical growth rates, monthly demand and expected future changes to load based on information provided by various sources, including account managers, LE engineering, local news and informed judgement.

3.3.4 Other Sales Forecast

The Other energy sales forecast consists of sales for the City's Municipal, Electric and Water Departments, private area lighting, roadway lighting and unmetered street lighting rate classes. Models are difficult to develop for these rate classes due to the large fluctuations in the historical billing data. Therefore, the projections for this category are based on historical trends and growth rates. Special consideration is given to account for new projects and potential developments.

3.3.5 Total Sales Forecast

The results of the energy sales forecasts for all revenue classes are added together to create a total sales forecast.

Lakeland Electric currently does not have any energy efficiency goals, therefore LE does not assume any deductions in peak load for the forecast period.

3.4 Net Energy for Load Forecast

A **loss factor of approximately 2.9%** is applied to convert total energy sales to Net Energy for Load (NEL). The loss factor is developed using a historical average of the estimated amount of energy lost during the generation, transmission and distribution of electricity.

3.5 Peak Demand Forecast

A regression model is estimated in MetrixND to forecast monthly peaks. The model is developed using Itron's SAE modeling approach to ensure that end-use appliance saturations and efficiencies that may affect peak are being accounted for. The models are driven by monthly energy coefficients and normal peak-producing weather conditions.

The winter peak forecast is developed under the assumption that its occurrence will be on a January weekday. Historical winter peaks have occurred between the months of December to March, between the hours of **7** and 9 a.m. Temperatures at time of winter peaks range from 19° F to 51° F.

The summer peak forecast is developed under the assumption that its occurrence will be on a July weekday. Historical summer peaks have occurred between the months of June to September, on weekdays, and between the hours of 3 and 6 p.m. Temperatures at time of summer peaks range from 90° F to 101° F.

3.6 Hourly Load Forecast

Twenty four hourly regression models are developed in MetrixND to generate the 20 year hourly load shape. Each of these models relates weather and calendar conditions (day-of-week, month, holidays, seasonal periods, etc.) to load. The uncalibrated hourly load shape is then scaled to the energy forecast and the peak forecast using MetrixLT. The result is an hourly load shape that is calibrated to the system energy and system peak forecasts produced using MetrixND.

3.7 Sensitivity Cases

3.7.1 High & Low Load Forecast Scenarios

A forecast is generated based on the projections of its drivers and assumptions at the time of forecast development. This base forecast (50/50) is intended to represent the forecast that is “most likely” to occur.

There may be some conditions arising that may cause variation from what is expected in the base forecast. For these reasons, high and low case scenario forecasts are developed for customers, energy sales, system net energy for load and peaks. The high and low forecasts are based on variations of the primary drivers including population and economic growth.

Model Evaluation and Statistics

The results of the Electric Load and Energy Forecast are reviewed by an outside consultant. Itron is contracted to review all sales, customer, peak and energy forecast models for reasonableness and statistical significance. Itron also evaluates and reviews all key forecast assumptions.

Additionally, the MetrixND software is used to calculate statistical tests for determining a significant model, including Adjusted R-Squared, Durbin-Watson Statistic, F-Statistic, Probability (F-Statistic), Mean Absolute Deviation (MAD) and Mean Absolute Percentage Error (MAPE).

Intentionally Blank

4.0 Energy Conservation & Management Programs

Lakeland Electric is committed to the efficient use of electric energy and is committed to provide cost effective energy conservation and demand reduction programs for all its consumers. Lakeland Electric is not subject to the Florida Energy Efficiency and Conservation Act (FEECA) rules but has in place several Energy Conservation & Management Programs and remains committed to utilize cost effective conservation and Energy Conservation & Management Programs that will benefit its customers. Presented in this section are the currently active programs.

4.1 Conservation Programs 2019

In keeping with Lakeland Electric's plan to promote retail conservation programs, the utility is continuing the following Energy Efficiency & Conservation Programs during 2019:

Residential

- Insulation rebate - $150 rebate for adding attic insulation to achieve R30 total. Certificate issued to resident at energy audit/visit and redeemed to Insulation Contractor. Can be homeowner installed.
- Energy Saving Kits – giveaway at audits contains weather-stripping, outlet gaskets, low flow showerhead, LED, etc.
- HVAC Maintenance Incentive - $50 rebate for residential customers that have A/C maintenance done.
- Heat Pump Rebate - $200 rebate for installing a SEER 15 or higher heat pump
- LED Lighting – giveaway at audits, up to 3 per residence
- On-line Energy Audit
- Energy Star Appliance Rebates

Commercial

- Conservation Rebate – rebate of $150/kw for GSLD, Contract, and Interruptible customers that make energy efficiency improvements. Promoted by Account Executives.
- Commercial Lighting – rebate of $150/kw reduced per customer for energy efficient lighting upgrades.

Estimated Demand and Energy Savings for FY 2019

- 3.2 MW demand reduction and over 4,976 MWhs

4.2 Solar Program Activities

Lakeland Electric considers solar photovoltaic (PV) system as distributed generators irrespective of their connection to the grid. Solar being available during the day time, it contributes to reduce peak demand/energy, linking it to energy conservation & management programs.

4.2.1 Utility Interactive Net Metered Photovoltaic Systems

As of December 2019, there were approximately 300 PV systems that had been privately owned in the Lakeland Electric service territory. These systems now generate a total of 1500 kW of electric capacity. Lakeland Electric has allowed the interconnection of these systems in "net meter" fashion.

4.2.2 Utility Scale Solar PV Program

During November 2007, Lakeland Electric issued a Request for Proposal seeking an investor to purchase and install investor owned PV systems totaling 24 MW on customer owned sites as well as City of Lakeland properties. During December 2007, a successful bidder was identified, and installation of the following PV systems began:

- Lakeland Electric's first Solar Energy Purchase Agreement (SEPA) was signed on July 21, 2009 for an investor-owned 250 kW PV system for a twenty-year commitment. The roof top system began commercial operation at the RP Funding Center on April 4, 2010.
- Phase I solar array is installed at the Lakeland Linder Airport with a SEPA that was initiated on November 9, 2010. This 2.25 MW PV system began operation on December 22, 2011, for a twenty-five-year term.
- Phase II of the Lakeland Linder Airport site is located off Hamilton Road and began shortly after Phase I. The SEPA for Phase II was initiated on December 9, 2010. Phase II is a 2.75 MW PV system that began operation on September 16, 2012, for a twenty-five-year term.
- Phase III, is the most recent solar array added to the Lakeland Linder Airport site and is located off Medulla Road. Lakeland Electric entered into a SEPA on

March 2, 2015, for 3.15 MW PV. This solar array operation began on December 21, 2016, for a twenty-five-years term.

- Lakeland entered into a SEPA with a solar vendor on November 25, 2013, for a 6.0 MW PV system located adjacent to the Sutton substation. The facility is commonly referred to as Birdblue or by the road intersection Bellavista/Sutton. It began generating power on July 6, 2015

In total, Lakeland Electric has 14.4 MW of solar capacity and has the potential to produce approximately 3.5% of the average daytime system-wide summer load. Total production is approximately 25,000 MWHs annually.

4.2.3 Utility Solar Water Heating Program

During November 2007, LE issued a Request for Proposals for the expansion of its Residential Solar Water Heating Program. In this solicitation, Lakeland sought the services of a venture capital investor who would purchase, install, own, operate and maintain 3,000 – 10,000 solar water heaters on LE customers' residences in return for a revenue sharing agreement. LE would provide customer service and marketing support, along with meter reading, billing and collections. During December 2007, a successful bidder was identified and notified. In August 2009, LE approved a contract with the vendor with plans to resume installations of solar water heaters. Annual projected energy savings from this project will range between 7,500 and 25,000 MWh. These solar generators will also produce Renewable Energy Credits that will contribute toward Florida's expected mandate for renewable energy as a part of the utility's energy portfolio.

During the summer of 2010, the "Solar for Lakeland" program began installing residential solar water heaters. Under this expanded program, the solar thermal energy was sold for the fixed monthly amount of $34.95. All solar heating systems continued to be metered for customers' verification of solar operation and for tracking green credits for the utility. Through the end of 2017, there were 259 solar heaters installed in Lakeland residences. The program is currently on hold with no new solar water heaters being installed.

4.2.4 Renewable Energy Credit Trading

Lakeland Electric Renewable Energy Credits are produced from its five, long term, purchase power agreements that have name plate capacity of 14.4 MWs.

In January of 2019 Lakeland Electric set up an account with the North American Renewable Registry to start trading its solar REC's classified as Green-e-Eligible. A REC is created for every (1) Megawatt-hour of renewable electricity generated and delivered to the utility grid.

The utility's 2019 fiscal year forecast for an average of 25,000 REC's and the RECs can sell for between $0.75 and $1.00 in the state of Florida.

5.0 Forecasting Methods and Procedures

This section describes Lakeland's long-term Integrated Resource Planning (IRP) process, the Florida Municipal Power Pool, presents the economic parameter assumptions, plus the fuel price projections being used in the current evaluation process.

5.1 Integrated Resource Plan

In addition to the Ten -Year Site Plan process, Lakeland Electric utilizes an IRP process for meeting 10 to 20 years of forecasted energy demand plus reserve capacity through a combination of supply and demand-side resources while meeting the objectives of environmental responsibility, reliability and affordable cost. The IRP evaluates the risks and uncertainties related to regulation, marketplace and technologies based on known information and assumptions.

5.2 Florida Municipal Power Pool

Lakeland Electric is a member of the Florida Municipal Power Pool (FMPP) along with the Orlando Utilities Commission (OUC) and the Florida Municipal Power Agency's (FMPA) All-Requirements Power Supply Project. The three utilities operate as one Balancing Authority (BA). All FMPP generating units are committed and dispatched together ensuring economic dispatch and reliability to the entire FMPP BA.

The FMPP is not a capacity pool meaning that each member must plan for and maintain sufficient capacity to meet their own individual electric demand and operating reserve obligations. Any member of the FMPP can withdraw from FMPP with a three-year written notice. Lakeland, therefore, must ultimately plan to meet its own load and reserve requirements as reflected in this document.

5.3 Economic Parameters

Subsections of 5.3 present the assumed values adopted for economic parameters used in Lakeland Electric's planning process. The assumptions stated in this section are applied consistently throughout this document.

5.3.1 Inflation Rate

The general inflation rate applied is assumed to be 1.7 percent, per year, based on the Congressional Budget Office's projection for the Gross Domestic Product deflator as of June 2020.

5.3.2 Bond Interest Rate

Consistent with the traditional tax-exempt financing approach used by Lakeland, the self-owned supply-side alternatives assume 100 percent debt financing. Lakeland's long-term tax-exempt bond interest rate is assumed to be 3.5 percent.

5.3.3 Present Worth Discount Rate

The present worth discount rate used in the analysis is set equal to Lakeland's assumed bond interest rate of 3.5 percent.

5.3.4 Interest During Construction

During construction of the plant, progress payments will be made to the EPC contractor and interest charges will accrue on loan draw downs. The interest during construction rate is assumed to be 3.5 percent.

5.3.5 Fixed Charge Rates

The fixed charge rate is the sum of the project fixed charges as a percent of the project's total initial capital cost. When the fixed charge rate is applied to the initial investment, the product equals the revenue requirements needed to offset fixed costs for a given year. A separate fixed charge rate can be calculated and applied to each year of an economic analysis, but it is most common to use a Levelized Fixed Charge Rate that has the same present value as the year by year fixed charged rates. Included in the fix charged rate calculation is an assumed 0.7 percent issuance fee, a 0.0 percent annual insurance cost, and a there is no 6 month debt reserve for Lakeland.

5.4 Fuel Parameters

Subsections of 5.3 outline the basic fuel assumptions.

5.4.1 Natural Gas

Natural gas is a colorless, odorless fuel that burns cleaner than many other traditional fossil fuels. Natural gas can be used for heating, cooling, and production of electricity and other industrial uses.

Natural gas is found in the Earth's crust. Once the gas is brought to the surface, it is refined to remove impurities such as water, sand and other gases. The natural gas is then transported through pipelines and delivered to the customer either directly from the pipeline or through a distribution company or utility.

5.4.1.1 Natural gas supply and availability

Significant natural gas reserves exist, both in the United States and throughout the North American mainland and coastal regions. Natural gas reserves are mostly dependent on domestic production. Production of natural gas from the Marcellus and Haynesville areas has increased due to advanced drilling technology which has lowered cost contributing to increased supply which reduces price volatility seen in recent years. During 2019, natural gas trading has averaged around $2.525 per MMBtu and the five-year

NYMEX Henry Hub Natural Gas forward curve is projecting the price to continue to average around $2.575 per MMBtu.

5.4.1.2 Natural gas transportation

There are now three transportation companies serving Peninsular Florida. Florida Gas Transmission Company (FGT), Sabal Trail Transmission, and Gulfstream Natural Gas System (GNGS). Lakeland Electric has interconnections and service agreements with GNGS and FGT to provide diversification and competition in delivery.

5.4.1.2.1 Florida Gas Transmission Company

FGT is an open access interstate pipeline company transporting natural gas for third parties through its 5,000 mile pipeline system extending from South Texas to Miami, Florida.

The FGT pipeline system accesses a diversity of natural gas supply regions, including:

- Anadarko Basin (Texas, Oklahoma, and Kansas)
- Arkona Basin (Oklahoma and Arkansas)
- Texas and Louisiana Gulf Areas (Gulf of Mexico)
- Black Warrior Basin (Mississippi and Alabama)
- Louisiana – Mississippi – Alabama Salt Basin

FGT’s total receipt point capacity is in excess of 3.0 billion cubic feet per day and includes connections with 12 interstate and 12 intrastate pipelines to facilitate transfers of natural gas into its pipeline system. FGT reports a current delivery capability to Peninsular Florida of approximately 3.1 billion cubic feet per day. Lakeland Electric currently has in excess of 28,000 MMBtu/day of firm transportation with FGT for natural gas delivery to its generation facilities.

5.4.1.2.2 Florida Gas Transmission market area pipeline system

The FGT multiple pipeline system corridor enters the Florida Panhandle in northern Escambia County and runs easterly to a point in southwestern Clay County, where the pipeline corridor turns southerly to pass west of the Orlando area. The mainline corridor then turns to the southeast to a point in southern Brevard County, where it turns south generally paralleling Interstate Highway 95 to the Miami area (see Fig. 5-1). A major lateral line (the St. Petersburg Lateral) extends from a junction point in southern Orange County westerly to terminate in the Tampa, St Petersburg and Sarasota area. A major loop corridor (the West Leg Pipeline) branches from the mainline corridor in southeastern Suwannee County to run southward through western Peninsular Florida to connect to the St. Petersburg Lateral system in northeastern Hillsborough County. Each of the above major corridors include stretches of multiple pipelines (loops) to provide flow redundancy and transport capability. Numerous lateral pipelines extend from the major corridors to serve major local distribution systems and industrial/utility customers.

FGT's Phase VIII Expansion Project came into full operation April 1, 2011. It consists of approximately 483.2 miles of multi diameter pipeline in Alabama, Mississippi and Florida with approximately 365.8 miles built parallel to existing pipelines. The project added 213,600 horsepower of additional mainline compression. One new compressor station was built in Highlands County, Florida. The project provides an annual average of 820,000 MMBtu/day of additional firm transportation capacity.

5.4.1.2.3 Gulfstream pipeline

The Gulfstream pipeline is a 744 mile pipeline originating in the Mobile Bay region and crossing the Gulf of Mexico to a landfall in Manatee County (south Tampa Bay). The pipeline supplies Florida with up to 1.1 billion cubic feet of gas per day serving existing and prospective electric generation and industrial projects in southern Florida. Phase I of the pipeline is complete and ends in Polk County, Florida. The pipeline extends to Florida Power & Light's Martin Plant. Construction for the Gulfstream pipeline began in 2001 and it was placed in service in May 2002. Phase II was completed in 2005. Lakeland Electric added an additional 10,000 MMBtus/day of Gulfstream Pipeline capacity during 2017, for a total of 50,000 MMBtus/day.

5.4.1.2.4 Sabal Trail Transmission

The Sabal Trail pipeline is a 515 mile interstate pipeline originating in Central Alabama and terminating in Central Florida. The pipeline's Phase 1 facilities began commercial service July 3, 2017. The Phase 1 capacity of the pipeline is 830,000 Dth/day.
Lakeland Electric is not currently a customer of Sabal Trail Transmission.

5.4.2 Coal

Coal is a long standing and reliable fuel used primarily for electric generation. Lakeland Electric's McIntosh Unit No. 3 is a 365 MW coal burning generator placed into service in the early 1980's. The coal commodity escalation rate is based off the 2019 U.S. Energy Information Administration (EIA) forecast.

5.4.2.1 Coal supply and availability

On May 6, 2019 the City of Lakeland (the City) entered into a three-year Illinois Basin contract for its calendar year supply beginning January 1, 2020 to December 31, 2023 for 350,000 tons annually. The current Illinois Basin contract expires December 31, 2019 along with the Indiana blending coal. The utility's low sulfur blending coal contract from eastern Kentucky (Central Appalachian) is for 75,000 tons annually and expires December 31, 2020. Currently a 90 to 120 day coal supply reserve (200,000 to 250,000 tons) is maintained at the McIntosh Plant due to market uncertainty of supplier availability due to potential bankruptcies..

5.4.2.2 Coal transportation

McIntosh Unit No. 3 is Lakeland Electric's only unit burning coal. Lakeland Electric projects McIntosh Unit No. 3 will burn approximately 400,000-500,000 tons of coal per year. Primary coal sources are in southwestern Indiana, western and eastern

Kentucky, southern Illinois, Pennsylvania, West Virginia, Tennessee, Alabama and North & South Carolina which affords the City multiple transportation options by water or single rail line via CSX Transportation (CSX). The plant typically burns 80% Illinois Basin and 20% Central Appalachian coal to meet the Mercury and Air Toxics Standards emission compliance standards. All contracts contain competitive pricing.

The City entered a four- year rail transportation contract with CSX, effective from October 1, 2019 to December 31, 2023. Under the terms of the contract with CSX, the City pays a monthly capacity charge to eliminate minimum tonnage requirements. The City renewed its railcar leases agreement with GATX with an automatic option to renew annually each September 30th by mutual consent. The City also leased a third train from another utility effective September 5, 2017 to September 30, 2023. All trains may be subleased to other shippers when not being utilized by Lakeland Electric.

5.4.3 Fuel Oil

5.4.3.1 Fuel oil supply and availability

Lakeland Electric obtains all fuel oil through spot market purchases and has no long-term contracts. This strategy provides the lowest cost for fuel oil consistent with usage, current price stabilization and on-site storage. Lakeland Electric's Fuels Section continually monitors the cost effectiveness of spot market purchasing.

5.4.3.2 Fuel oil transportation

Although Lakeland Electric is not a large consumer of fuel oils, a small amount is consumed during operations for backup fuel and diesel unit operations. Fuel oil is transported to Lakeland by truck.

5.4.4 Fuel Price Projections

This section presents the fuel price projections for coal, natural gas and oil. The fuel price forecast for solid fuel, oil and natural gas is prepared by Lakeland Electric's Fuels Department. The transportation inflation rate is based off the January 2019-2029 Congressional Budget Office (CBO) Gross Domestic Product inflation rate of 1.7% through 2023 and 1.8% from 2024 through 2029. The natural gas forecast uses a blended average from a consultant forecast and the New York Mercantile Exchange (NYMEX) natural gas forward curve along with including the following: transport rate, usage and fuel to provide a total delivered price. The oil prices use the ten-year NYMEX crude oil forward curve. The diesel oil forecast is, with respect to the percentage of growth, based off the Energy Information Administration's Annual Energy Outlook 2019.

5.4.4.1 Natural gas price forecast

The price forecast for natural gas is based on historical experience and future expectations for the market. The forecast takes into account the spot purchases of gas to meet its needs along with its risk management holdings intended to reduce price volatility. To address the historic volatility of the natural gas market, Lakeland Electric initiated a formal fuel hedging program in 2003. The Energy Authority (TEA), a company located in Jacksonville, FL, is Lakeland Electric's consultant assisting in the administration and adjustment of policies and procedures, as well as the oversight of the program.

Lakeland Electric purchases "seasonal" gas to supplement the base requirement and purchases "as needed" daily gas, known commonly as "spot gas", to round out its supply needs.

Natural gas transportation from FGT is currently supplied under three rates in FGT's tariff; FTS-1, FTS-2 and FTS-3. Rates in FTS-1 are based on FGT's Phase II expansion and rates in FTS-2 are based on the Phase III expansion. Rates in FTS-3 are based on the Phase VIII expansion, which went in service April 1, 2011[1]. The FTS-1 and FTS-2 rates have the same reservation rate, but the FTS-2 has a $0.10 surcharge added to it effective February 1, 2016 for 66 months as part of the November 2014 rate case settlement. Rates for the Phase IV, Phase V, and Phase VI are included in the FTS-2 rate

[1] Lakeland does not currently subscribe to any FTS-3 capacity.

structure. Transportation rates are reflected in Table 5-1. Once the surcharge expires, the FTS-1 and FTS-2 rate classes will merge as a result of the settlement of FGT's rate case. Lakeland's rate for FGT transportation decreased on an overall basis, as a result of the rate case, lowering the FTS-2 rate. Lakeland owns 67% of its FGT capacity proving a savings to our ratepayers. The FGT usage and fuel rates listed below are effective, September 1, 2019.

Table 5-1
Natural Gas Tariff Transportation Rates

	Rate Schedules					
Rates And Surcharges	FGT FTS-1 w/surcharges (cents/DTH)*	FGT FTS-2 w/surcharges (cents/DTH)*	**FGT FTS-3 w/surcharges (cents/DTH)*	FGT ITS-1	Gulfstream FTS-1	Gulfstream FTS-6%
Reservation	53.18	63.18	132.99	96.57	55.763	70.41
Usage	4.15	4.15	2.82	0.00	0.0213	0.0068
Total	57.33	67.33	135.81	96.57	55.7813	70.4168
Fuel Charge	2.78%	2.78%	2.78%	2.78%	1.85%	1.85%

* A DTH is equivalent to 1 MMBtu or 1 MCF
** Lakeland does not currently subscribe to any FTS-3 Capacity

A combination rate of $0.62/MMBtu will be used for purposes of projecting delivered gas prices and transportation charges applied to existing units as this is the average cost for Lakeland to obtain natural gas transportation for those units. This average rate is realized through a current mix of FTS-1, FTS-2 and Gulfstream transportation, including consideration of Lakeland Electric's ability to relinquish its FTS and Gulfstream transportation or acquire other firm and interruptible gas transportation on the market. The delivered natural gas price is projected to remain relatively flat during the next five years The average delivered gas price forecast for the year 2019 is below $2.6/MMBtu.

5.4.4.2 Coal price forecast

Lakeland Electric has multiple contracts for coal supply, the longest of which expires on December 31, 2022. Coal prices are expected to decrease for the upcoming years due to an excess supply of Natural Gas which was decrease the demand for coal generation due to economics. Both Central Appalachian and Illinois Basin pricing have experienced a major price drops in efforts to compete with NG dispatch cost. Expected delivered coal price to Lakeland Electric is around $2.511/MMBtu in 2019.

5.4.4.3 Fuel oil price forecast

Changes in production levels and methods are placing oil prices at a lower level in the world market. Lakeland adjusts its oil price forecast to reflect current market pricing and what the anticipated future price may be.

5.4.5 Fuel Forecast Sensitivities

Lakeland Electric is not presenting specific forecasted fuel price sensitivities.

6.0 Forecast of New Capacity Requirements

6.1 Assessment of the Need for Additional Capacity

This section describes the process Lakeland Electric uses to assess the need for additional capacity to serve Lakeland Electric's customers in the future. The need for capacity is based on Lakeland Electric's load forecast, reserve margin requirements, existing generating, plus planned new generation and less planned retirement of generation.

6.1.1 Load Forecast

The load forecast described in Section 3.0 is used to determine the need for capacity. A summary of the load forecast for winter and summer peak demand for base high and low projections are provided in Tables 6-1 and 6-2.

6.1.2 Reserve Requirements

Prudent utility planning requires that utilities secure firm generating resources over and above the expected peak system demand to account for unanticipated demand levels and supply constraints. Several methods of estimating the appropriate level of reserve capacity are used. A commonly used approach is the reserve margin method, which is calculated as follows:

$$\frac{\text{System net capacity - System net peak demand}}{\text{System net peak demand}}$$

Lakeland Electric has looked at probabilistic approaches to determine its reliability needs in the past. These have included indices such as Loss of Load Probability (LOLP) and Expected Unserved Energy (EUE) Use. Lakeland Electric has found that due to the strength of its transmission system, expected LOLP or EUE values were so small that reserves based on those measures would be nearly non-existent.

Conversely, isolated probabilistic values come out overly pessimistic calling for excessively high levels of reserves due to more than 50% of Lakeland Electric's capacity being made up by only two units. As a result, Lakeland Electric has stayed with the reserve margin method based on the equation presented above. When combined with regular review of unit performance at times of system peak, Lakeland Electric finds reserve margin to be the proper reliability measure for its system.

6.1.3 Existing Generation and Retirements

Generation availability is reviewed annually and is found to be within industry standards for the types of units that Lakeland Electric has in its fleet, indicating adequate and prudent maintenance is taking place.

Lakeland Electric plans to retire McIntosh Unit #2, after Lakeland's planned new unit, McIntosh Unit GT2, becomes commercial.

6.2 Additional Capacity and Reserve Margins

As discussed in Section 6.1.2 above, by comparing Lakeland Electric's load forecast plus reserves with firm supply, the Reserve Margins can be identified. Lakeland Electric's Reserve Margins are presented in Tables 6-1 and 6-2. The Net Generating Capacity includes the planned 135 MW new gas turbine, McIntosh Unit GT2, at McIntosh Power Plant in 2020, and is less 106 MWs due to the planned retirement of McIntosh Unit # 2 after the new gas turbine becomes commercial. The new gas turbine is being added to Lakeland Electric's portfolio of resources to help assure reliability.

Lakeland Electric's winter and summer reserve margin target is currently 15%. Tables 6-1 and 6-2 indicate that using the base winter and summer forecast, Lakeland Electric's Reserve Margins are greater than 20% during the current ten year planning period. This complies with the Florida Reliability Coordinating Council's (FRCC) minimum reserve margin criteria for the FRCC Region in terms of reliability requirement.

As Lakeland Electric's needs and fleet of resources continue to change through time, reserve margin levels will be reviewed and adjusted as appropriate.

Table 6-1
Projected Reliability Levels - Winter / Base Case

Year	Net Generating Capacity	Net System Purchases	Net System Sales	Net System Capacity	System Peak Demand		Reserve Margin		Excess(Deficit) to Maintain 15% Reserve Margin	
					Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management
	MW	MW	MW	MW	MW	MW	%	%	%	MW
2020/21	909	0	0	0	690	690	32%	32%	116	116
2021/22	909	0	0	0	695	695	31%	31%	110	110
2022/23	909	0	0	0	700	700	30%	30%	104	104
2023/24	909	0	0	0	708	708	28%	28%	95	95
2024/25	909	0	0	0	711	711	28%	28%	91	91
2025/26	909	0	0	0	716	716	27%	27%	86	86
2026/27	909	0	0	0	722	722	26%	26%	79	79
2027/28	909	0	0	0	730	730	25%	25%	70	70
2028/29	909	0	0	0	734	734	24%	24%	65	65
2029/30	909	0	0	0	738	738	23%	23%	60	60

Table 6-2
Projected Reliability Levels - Summer / Base Case

Year	Net Generating Capacity	Net System Purchases	Net System Sales	Net System Capacity	System Peak Demand		Reserve Margin		Excess(Deficit) to Maintain 15% Reserve Margin	
					Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management
	MW	MW	MW	MW	MW	MW	%	%	%	MW
2020	853	7	0	860	656	656	31	31	105	105
2021	853	7	0	860	659	659	30	30	102	102
2022	853	7	0	860	665	665	29	29	96	96
2023	853	7	0	860	669	669	28	28	90	90
2024	853	7	0	860	676	676	27	27	83	83
2025	853	7	0	860	680	680	26	26	78	78
2026	853	7	0	860	685	685	26	26	72	72
2027	853	7	0	860	691	691	25	25	66	66
2028	853	7	0	860	697	697	23	23	58	58
2029	853	7	0	860	703	703	22	22	51	51

Intentionally Blank

7.0 Environmental and Land Use Information

As discussed in Section 6, Lakeland Electric plans to add a new 135 MW gas turbine in 2020 at Lakeland Electric's McIntosh Power Plant.

Per the Ten Year Site Plan definitions (rule 25-22-072), "Preferred Sites" include sites where a utility has take action to site new generation.

Because of the new generating unit, "Preferred Site" information of McIntosh power plant is provided in Table 7-1.

Table 7-2 summarizes different control strategies adopted to comply with various environmental emissions for existing major generating units.

All existing units are fully permitted and meet all regulatory requirements.

Lakeland Electric will meet or exceed all State and Federal environmental standards.

[See Table 7-1 on next page]

Table 7-1 Preferred Site Report for McIntosh Power Plant (McIntosh GT2)		
a.	U.S. Geological Survey map	See attached figures.
b.	Map - general layout of preferred site facilities	
C.	Map - preferred site and adjacent areas	
d.	Description - existing land use preferred site and adjacent areas	Electrical generating facilities; low density rural, transportation, communication, utilities, commercial, water and conservation.
e.	Description - general vicinity environmental features	Former phosphate mined land that is predominately dry scrub uplands. Conservation lands, natural lakes, man-made water bodies, wetlands are also present.
e1.	Description - natural environment	Site is comprised of facilities related to power generation.
e2.	Description - Endangered animal and plant species	Listed animal species observed within and adjacent to the site include two avian species, little blue heron (Egretta caerulea) and wood stork (Mycteria americana). No adverse impacts to listed avian species are anticipated as a result of construction and operation of the Project.
e3.	Statement - designated as significant natural resource	No natural resources of regional significance status at or adjacent to the site.
e4.	Description - preferred site significant features	Lakeland Electric is not aware of any other significant features of the site.
f.	Description - Design features of preferred site	The project design includes an approximately 120 MW simple cycle, natural gas-fired combustion turbine (CT) generating unit and site stormwater system.
g.	Description - land use designations of site and adjacent areas.	The site is zoned General Industrial.
h.	Description - criteria used in site selection	The McIntosh plant has been selected as a preferred site due to consideration of various factors including system load and economics. Environmental issues were not a deciding factor since this site does not exhibit significant environmental sensitivity or other environmental issues. The project at this existing site will not require a new gas pipeline and will make use of the existing transmission facilities and water supply.
I	Description - existing ground and surface water resources of preferred site and adjacent areas	Since this is simple cycle unit cooling water will not be needed. Process water for the operation of water injection system (for NOx control) will come from the existing water supply sources (City of Lakeland).
j.	Description - geological features, preferred site and adjacent areas.	
k.	Description - projected quantities of water needs	No new sources or additional quantities of water will be needed for the project. Existing water quantities will be reallocated to meet the needs of the project.
k1.		
k2.		
k3.		
l.	Description - potential water supply sources	Process water: As existing, City of Lakeland Potable water: As existing, City of Lakeland
m.	Description - available water conservation strategies	No additional water resources are required beyond current usage.
n.	Description - potential water pollution control	Best Management Practices will be employed to prevent and control inadvertent release of pollutants.
o.	Description - proposed fuel delivery, storage, disposal facilities	Natural gas will be transported via an existing pipeline. Ultra low sulfur diesel (ULSD) will be trucked to the facility and stored in the existing ULSD storage tank.
p.	Estimates - air emissions and control systems	Fuel: Use of cleaner natural gas and ULSD. Water injection will be used to reduce NOx emissions.
q.	Estimates - noise and description potential	Noise from the operation of the new unit will be within allowable levels.
3.	Status of application for certification of the preferred site with the DEP	Minor (non-PSD) Air Construction Permit received on July 23, 2018. Environmental Resource Permit received on February 8, 2019.

[See Table 7-2 on next page]

Table 7-2
Lakeland Electric
Existing Generating Facilities
Environmental Considerations for Major Generating Units

Plant Name	Unit (Type)	Fuel		Air Pollutants and Control Strategies				Cooling Type
		Primary	Alt.	PM	SO2	Nox	CO	
Charles Larsen Memorial	8 (CC)	NG	DFO	None	LS	LNB WI	None	OTF
C.D. McIntosh, Jr.	2 (ST)	NG	RFO	None	LS	FGR	None	WCTM
	3 (ST)	Coal	---	ESP	FGD	LNB OFA SCR	None	WCTM
	5 (CC)	NG	---	None	LS	LNB SCR	OC	WCTM
Winston	1-20 (IC)	DFO	---	None	LS	OFA	OC	N/A

PM Particulte matter
SO2 Sulfur dioxide
NOX Nitrogen oxides
CO Carbon monoxide
LS Low sulfur fuel
LNB Low Nox burners
WI Water injections
RFO Residual Fuel Oil
OTF Once-through flow
FGR Flue gas recirculation
IC Internal combustion
NG Natural Gas
WCTM Water cooling tower mechanical
ESP Electrostatic precipitator
CC Combined Cycle
FGD Flue gas desulfurization
OFA Overfire air
SCR Selective catalytic reduction
ST Steam turbines
OC Oxidation catalyst
DFO Distilate Fuel oil
Alt Alterenate

Source: Lakeland Environmental Staff

Figure 7-1

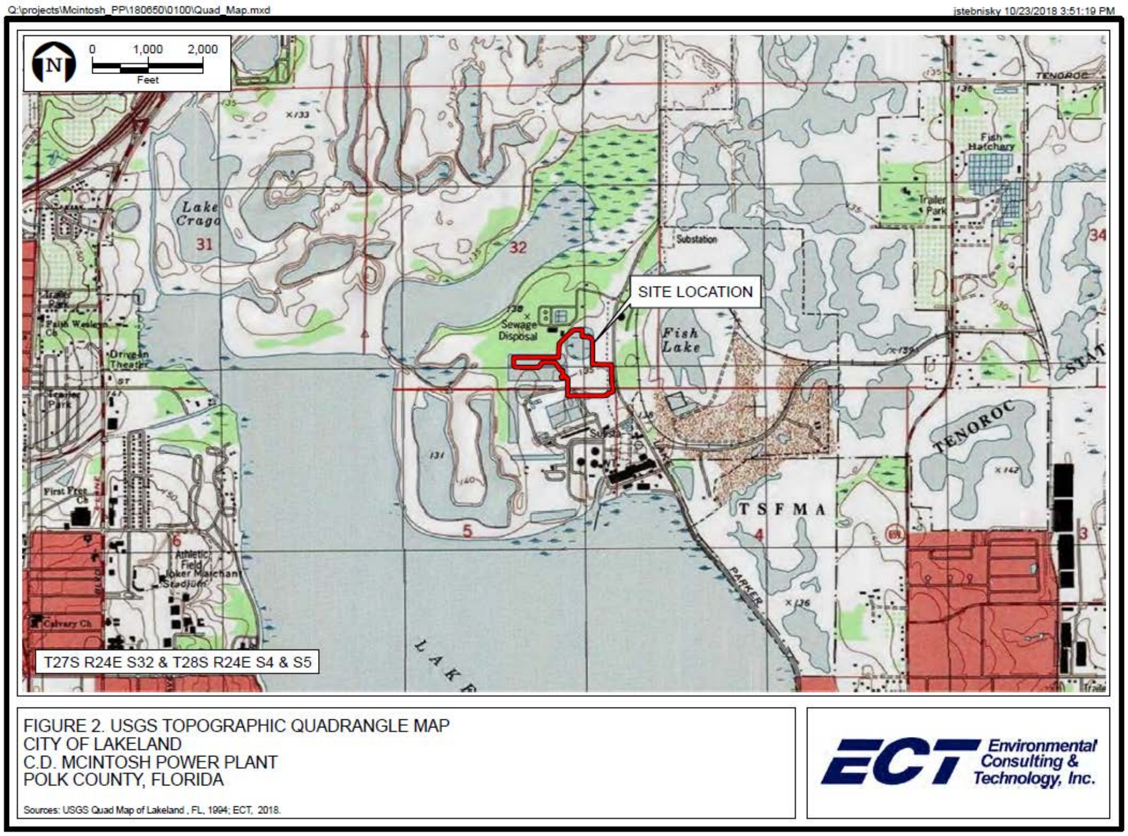


Figure 7-2

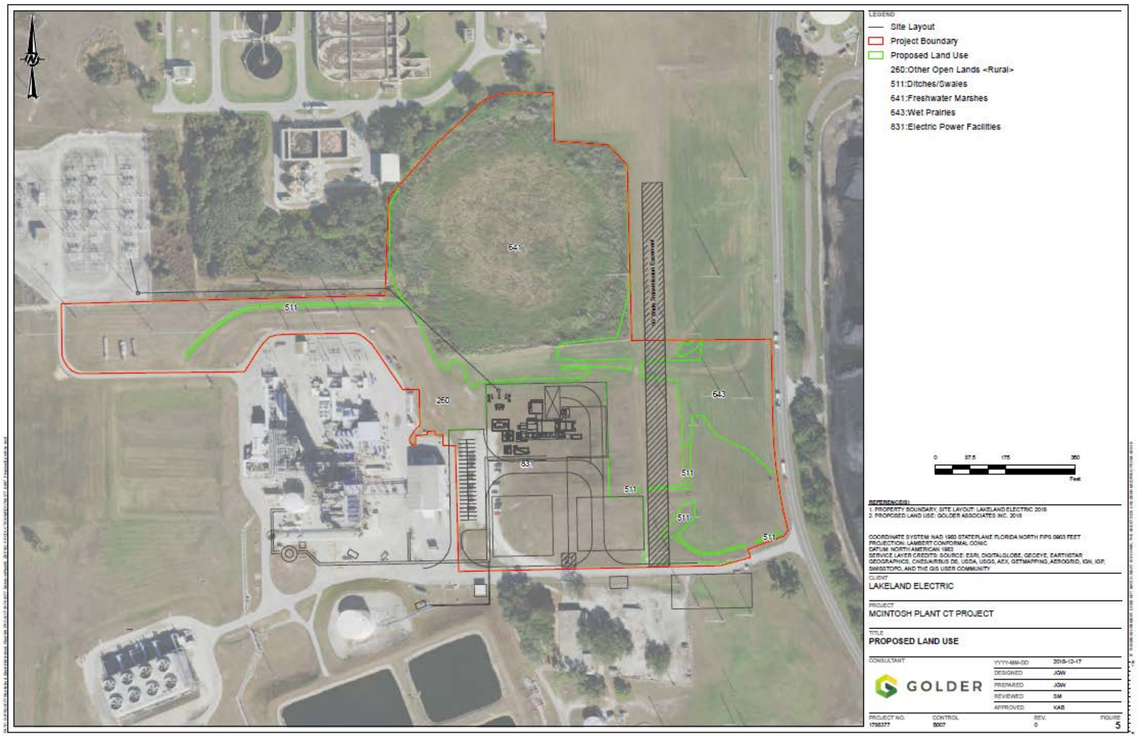
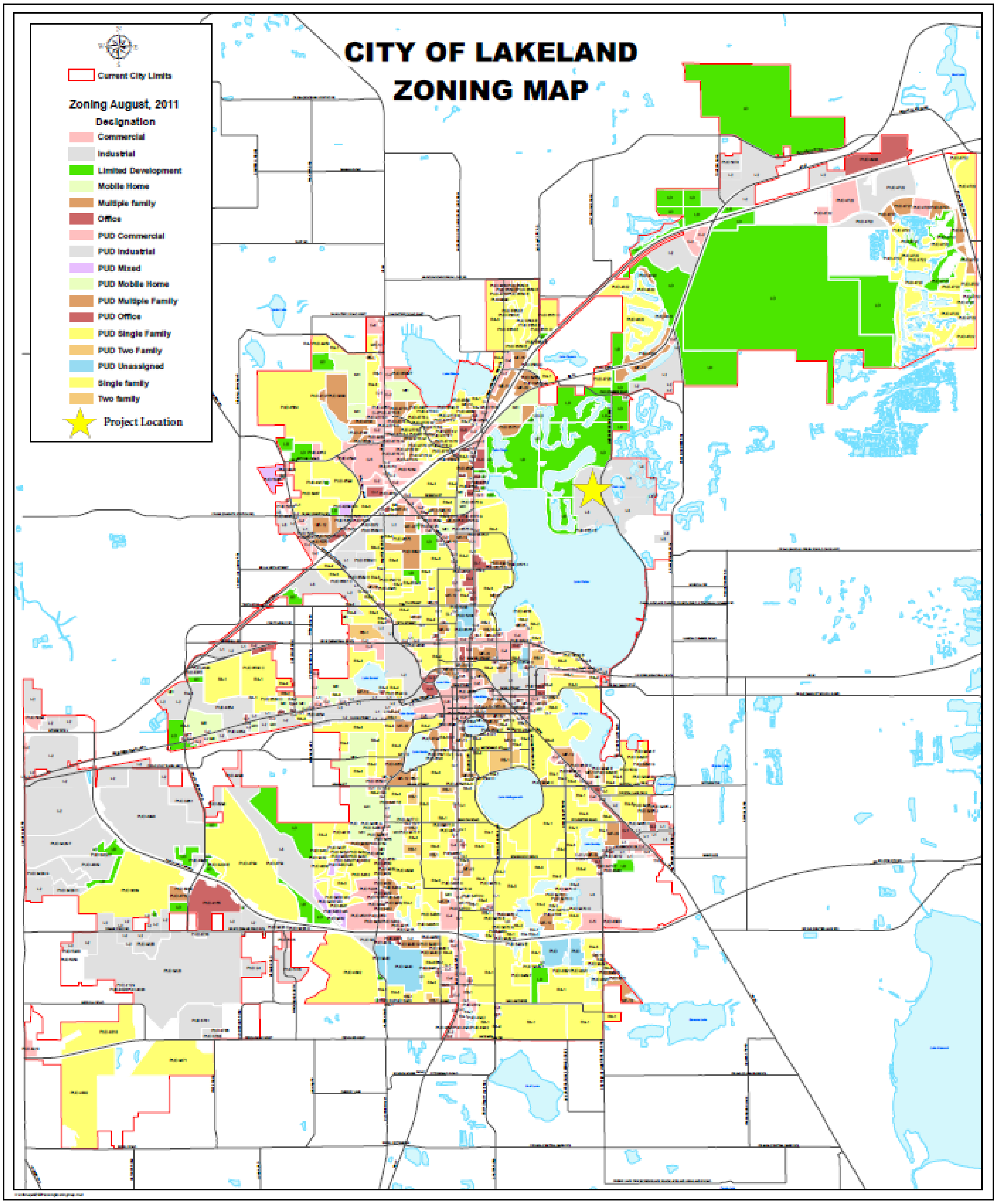


Figure 7-3


CITY OF LAKELAND
ZONING MAP
Current City Limits
Zoning August, 2011
Designation
Commercial
Industrial
Limited Development
Mobile Home
Multiple family
Office
PUD Commercial
PUD Industrial
PUD Mixed
PUD Mobile Home
PUD Multiple Family
PUD Office
PUD Single Family
PUD Two Family
PUD Unassigned
Single family
Two family
Project Location

Intentionally Blank

8.0 Ten-Year Site Plan Schedules

This section presents all the schedules as required by the Ten-Year Site Plan for the Florida Public Service Commission.

Tables 8-1 and 8-1a provide existing unit characteristics.

Tables 8-2 through 8-5 provide information by customer class.

Tables 8-2 through 8-8 provide demand and energy history and forecasts.

Table 8-9 provides a history and forecast of fuel requirements by fuel type.

Tables 8-10 and 8-11 provide a history and forecast of energy produced by fuel type.

Tables 8-12 and 8-13 provide comparisons of Lakeland Electric resources to Lakeland Electric demand. This table demonstrates that Lakeland Electric's Reserve Margin forecast exceeds the 20% each year included in this Ten-Year-Site Plan.

Tables 8-14 and 8-15 provide information related to Lakeland Electrics planned new gas turbine.

-

Table 8-1
Schedule 1.0: Existing Generating Facilities as of December 31, 2019

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
				Fuel		Fuel Transport						Net Capability[2]	
Plant Name	Unit No.	Location	Unit Type	Pri	Alt	Pri	Alt	Alt Fuel Days Use[1]	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate kW	Summer MW	Winter MW
Charles Larsen Memorial	GT2	16-17/28S/24E	GT	NG	DFO	PL	TK	---	11/62	Unknown	11,250	10	14
	GT3		GT	NG	DFO	PL	TK	---	12/62	Unknown	11,250	9	13
	8		CA	WH	---	---			04/56	Unknown	26,000	29	31
	8		CT	NG	DFO	PL	TK	---	07/92	Unknown	88,000	76	93
Plant Total												124	151

[1]LAK does not maintain records of the days the alternative fuel was used. ,[2]Net Normal.

Source: Lakeland Energy Supply Unit Rating Group

Table 8-1a

Schedule 1.0: Existing Generating Facilities as of December 31, 2019

				Fuel[4]		Fuel Transport[5]						Net Capability	
Plant Name	Unit No.	Location	Unit Type[3]	Pri	Alt	Pri	Alt	Alt Fuel Days Use[2]	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate kW	Summer MW	Winter MW
Winston Peaking Station	1-20	21/28S/23E	IC	DFO	---	TK	---	---	12/01	Unknown	2,500 each	50	50
Plant Total												50	50
C.D. McIntosh, Jr.	D1	4-5/28S/24E	IC	DFO	---	TK	---	---	01/70	Unknown	2,500	2.5	2.5
	D2		IC	DFO	---	TK	---	---	01/70	Unknown	2,500	2.5	2.5
	GT1		GT	NG	DFO	PL	TK	---	05/73	Unknown	20,000	16	19
	2		ST	NG	RFO	PL	TK	---	06/76	Unknown	114,700	106	106
	3[1]		ST	BIT	---	RR	TK	---	09/82	Unknown	219,000	205	205
	5		CT	NG	---	PL	---	---	05/01	Unknown	245,000	213	233
	5		CA	WH	---	---	---	---	05/02	Unknown	120,000	125	121
Plant Total												670	689
System Total												**844**	**890**

[1]Lakeland's 60 percent portion of joint ownership with Orlando Utilities Commission.

[2]Lakeland does not maintain records of the number of days that alternate fuel is used.

[3]**Unit Type**	[4]**Fuel Type**	[5]**Fuel Transportation Method**
CA Combined Cycle Steam Part	DFO Distillate Fuel Oil	PL Pipeline
CT Combined Cycle Combustion Turbine	RFO Residual Fuel Oil	TK Truck
GT Combustion Gas Turbine	BIT Bituminous Coal	RR Railroad
ST Steam Turbine	WH Waste Heat	
	NG Natural Gas	

Table 8-2

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

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Rural & Residential					Commercial		
Year	Population	Members per Household	GWh	Average No. of Customers	Average kWh Consumption per Customer	GWh	Average No. of Customers	Average kWh Consumption per Customer
2010	253,009	2.51	1,530	100,719	15,191	753	11,806	63,781
2011	260,567	2.59	1,437	100,784	14,258	744	11,786	63,126
2012	262,288	2.59	1,343	101,252	13,264	727	11,765	61,793
2013	264,023	2.59	1,368	101,968	13,416	742	11,864	62,542
2014	271,379	2.63	1,400	103,099	13,579	752	12,022	62,552
2015	274,861	2.63	1,468	104,581	14,037	789	12,157	64,901
2016	279,331	2.64	1,473	105,932	13,905	795	12,225	65,031
2017	283,626	2.63	1,460	107,703	13,556	803	12,372	64,905
2018	288,157	2.64	1,524	109,043	13,976	813	12,543	64,817
2019	292,465	2.65	1,540	110,403	13,949	806	12,687	63,530
Forecast								
2020	296,809	2.65	1,512	112,139	13,483	815	12,835	63,498
2021	301,170	2.65	1,524	113,702	13,403	819	12,986	63,068
2022	305,535	2.65	1,541	115,319	13,363	825	13,139	62,790
2023	309,928	2.65	1,557	116,906	13,318	830	13,293	62,439
2024	314,315	2.65	1,575	118,449	13,297	836	13,443	62,188
2025	318,676	2.66	1,595	119,968	13,295	841	13,590	61,884
2026	323,012	2.66	1,612	121,440	13,274	845	13,733	61,531
2027	327,377	2.66	1,631	122,880	13,273	850	13,873	61,270
2028	331,696	2.67	1,652	124,282	13,292	856	14,009	61,104
2029	336,040	2.67	1,675	125,680	13,327	862	14,143	60,949

Table 8-3
Schedule 2.2: History and Forecast of Energy Consumption and Number of Customers by Customer Class

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Industrial						
Year	GWh	Average No. of Customers	Average kWh Consumption per Customer	Railroads and Railways	Street & Highway Lighting GWh	Other Sales to Public Authorities GWh	Total Sales to Ultimate Consumers GWh
2010	581	84	6,916,667	0	33	69	2,966
2011	578	86	6,720,930	0	33	73	2,864
2012	579	81	7,148,148	0	33	70	2,751
2013	618	79	7,822,785	0	33	70	2,831
2014	649	77	8,428,571	0	33	70	2,903
2015	670	76	8,815,789	0	34	73	3,034
2016	655	74	8,851,351	0	34	73	3,030
2017	648	72	9,000,000	0	35	72	3,018
2018	676	74	9,135,135	0	35	70	3,118
2019	667	76	8,776,316	0	35	69	3,117
Forecast							
2020	695	75	9,266,667	0	35	70	3,127
2021	698	76	9,184,211	0	35	70	3,146
2022	703	77	9,129,870	0	35	70	3,174
2023	707	79	8,949,367	0	35	70	3,199
2024	713	80	8,912,500	0	35	70	3,229
2025	717	81	8,851,852	0	35	71	3,259
2026	721	82	8,792,683	0	35	71	3,284
2027	726	83	8,746,988	0	35	71	3,313
2028	731	84	8,702,381	0	35	71	3,345
2029	735	84	8,750,000	0	36	71	3,379

Table 8-4

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

(1)	(2)	(3)	(4)	(5)	(6)
Year	Wholesale Purchases for Resale GWh	Wholesale Sales for Resale GWh	Net Energy for Load GWh	Other Customers (Average No.)	Total No. of Customers
2010	0	0	3,118	9,207	121,815
2011	0	0	2,893	9,070	121,725
2012	0	0	2,873	8,953	122,050
2013	0	0	2,919	8,892	122,803
2014	0	0	3,006	8,820	124,019
2015	0	0	3,126	8,860	125,674
2016	0	0	3,109	8,921	127,152
2017	0	0	3,086	8,966	129,113
2018	0	0	3,180	8,997	130,658
2019	0	0	3,189	9,051	132,217
Forecast					
2020	0	0	3,221	9,032	134,081
2021	0	0	3,241	9,060	135,825
2022	0	0	3,269	9,089	137,624
2023	0	0	3,297	9,118	139,396
2024	0	0	3,327	9,147	141,118
2025	0	0	3,357	9,176	142,814
2026	0	0	3,384	9,205	144,460
2027	0	0	3,413	9,235	146,070
2028	0	0	3,446	9,265	147,639
2029	0	0	3,481	9,295	149,203

Table 8-5
Schedule 3.1: History and Forecast of Summer Peak Demand Base Case (MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Residential		Commercial/Industrial		
Year	Total	Wholesale	Retail	Interrupt.	Load Management	Conservation	Load Management	Conservation	Net Firm Demand
2010	638	0	638	0	0	0	0	0	638
2011	611	0	611	0	0	0	0	0	611
2012	590	0	590	0	0	0	0	0	590
2013	602	0	602	0	0	0	0	0	602
2014	627	0	627	0	0	0	0	0	627
2015	632	0	632	0	0	0	0	0	632
2016	649	0	649	0	0	0	0	0	649
2017	644	0	644	0	0	0	0	0	644
2018	639	0	639	0	0	0	0	0	639
2019	667	0	667	0	0	0	0	0	667
Forecast									
2020	656	0	656	0	0	0	0	0	656
2021	659	0	659	0	0	0	0	0	659
2022	665	0	665	0	0	0	0	0	665
2023	669	0	669	0	0	0	0	0	669
2024	676	0	676	0	0	0	0	0	676
2025	680	0	680	0	0	0	0	0	680
2026	685	0	685	0	0	0	0	0	685
2027	691	0	691	0	0	0	0	0	691
2028	697	0	697	0	0	0	0	0	697
2029	703	0	703	0	0	0	0	0	703

Table 8-5a
Schedule 3.1a: History and Forecast of Summer Peak Demand Low Case (MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Residential		Commercial/Industrial		
Year	Total	Wholesale	Retail	Interrupt.	Load Management	Conservation	Load Management	Conservation	Net Firm Demand
2010	638	0	638	0	0	0	0	0	638
2011	611	0	611	0	0	0	0	0	611
2012	590	0	590	0	0	0	0	0	590
2013	602	0	602	0	0	0	0	0	602
2014	627	0	627	0	0	0	0	0	627
2015	632	0	632	0	0	0	0	0	632
2016	649	0	649	0	0	0	0	0	649
2017	644	0	644	0	0	0	0	0	644
2018	639	0	639	0	0	0	0	0	639
2019	667	0	667	0	0	0	0	0	667
Forecast									
2020	653	0	653	0	0	0	0	0	653
2021	656	0	656	0	0	0	0	0	656
2022	661	0	661	0	0	0	0	0	661
2023	666	0	666	0	0	0	0	0	666
2024	672	0	672	0	0	0	0	0	672
2025	677	0	677	0	0	0	0	0	677
2026	682	0	682	0	0	0	0	0	682
2027	687	0	687	0	0	0	0	0	687
2028	694	0	694	0	0	0	0	0	694
2029	699	0	699	0	0	0	0	0	699

Table 8-5b
Schedule 3.1b: History and Forecast of Summer Peak Demand High Case (MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Residential		Commercial/Industrial		
Year	Total	Wholesale	Retail	Interrupt.	Load Management	Conservation	Load Management	Conservation	Net Firm Demand
2010	638	0	638	0	0	0	0	0	638
2011	611	0	611	0	0	0	0	0	611
2012	590	0	590	0	0	0	0	0	590
2013	602	0	602	0	0	0	0	0	602
2014	627	0	627	0	0	0	0	0	627
2015	632	0	632	0	0	0	0	0	632
2016	649	0	649	0	0	0	0	0	649
2017	644	0	644	0	0	0	0	0	644
2018	639	0	639	0	0	0	0	0	639
2019	667	0	667	0	0	0	0	0	667
Forecast									
2020	659	0	659	0	0	0	0	0	659
2021	663	0	663	0	0	0	0	0	663
2022	668	0	668	0	0	0	0	0	668
2023	673	0	673	0	0	0	0	0	673
2024	679	0	679	0	0	0	0	0	679
2025	684	0	684	0	0	0	0	0	684
2026	689	0	689	0	0	0	0	0	689
2027	694	0	694	0	0	0	0	0	694
2028	701	0	701	0	0	0	0	0	701
2029	707	0	707	0	0	0	0	0	707

Table 8-6
Schedule 3.2: History and Forecast of Winter Peak Demand Base Case (MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total	Wholesale	Retail	Interrupt.	Residential		Comm./Ind.		Net Firm Demand
					Load Management	Conservation	Load Management	Conservation	
2010/11	709	0	709	0	0	0	0	0	709
2011/12	612	0	612	0	0	0	0	0	612
2012/13	549	0	549	0	0	0	0	0	549
2013/14	577	0	577	0	0	0	0	0	577
2014/15	653	0	653	0	0	0	0	0	653
2015/16	583	0	583	0	0	0	0	0	583
2016/17	534	0	534	0	0	0	0	0	534
2017/18	701	0	701	0	0	0	0	0	701
2018/19	545	0	545	0	0	0	0	0	545
2019/20	600	0	600	0	0	0	0	0	600
Forecast									
2020/21	690	0	690	0	0	0	0	0	690
2021/22	695	0	695	0	0	0	0	0	695
2022/23	700	0	700	0	0	0	0	0	700
2023/24	708	0	708	0	0	0	0	0	708
2024/25	711	0	711	0	0	0	0	0	711
2025/26	716	0	716	0	0	0	0	0	716
2026/27	722	0	722	0	0	0	0	0	722
2027/28	730	0	730	0	0	0	0	0	730
2028/29	734	0	734	0	0	0	0	0	734
2029/30	738	0	738	0	0	0	0	0	738

Table 8-6a
Schedule 3.2a: History and Forecast of Winter Peak Demand Low Case (MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total	Wholesale	Retail	Interrupt.	Residential		Comm./Ind.		Net Firm Demand
					Load Management	Conservation	Load Management	Conservation	
2010/11	709	0	709	0	0	0	0	0	709
2011/12	612	0	612	0	0	0	0	0	612
2012/13	549	0	549	0	0	0	0	0	549
2013/14	577	0	577	0	0	0	0	0	577
2014/15	653	0	653	0	0	0	0	0	653
2015/16	583	0	583	0	0	0	0	0	583
2016/17	534	0	534	0	0	0	0	0	534
2017/18	701	0	701	0	0	0	0	0	701
2018/19	545	0	545	0	0	0	0	0	545
2019/20	600	0	600	0	0	0	0	0	600
Forecast									
2020/21	686	0	686	0	0	0	0	0	686
2021/22	691	0	691	0	0	0	0	0	691
2022/23	696	0	696	0	0	0	0	0	696
2023/24	704	0	704	0	0	0	0	0	704
2024/25	707	0	707	0	0	0	0	0	707
2025/26	712	0	712	0	0	0	0	0	712
2026/27	717	0	717	0	0	0	0	0	717
2027/28	725	0	725	0	0	0	0	0	725
2028/29	729	0	729	0	0	0	0	0	729
2029/30	733	0	733	0	0	0	0	0	733

Table 8-6b
Schedule 3.2b: History and Forecast of Winter Peak Demand High Case (MW)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Year	Total	Wholesale	Retail	Interrupt.	Residential		Comm./Ind.		Net Firm Demand
					Load Management	Conservation	Load Management	Conservation	
2010/11	709	0	709	0	0	0	0	0	709
2011/12	612	0	612	0	0	0	0	0	612
2012/13	549	0	549	0	0	0	0	0	549
2013/14	577	0	577	0	0	0	0	0	577
2014/15	653	0	653	0	0	0	0	0	653
2015/16	583	0	583	0	0	0	0	0	583
2016/17	534	0	534	0	0	0	0	0	534
2017/18	701	0	701	0	0	0	0	0	701
2018/19	545	0	545	0	0	0	0	0	545
2019/20	600	0	600	0	0	0	0	0	600
Forecast									
2020/21	694	0	694	0	0	0	0	0	694
2021/22	699	0	699	0	0	0	0	0	699
2022/23	705	0	705	0	0	0	0	0	705
2023/24	713	0	713	0	0	0	0	0	713
2024/25	716	0	716	0	0	0	0	0	716
2025/26	721	0	721	0	0	0	0	0	721
2026/27	726	0	726	0	0	0	0	0	726
2027/28	735	0	735	0	0	0	0	0	735
2028/29	739	0	739	0	0	0	0	0	739
2029/30	742	0	742	0	0	0	0	0	742

Table 8-7
Schedule 3.3: History and Forecast of Annual Net Energy for Load – GWh
Base Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Total Sales	Residential Conservation	Comm./Ind. Conservation	Retail	Wholesale	Utility Use & Losses	Net Energy for Load	Load Factor %
2010	2,966	0	0	2,966	0	152	3,118	44%
2011	2,864	0	0	2,864	0	29	2,893	50%
2012	2,751	0	0	2,751	0	122	2,873	54%
2013	2,831	0	0	2,831	0	88	2,919	55%
2014	2,903	0	0	2,903	0	103	3,006	55%
2015	3,034	0	0	3,034	0	92	3,126	54%
2016	3,030	0	0	3,030	0	79	3,109	55%
2017	3,018	0	0	3,018	0	68	3,086	55%
2018	3,118	0	0	3,118	0	62	3,180	55%
2019	3,117	0	0	3,117	0	73	3,190	67%
Forecast								
2020	3,127	0	0	3,127	0	94	3,221	61%
2021	3,146	0	0	3,146	0	95	3,241	54%
2022	3,173	0	0	3,173	0	96	3,269	54%
2023	3,200	0	0	3,200	0	96	3,297	54%
2024	3,230	0	0	3,230	0	97	3,327	54%
2025	3,259	0	0	3,259	0	98	3,357	54%
2026	3,285	0	0	3,285	0	99	3,384	54%
2027	3,313	0	0	3,313	0	100	3,413	54%
2028	3,346	0	0	3,346	0	101	3,446	54%
2029	3,379	0	0	3,379	0	102	3,481	54%

Table 8-7a
Schedule 3.3a: History and Forecast of Annual Net Energy for Load – GWh
Low Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	Total Sales	Residential Conservation	Comm./Ind. Conservation	Retail	Wholesale	Utility Use & Losses	Net Energy for Load
2010	2,966	0	0	2,966	0	152	3,118
2011	2,864	0	0	2,864	0	29	2,893
2012	2,751	0	0	2,751	0	122	2,873
2013	2,831	0	0	2,831	0	88	2,919
2014	2,903	0	0	2,903	0	103	3,006
2015	3,034	0	0	3,034	0	92	3,126
2016	3,030	0	0	3,030	0	79	3,109
2017	3,018	0	0	3,018	0	68	3,086
2018	3,118	0	0	3,118	0	62	3,180
2019	3,117	0	0	3,117	0	73	3,190
Forecast							
2020	3,110	0	0	3,110	0	93	3,203
2021	3,129	0	0	3,129	0	94	3,223
2022	3,156	0	0	3,156	0	95	3,251
2023	3,183	0	0	3,183	0	95	3,278
2024	3,212	0	0	3,212	0	97	3,309
2025	3,240	0	0	3,240	0	98	3,338
2026	3,266	0	0	3,266	0	98	3,364
2027	3,294	0	0	3,294	0	99	3,393
2028	3,327	0	0	3,327	0	100	3,427
2029	3,359	0	0	3,359	0	101	3,460

Table 8-7b
Schedule 3.3b: History and Forecast of Annual Net Energy for Load – GWh
High Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	Total Sales	Residential Conservation	Comm./Ind. Conservation	Retail	Wholesale	Utility Use & Losses	Net Energy for Load
2010	2,966	0	0	2,966	0	152	3,118
2011	2,864	0	0	2,864	0	29	2,893
2012	2,751	0	0	2,751	0	122	2,873
2013	2,831	0	0	2,831	0	88	2,919
2014	2,903	0	0	2,903	0	103	3,006
2015	3,034	0	0	3,034	0	92	3,126
2016	3,030	0	0	3,030	0	79	3,109
2017	3,018	0	0	3,018	0	68	3,086
2018	3,118	0	0	3,118	0	62	3,180
2019	3,117	0	0	3,117	0	73	3,190
Forecast							
2020	3,144	0	0	3,144	0	94	3,238
2021	3,163	0	0	3,163	0	96	3,259
2022	3,191	0	0	3,191	0	96	3,287
2023	3,218	0	0	3,218	0	97	3,315
2024	3,248	0	0	3,248	0	98	3,346
2025	3,277	0	0	3,277	0	99	3,376
2026	3,303	0	0	3,303	0	100	3,403
2027	3,332	0	0	3,332	0	100	3,432
2028	3,365	0	0	3,365	0	101	3,466
2029	3,398	0	0	3,398	0	103	3,501

Table 8-8

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

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2019 Actual		2020 Forecast		2021 Forecast	
Month	Peak Demand[1] MW	NEL GWh	Peak Demand[1] MW	NEL GWh	Peak Demand[1] MW	NEL GWh
January	545	243	689	250	690	252
February	486	211	583	213	583	210
March	496	229	487	245	489	246
April	535	243	555	256	558	258
May	636	295	616	304	619	306
June	667	300	636	297	639	299
July	647	310	656	316	659	319
August	632	315	648	320	651	323
September	647	304	619	291	622	293
October	582	291	582	260	585	262
November	521	223	485	218	486	220
December	436	225	507	250	508	252

[1]Includes Conservation

Table 8-9

Schedule 5: Fuel Requirements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Calendar Year										
	Fuel Requirements	Type	UNITS	2019-Actual	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
(1)	Nuclear		Trillion Btu											
(2)	Coal[1]		1000 Ton	245	218	265	241	320	335	249	393	368	449	461
(3)	Residual	Steam	1000 BBL											
(4)		CC	1000 BBL											
(5)		CT	1000 BBL											
(6)		Total	1000 BBL											
(7)	Distillate	Steam	1000 BBL											
(8)		CC	1000 BBL											
(9)		CT	1000 BBL	1	2	1	3	1	1	3	2	3	3	2
(10)		Total	1000 BBL	1	2	1	3	1	1	3	2	3	3	2
(11)	Natural Gas	Steam	1000 MCF	1,187	0	0	0	0	0	0	0	0	0	0
(12)		CC	1000 MCF	17,563	18,627	18,615	19,144	18,243	18,136	17,290	15,462	14,157	12,698	12,281
(13)		CT	1000 MCF	8	156	191	193	245	197	220	216	247	230	368
(14)		Total	1000 MCF	18,758	18,783	18,806	19,337	18,488	18,333	17,510	15,678	14,404	12,928	12,649
(15)	Other		Trillion Btu											

[1] Fuel required for LAK's share (60%)

Table 8-10
Schedule 6.1: Energy Sources

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Calendar Year										
	Energy Sources	Type	UNITS	2019-Actual	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
(1)	Inter-Regional Interchange		GWh											
(2)	Nuclear		GWh											
(3)	Coal		GWh	548	460	562	510	684	724	526	399	307	979	1,003
(4)	Residual	Steam	GWh	0	0	0	0	0	0	0	0	0	0	0
(5)		CC	GWh	0	0	0	0	0	0	0	0	0	0	0
(6)		CT	GWh	0	0	0	0	0	0	0	0	0	0	0
(7)		Total	GWh	0	0	0	0	0	0	0	0	0	0	0
(8)	Distillate	Steam	GWh	0	0	0	0	0	0	0	0	0	0	0
(9)		CC	GWh	0	0	0	0	0	0	0	0	0	0	0
(10)		CT	GWh	0	2	1	2	1	1	2	2	1	2	1
(11)		Total	GWh	0	2	1	2	1	1	2	2	1	2	1
(12)	Natural Gas	Steam	GWh											
(13)		CC	GWh	2,382	2,609	2,706	2,785	2,666	2,636	2,517	2,238	2,340	2,056	1,740
(14)		CT	GWh	0	15	11	13	18	15	16	15	18	14	27
(15)		Total	GWh	2,382	2,624	2,717	2,798	2,684	2,651	2,533	2,253	2,358	2,070	1767
(16)	NUG													
(17)	Solar			28	28	28	28	28	28	28	28	28	28	28
(18)	Other (Purchase/Sales)[1]			231	107	-67	-69	-100	-77	268	702	719	367	682
(19)	Net Energy for Load		GWh	3,189	3,221	3,241	3,269	3,297	3,327	3,357	3,384	3,413	3,446	3,481

[1] Intra-Regional Net Interchange

Table 8-11
Schedule 6.2: Energy Sources

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Calendar Year										
	Energy Source	Type	Units	2019-Actual	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
(1)	Inter-Regional Interchange		%	0.0	0.0	0.0	0.0	0.0	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
(3)	Coal		%	17.2%	14.3%	17.3%	15.6%	20.7%	21.8%	15.7%	11.8%	9.0%	28.4%	28.8%
(4)	Residual	Steam	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(5)		CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(6)		CT	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(7)		Total	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(8)	Distillate	Steam	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(9)		CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(10)		CT	%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%
(11)		Total	%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%
(12)	Natural Gas	Steam	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(13)		CC	%	74.7%	81.0%	83.5%	85.2%	80.9%	79.2%	75.0%	66.1%	68.6%	59.7%	50.0%
(14)		CT	%	0.0%	0.5%	0.3%	0.4%	0.5%	0.5%	0.5%	0.4%	0.5%	0.4%	0.8%
(15)		Total	%	74.7%	81.5%	83.8%	85.6%	81.4%	79.7%	75.5%	66.6%	69.1%	60.1%	50.8%
(16)	NUG		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Solar		%	0.9%	0.9%	0.9%	0.9%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
	Other (Specify)[1]		%	7.2%	3.3%	-2.1%	-2.1%	-3.0%	-2.3%	8.0%	20.7%	21.1%	10.7%	19.6%
(18)	Net Energy for Load		%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

[1] Other = Intra-Regional Net Interchange

Table 8-12

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)
Year	Total Installed Capacity	Firm Capacity Import	Firm Capacity Export	Projected Firm Net To Grid from NUG	Total Capacity Available	System Firm Peak Demand	Reserve Margin Before Maintenance[1]		Scheduled Maintenance	Reserve Margin After Maintenance[1]	
	MW	MW	MW	MW	MW	MW	MW	%	MW	MW	%
2020	853	0	0	7	860	656	204	31	0	204	31
2021	853	0	0	7	860	659	201	30	0	201	30
2022	853	0	0	7	860	665	195	29	0	195	29
2023	853	0	0	7	860	669	191	28	0	191	28
2024	853	0	0	7	860	676	184	27	0	184	27
2025	853	0	0	7	860	680	180	26	0	180	26
2026	853	0	0	7	860	685	175	26	0	175	26
2027	853	0	0	7	860	691	169	25	0	169	25
2028	853	0	0	7	860	697	163	23	0	163	23
2029	853	0	0	7	860	703	157	22	0	157	22

Table 8-13

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)
Year	Total Installed Capacity	Firm Capacity Import	Firm Capacity Export	Projected Firm Net To Grid from NUG	Total Capacity Available	System Firm Peak Demand	Reserve Margin Before Maintenance[1]		Scheduled Maintenance	Reserve Margin After Maintenance[1]	
	MW	MW	MW	MW	MW	MW	MW	%	MW	MW	%
2020/21	909	0	0	0	909	690	219	32	0	219	32
2021/22	909	0	0	0	909	695	214	31	0	214	31
2022/23	909	0	0	0	909	700	209	30	0	209	30
2023/24	909	0	0	0	909	708	201	28	0	201	28
2024/25	909	0	0	0	909	711	198	28	0	198	28
2025/26	909	0	0	0	909	716	193	27	0	193	27
2026/27	909	0	0	0	909	722	187	26	0	187	26
2027/28	909	0	0	0	909	730	179	25	0	179	25
2028/29	909	0	0	0	909	734	175	24	0	175	24
2029/30	909	0	0	0	909	738	171	23	0	171	23

[1] Includes Conservation

Table 8-14
Schedule 8.0: Planned and Prospective Generating Facility Additions and Changes

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Plant Name	Unit No.	Location	Unit Type	Fuel		Fuel Transport		Const Start	Commercial In-Service	Expected Retirement	Gen Max Nameplate	Net Capability		Status
				Pri.	Alt.	Pri.	Alt.	Mo/Yr	Mo/Yr	Mo/Yr	MW	Sum MW	Win MW	
C.D. McIntosh Power Plant	Gas Turbine #2	Polk County	CT	NG	DFO	PL	TK	Apr-19	Apr-20	UNKNOWN	135	115	125	V
C.D. McIntosh Power Plant	2	Polk County	ST	NG	RFO	PL	TK			Apr-20	114.7	106	106	RT

Table 8-15
Schedule 9.1: Status Report and Specifications of Approved Generating Facilities

(1)	Plant Name and Unit Number:	MCINTOSH UNIT GT 2
(2)	Capacity:	
(3)	Summer MW	115
(4)	Winter MW	125
(5)	Technology Type:	CT
(6)	Anticipated Construction Timing:	
(7)	Field Construction Start-date:	Apr-19
(8)	Commercial In-Service date:	Apr-20
(9)	Fuel	
(10)	Primary	NG
(11)	Alternate	DFO
(12)	Air Pollution Control Strategy:	WATER INJECTION
(13)	Cooling Method:	AIR
(14)	Total Site Area:	2 ACRES
(15)	Construction Status:	Not started as of 12 /31/2018
(16)	Certification Status:	N/A
(17)	Status with Federal Agencies:	PERMITTTED
(18)	*Projected* Unit Performance Data:	
(19)	Planned Outage Factor (POF):	2%
(20)	Forced Outage Factor (FOF):	2%
(21)	Equivalent Availability Factor (EAF):	96%
(22)	Resulting Capacity Factor (%):	<10%
(23)	Average Net Operating Heat Rate (ANOHR):	12,000
(24)	*Projected* Unit Financial Data:	
(25)	Book Life:	20 YEARS
(26)	Total Installed Cost (In-Service year $/kW):	N/A
(27)	Direct Construction Cost ($/kW):	N/A
(28)	AFUDC Amount ($/kW):	N/A
(29)	Escalation ($/kW):	N/A
(30)	Fixed O&M ($/kW-yr):	N/A
(31)	Variable O&M ($/MWh):	N/A

Table 8-16

Schedule 9.2: Status Report and Specifications of Proposed Generating Facilities

(1)	Plant Name and Unit Number:	None in Current Planning Cycle
(2)	Capacity:	
(3)	Summer MW	
(4)	Winter MW	
(5)	Technology Type:	
(6)	Anticipated Construction Timing:	
(7)	Field Construction Start-date:	
(8)	Commercial In-Service date:	
(9)	Fuel	
(10)	Primary	
(11)	Alternate	
(12)	Air Pollution Control Strategy:	
(13)	Cooling Method:	
(14)	Total Site Area:	
(15)	Construction Status:	
(16)	Certification Status:	
(17)	Status with Federal Agencies:	
(18)	Projected Unit Performance Data:	
(19)	Planned Outage Factor (POF):	
(20)	Forced Outage Factor (FOF):	
(21)	Equivalent Availability Factor (EAF):	
(22)	Resulting Capacity Factor (%):	
(23)	Average Net Operating Heat Rate (ANOHR):	
(24)	Projected Unit Financial Data:	
(25)	Book Life:	
(26)	Total Installed Cost (In-Service year $/kW):	
(27)	Direct Construction Cost ($/kW):	
(28)	AFUDC Amount ($/kW):	
(29)	Escalation ($/kW):	
(30)	Fixed O&M ($/kW-yr):	
(31)	Variable O&M ($/MWh):	

Table 8-17
Schedule 10: Statrus Report and Specifications of Proposed
Directly Associated Transmission Lines

(1)	Point of Origin and Termination:	None planned.
(2)	Number of Lines:	None planned.
(3)	Right of Way:	None planned.
(4)	Line Length:	None planned.
(5)	Voltage:	None planned.
(6)	Anticipated Construction Time:	None planned.
(7)	Anticipated Capital Investment:	None planned.
(8)	Substations:	None planned.
(9)	Participation with Other Utilities:	None planned.

8.1 Abbreviations and Descriptions

The following abbreviations are used throughout the Ten-Year Site Plan Schedules.

Abbreviation	Description
Unit Type	
CA	Combined Cycle Steam Part
GT	Combustion Gas Turbine
ST	Steam Turbine
CT	Combustion Turbine
CC	Combined Cycle
IC	Internal Combustion Engine
Fuel Type	
NG	Natural Gas
DFO	Distillate Fuel Oil
RFO	Residual Fuel Oil
BIT	Bituminous Coal
WH	Waste Heat
Fuel Transportation Method	
PL	Pipeline
TK	Truck
RR	Railroad
Unit Status Code	
RE	Retired
SB	Cold Standby (Reserve)
TS	Construction Complete, not yet in commercial operation
U	Under Construction
P	Planned for installation

Intentionally Blank