Report
03/29/2019

LAKELAND ELECTRIC
POWERED FOR LIFE

March 28, 2019

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

Re: 2019 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 hereby submits 5 printed copies of its 2018 Ten Year Site Plan.

If you have any questions please do not hesitate to contact me at 863-834-6595.

Sincerely,

Cynthia Clemmons

Cynthia Clemmons
City of Lakeland
Manager of Legislative and Regulatory Relations
Lakeland Electric
863-834-6595 Work
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Lakeland, Florida 33801

Enclosure

# Lakeland Electric
# Ten-Year Site Plan 2019-2028

April 2019

Submitted to:
**Florida Public Service Commission**

LAKELAND ELECTRIC
POWERED FOR LIFE

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

# 1.0 Introduction [SECTION 1]

This report contains the 2019 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 after December 31, 2018. 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 2019 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 2018).

## 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. This section also provides Table 7-1 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 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 has a 30-year firm powerwheeling 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. 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, 2018.

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, 2018. 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 has not set any retirement plans for any units.

### *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 550 MW which occurred on January 29, 2018. Summer peaks have typically occurred between June and August, but the 2018 summer peak of 637 MWs occurred on September 17, 2018. 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** | [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 2-1a

Lakeland Electric Existing Generating Facilities

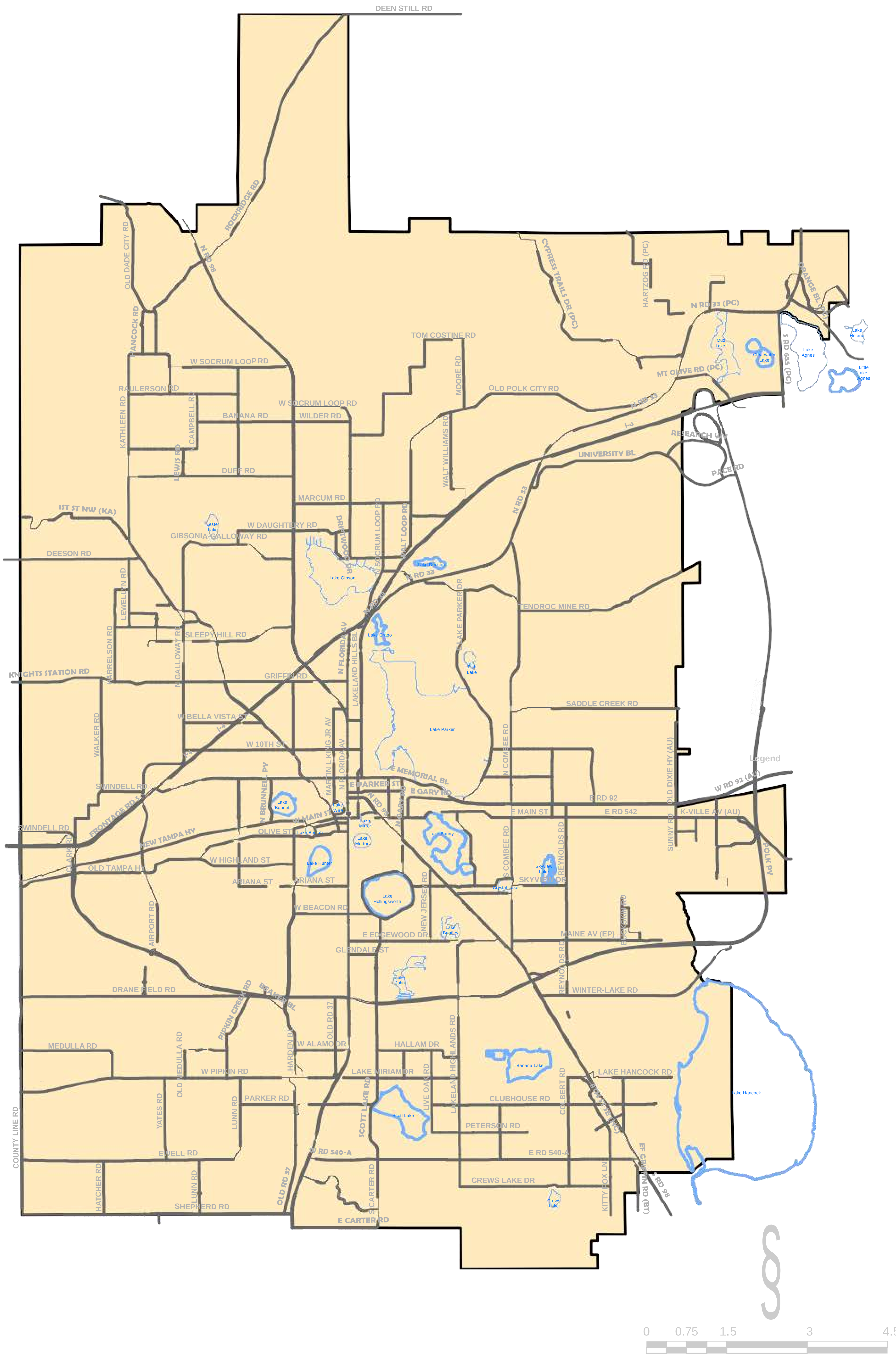
| | | | | Fuel[4] | | Fuel Transport[5] | | | | | | Net Capability | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant Name | Unit No. | Location | Unit Type[3] | Pri | Alt | Pri | Alt | Alt Fuel Days Use[2] | Commercial In-Service Month/Year | Expected Retirement Month/Year | Gen. Max. Nameplate kW | Summer MW | Winter MW |
| Winston Peaking Station | 1-20 | 21/28S/23E | IC | DFO | --- | TK | --- | 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: Lakeland Electric System Service Territory (as of December, 2018)**



# 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 2018 was 288,157 persons.

Population Forecast

Lakeland Electric's service territory population is projected to increase at an estimated 1.38% average annual growth rate (AAGR) for years 2019 – 2028.

Polk County's population (Lakeland / Winter Haven MSA) is expected to grow at 1.70% 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:

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

*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

$\alpha$ , $\beta$ , $\gamma$ 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:

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

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:

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

*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 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 January to March, on weekdays, and between the hours of 7 and 8 a.m. Temperatures at time of winter peaks range from 27° F to 46° F.

The summer peak forecast is developed under the assumption that its occurrence will be on a July weekday. Historical summer peaks have typically occurred between the months of June to August, on weekdays, and between the hours of 3 and 6 p.m. Temperatures at time of summer peaks range from 92° F to 99° 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).

# 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 2018*

In keeping with Lakeland Electric's plan to promote retail conservation programs, the utility is continuing the following Energy Efficiency & Conservation Programs during 2018:

**Residential**

- Insulation rebate - $200 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 - $300 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 2018**

- 2.7 MW demand reduction and over 5,133 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, contributes to reduce peak demand/energy, linking it to energy conservation & management programs. As such, they can potentially fill the much desired role that an electric utility needs to avoid future costs of building new (and/or re-working existing) supply side resources and delivery systems.

### *4.2.1 Utility Interactive Net Metered Photovoltaic Systems*

As of December 2018, 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. In October 2008, Lakeland Electric approved the contract with the vendor. Installation of these PV systems began in 2010.

During 2010, an investor owned 250 kW PV system was installed on the roof of Lakeland’s Civic Center.

During 2011 a 2.25 MW PV system (Phase 1) was installed at the Lakeland Linder Airport.

During 2012, a 2.75 MW PV system (Phase 2) was added to the Hamilton Road site bringing the project total to 5.0 MW.

During 2015, 6.0 MW PV system was added on property adjacent to the Sutton substation.

During 2016 another 3.15 MW PV system was added on Lakeland Airport property at Medulla Rd.

Lakeland Electric has a total of 14.4 MW of solar capacity which has the potential to produce approximately 3.5% of the average daytime system wide summer load, and 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 is around 25,000 REC's annually.

### *4.2.5 Community Solar*

During the second half of 2015, Lakeland Electric conducted telephone surveys and held focus group meetings to determine the level of interest in a Community Solar Program. Community Solar programs provide an alternative to the traditional process of individuals or businesses placing solar on their property. In this program, Lakeland Electric's customers will have the choice of purchasing solar energy from a designated solar generation facility instead of a traditional power plant.

Joining other utilities across the United States, Lakeland Electric has chosen Community Solar as a means to increase participation in solar energy for the people who may have physical, financial, or other limitations to installing solar on their own property.

A rollout date for Community Solar has not been determined.

### *4.2.6 Energy Storage Pilot Project*

Lakeland Electric is constantly looking to provide its customer base with the highest value by offering creative solutions to improve reliability and efficiency. Lakeland Electric deployed a pilot battery energy storage project of installed capacity of 6 kW in 2017. The energy storage solution is intended to provide energy storage capability to shave customer's peak demand which can potentially lead to monetary savings. In this pilot program, Lakeland Electric charges the storage unit from the solar energy during off-peak hours and discharges daily during peak hours.

# 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 2.1 percent, per year, based on the Congressional Budget Office's projection for the Gross Domestic Product deflator as of June 2019.

### *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 4.0 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 4.0 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 4.0 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 2.0 percent issuance fee, a 1.0 percent annual insurance cost, and a 6 month debt reserve fund earning interest at a rate equal to the bond interest rate.

## *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. Increasing production of natural gas from the Marcellus shale and advance drilling technology has lower mining cost contributing to increase supply which reduces price volatility seen in recent years. Recent periods have experienced gas trading around $3.00 per MMBtu and the five year NYMEX Henry Hub Natural Gas forward curve is projecting the price to average under $2.90 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.

### *5.4.1.2.2 Florida Gas Transmission market area pipeline system*

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. Lakeland Electric currently has in excess of 28,000 MMBtu / day of firm transportation contracted with FGT for natural gas delivery to Lakeland Electric's generation facilities.

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 2018 U.S. Energy Information Administration (EIA) forecast.

#### *5.4.2.1 Coal supply and availability*

On January 3, 2017 the City of Lakeland (the City) entered into a three year contract with Illinois Basin for 455,000 tons annually. Following an RFP process in late 2018, the City entered a two year contract on January 1, 2019 totaling 90,000 tons of low sulfur coal and executed an option to extend another contract for 102,000 tons for blending purposes with the coals being sourced from Indiana (Illinois Basin) and Eastern Kentucky (Central Appalachian). Normally a 40 to 75 day coal supply reserve (100,000-150,000 tons) is maintained at the McIntosh Plant.

#### *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 650,000-675,000 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 two year coal transportation contract effective October 1, 2014 with CSX, but this contract was extended and is scheduled to expire December 31, 2019. The City is currently negotiating to renew the CSX contract for another two year period.

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 effective, September 30, 2020, with the option to renew annually 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 2018-2028 Congressional Budget Office (CBO) Gross Domestic Product inflation rate of 2%. 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 2018.

### *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 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 tariff rates listed below became effective, February 1, 2019.

.

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

| | Table 5-1<br>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 | 96.81 | 55.763 | 70.41 |
| Usage | 4.39 | 4.39 | 3.06 | 0.00 | 0.0213 | 0.0068 |
| Total | 57.57 | 67.57 | 136.05 | 96.81 | 55.7813 | 70.4168 |
| Fuel Charge | 2.41% | 2.41% | 2.41% | 2.41% | 1.85% | 1.85% |
| | * A DTH is equivalent to 1 MMBtu or 1 MCF<br>** 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 few years (i.e., average growth rate of 1%). The average delivered gas price forecast for the year 2019 is below $3.8/MMBtu.

### *5.4.4.2 Coal price forecast*

Lakeland Electric has multiple contracts for coal supply, the longest of which expires on December 31, 2020. Coal prices are expected to continue increasing this year due to a large increase in cost for Central Appalachian created by the export markets. This coal is used for blending. The Illinois Basin pricing had a modest price increase. Expected delivered coal price to Lakeland Electric is around $3/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 has not established retirement dates for any of its existing generators.

## *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 at McIntosh Power Plant in 2020. This plant 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 (MW) | Net System Purchases (MW) | Net System Sales (MW) | Net System Capacity (MW) | System Peak Demand: Before Interruptible and Load Management (MW) | System Peak Demand: After Interruptible and Load Management (MW) | Reserve Margin: Before Interruptible and Load Management (%) | Reserve Margin: After Interruptible and Load Management (%) | Excess/ (Deficit) to Maintain 15% Reserve Margin: Before Interruptible and Load Management (MW) | Excess/ (Deficit) to Maintain 15% Reserve Margin: After Interruptible and Load Management (MW) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2019/20 | 890 | 0 | 0 | 890 | 687 | 687 | 30 | 30 | 203 | 203 |
| 2020/21 | 1015 | 0 | 0 | 1015 | 688 | 688 | 48 | 48 | 327 | 327 |
| 2021/22 | 1015 | 0 | 0 | 1015 | 693 | 693 | 46 | 46 | 322 | 322 |
| 2022/23 | 1015 | 0 | 0 | 1015 | 699 | 699 | 45 | 45 | 316 | 316 |
| 2023/24 | 1015 | 0 | 0 | 1015 | 707 | 707 | 44 | 44 | 308 | 308 |
| 2024/25 | 1015 | 0 | 0 | 1015 | 710 | 710 | 43 | 43 | 305 | 305 |
| 2025/26 | 1015 | 0 | 0 | 1015 | 715 | 715 | 42 | 42 | 300 | 300 |
| 2026/27 | 1015 | 0 | 0 | 1015 | 721 | 721 | 41 | 41 | 294 | 294 |
| 2027/28 | 1015 | 0 | 0 | 1015 | 730 | 730 | 39 | 39 | 285 | 285 |
| 2028/29 | 1015 | 0 | 0 | 1015 | 734 | 734 | 38 | 38 | 281 | 281 |

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

| | | | | | System Peak Demand | | Reserve Margin | | Excess/ (Deficit) to Maintain 15% Reserve Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Net Generating Capacity (MW) | Net System Purchases (MW) | Net System Sales (MW) | Net System Capacity (MW) | Before Interruptible and Load Management (MW) | After Interruptible and Load Management (MW) | Before Interruptible and Load Management (%) | After Interruptible and Load Management (%) | Before Interruptible and Load Management (MW) | After Interruptible and Load Management (MW) |
| 2018 | 844 | 0 | 0 | 844 | 645 | 645 | 31 | 31 | 199 | 199 |
| 2019 | 959 | 0 | 0 | 959 | 650 | 650 | 30 | 30 | 194 | 194 |
| 2020 | 959 | 0 | 0 | 959 | 654 | 654 | 47 | 47 | 305 | 305 |
| 2021 | 959 | 0 | 0 | 959 | 660 | 660 | 45 | 45 | 299 | 299 |
| 2022 | 959 | 0 | 0 | 959 | 666 | 666 | 44 | 44 | 293 | 293 |
| 2023 | 959 | 0 | 0 | 959 | 673 | 673 | 42 | 42 | 286 | 286 |
| 2024 | 959 | 0 | 0 | 959 | 679 | 679 | 41 | 41 | 280 | 280 |
| 2025 | 959 | 0 | 0 | 959 | 686 | 686 | 40 | 40 | 273 | 273 |
| 2026 | 959 | 0 | 0 | 959 | 692 | 692 | 39 | 39 | 267 | 267 |
| 2027 | 959 | 0 | 0 | 959 | 701 | 701 | 37 | 37 | 258 | 258 |

# 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. Not all land and environmental feature details were available as of December 31, 2018. See Table 8-15 for the data that was available at the time of this report.

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

All existing units are fully permitted and meet all regulatory requirements. Table 7-1 summarizes different control strategies adopted to comply with various environmental emissions for existing major generating units.

Table 7-1
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 | $SO_2$ | $NO_x$ | CO | |
| Charles Larsen Memorial | 8 (CC) | NG | DFO | None | LS | LNB<br>WI | None | OTF |
| C. D. McIntosh, Jr. | 2 (ST) | NG | RFO | None | LS | FGR | None | WCTM |
| | 3 (ST) | Coal | -- | ESP | FGD | LNB<br>OFA<br>SCR | None | WCTM |
| | 5 (CC) | NG | -- | None | LS | LNB<br>SCR | OC | WCTM |
| Winston | 1-20 (IC) | DFO | -- | None | LS | SCR | OC | N/A |

| | | | | | |
|---|---|---|---|---|---|
| PM | Particulate matter | OTF | Once-through flow | FGD | Flue gas desulfurization |
| $SO_2$ | Sulfur dioxide | FGR | Flue gas recirculation | OFA | Overfire air |
| $NO_x$ | Nitrogen oxides | IC | Internal combustion | SCR | Selective catalytic reduction |
| CO | Carbon monoxide | NG | Natural Gas | ST | Steam turbine |
| LS | Low sulfur fuel | WCTM | Water cooling tower mechanical | OC | Oxidation catalyst |
| LNB | Low $NO_x$ burners | ESP | Electrostatic precipitator | DFO | Distillate Fuel Oil |
| WI | Water injection | CC | Combined Cycle | Alt | Alternate |
| RFO | Residual Fuel Oil | | | | |

Source: Lakeland Environmental Staff

# 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, 2018

| (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 | 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]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, 2018

| | | | | 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 | --- | 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**

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 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 |
| 2009 | 253,084 | 2.51 | 1,417 | 100,641 | 14,080 | 749 | 11,836 | 63,282 |
| 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 |
| Forecast | | | | | | | | |
| 2019 | 292,141 | 2.64 | 1,497 | 110,597 | 13,536 | 819 | 12,647 | 64,758 |
| 2020 | 296,408 | 2.64 | 1,503 | 112,217 | 13,394 | 823 | 12,792 | 64,337 |
| 2021 | 300,650 | 2.64 | 1,514 | 113,769 | 13,308 | 832 | 12,934 | 64,327 |
| 2022 | 304,865 | 2.64 | 1,528 | 115,319 | 13,250 | 841 | 13,072 | 64,336 |
| 2023 | 309,089 | 2.64 | 1,544 | 116,885 | 13,210 | 850 | 13,212 | 64,335 |
| 2024 | 313,300 | 2.64 | 1,562 | 118,455 | 13,186 | 858 | 13,352 | 64,260 |
| 2025 | 317,484 | 2.64 | 1,579 | 120,042 | 13,154 | 867 | 13,493 | 64,256 |
| 2026 | 321,649 | 2.64 | 1,596 | 121,618 | 13,123 | 876 | 13,635 | 64,246 |
| 2027 | 325,887 | 2.65 | 1,614 | 123,177 | 13,103 | 885 | 13,775 | 64,247 |
| 2028 | 330,124 | 2.65 | 1,635 | 124,717 | 13,110 | 895 | 13,914 | 64,324 |

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 |
| 2009 | 590 | 84 | 7,023,810 | 0 | 33 | 71 | 2,860 |
| 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 |
| Forecast | | | | | | | |
| 2019 | 682 | 73 | 9,342,466 | 0 | 36 | 70 | 3,104 |
| 2020 | 687 | 74 | 9,283,784 | 0 | 36 | 70 | 3,119 |
| 2021 | 691 | 75 | 9,213,333 | 0 | 36 | 70 | 3,143 |
| 2022 | 696 | 76 | 9,157,895 | 0 | 36 | 70 | 3,171 |
| 2023 | 701 | 77 | 9,103,896 | 0 | 36 | 71 | 3,202 |
| 2024 | 708 | 78 | 9,076,923 | 0 | 36 | 70 | 3,234 |
| 2025 | 712 | 79 | 9,012,658 | 0 | 36 | 71 | 3,265 |
| 2026 | 717 | 80 | 8,962,500 | 0 | 36 | 71 | 3,296 |
| 2027 | 723 | 81 | 8,925,926 | 0 | 36 | 71 | 3,329 |
| 2028 | 729 | 82 | 8,890,244 | 0 | 36 | 71 | 3,367 |

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 |
| 2009 | 0 | 0 | 2,992 | 9,430 | 121,991 |
| 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 |
| Forecast | | | | | |
| 2019 | 0 | 0 | 3,195 | 8,999 | 132,316 |
| 2020 | 0 | 0 | 3,210 | 9,029 | 134,112 |
| 2021 | 0 | 0 | 3,235 | 9,059 | 135,837 |
| 2022 | 0 | 0 | 3,264 | 9,090 | 137,557 |
| 2023 | 0 | 0 | 3,296 | 9,120 | 139,294 |
| 2024 | 0 | 0 | 3,329 | 9,151 | 141,036 |
| 2025 | 0 | 0 | 3,361 | 9,183 | 142,797 |
| 2026 | 0 | 0 | 3,393 | 9,214 | 144,547 |
| 2027 | 0 | 0 | 3,427 | 9,246 | 146,279 |
| 2028 | 0 | 0 | 3,466 | 9,278 | 147,990 |

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 |
| 2009 | 625 | 0 | 625 | 0 | 0 | 0 | 0 | 0 | 625 |
| 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 | 630 | 0 | 630 | 0 | 0 | 0 | 0 | 0 | 630 |
| 2016 | 646 | 0 | 646 | 0 | 0 | 0 | 0 | 0 | 646 |
| 2017 | 643 | 0 | 643 | 0 | 0 | 0 | 0 | 0 | 643 |
| 2018 | 637 | 0 | 637 | 0 | 0 | 0 | 0 | 0 | 637 |
| Forecast | | | | | | | | | |
| 2019 | 645 | 0 | 645 | 0 | 0 | 0 | 0 | 0 | 645 |
| 2020 | 650 | 0 | 650 | 0 | 0 | 0 | 0 | 0 | 650 |
| 2021 | 654 | 0 | 654 | 0 | 0 | 0 | 0 | 0 | 654 |
| 2022 | 660 | 0 | 660 | 0 | 0 | 0 | 0 | 0 | 660 |
| 2023 | 666 | 0 | 666 | 0 | 0 | 0 | 0 | 0 | 666 |
| 2024 | 673 | 0 | 673 | 0 | 0 | 0 | 0 | 0 | 673 |
| 2025 | 679 | 0 | 679 | 0 | 0 | 0 | 0 | 0 | 679 |
| 2026 | 686 | 0 | 686 | 0 | 0 | 0 | 0 | 0 | 686 |
| 2027 | 692 | 0 | 692 | 0 | 0 | 0 | 0 | 0 | 692 |
| 2028 | 701 | 0 | 701 | 0 | 0 | 0 | 0 | 0 | 701 |

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 |
| 2009 | 625 | 0 | 625 | 0 | 0 | 0 | 0 | 0 | 625 |
| 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 | 630 | 0 | 630 | 0 | 0 | 0 | 0 | 0 | 630 |
| 2016 | 646 | 0 | 646 | 0 | 0 | 0 | 0 | 0 | 646 |
| 2017 | 643 | 0 | 643 | 0 | 0 | 0 | 0 | 0 | 643 |
| 2018 | 637 | 0 | 637 | 0 | 0 | 0 | 0 | 0 | 637 |
| Forecast | | | | | | | | | |
| 2019 | 641 | 0 | 641 | 0 | 0 | 0 | 0 | 0 | 641 |
| 2020 | 646 | 0 | 646 | 0 | 0 | 0 | 0 | 0 | 646 |
| 2021 | 651 | 0 | 651 | 0 | 0 | 0 | 0 | 0 | 651 |
| 2022 | 657 | 0 | 657 | 0 | 0 | 0 | 0 | 0 | 657 |
| 2023 | 663 | 0 | 663 | 0 | 0 | 0 | 0 | 0 | 663 |
| 2024 | 670 | 0 | 670 | 0 | 0 | 0 | 0 | 0 | 670 |
| 2025 | 675 | 0 | 675 | 0 | 0 | 0 | 0 | 0 | 675 |
| 2026 | 682 | 0 | 682 | 0 | 0 | 0 | 0 | 0 | 682 |
| 2027 | 688 | 0 | 688 | 0 | 0 | 0 | 0 | 0 | 688 |
| 2028 | 697 | 0 | 697 | 0 | 0 | 0 | 0 | 0 | 697 |

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 |
| 2009 | 625 | 0 | 625 | 0 | 0 | 0 | 0 | 0 | 625 |
| 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 | 630 | 0 | 630 | 0 | 0 | 0 | 0 | 0 | 630 |
| 2016 | 646 | 0 | 646 | 0 | 0 | 0 | 0 | 0 | 646 |
| 2017 | 643 | 0 | 643 | 0 | 0 | 0 | 0 | 0 | 643 |
| 2018 | 637 | 0 | 637 | 0 | 0 | 0 | 0 | 0 | 637 |
| Forecast | | | | | | | | | |
| 2019 | 648 | 0 | 648 | 0 | 0 | 0 | 0 | 0 | 648 |
| 2020 | 653 | 0 | 653 | 0 | 0 | 0 | 0 | 0 | 653 |
| 2021 | 658 | 0 | 658 | 0 | 0 | 0 | 0 | 0 | 658 |
| 2022 | 664 | 0 | 664 | 0 | 0 | 0 | 0 | 0 | 664 |
| 2023 | 670 | 0 | 670 | 0 | 0 | 0 | 0 | 0 | 670 |
| 2024 | 677 | 0 | 677 | 0 | 0 | 0 | 0 | 0 | 677 |
| 2025 | 683 | 0 | 683 | 0 | 0 | 0 | 0 | 0 | 683 |
| 2026 | 689 | 0 | 689 | 0 | 0 | 0 | 0 | 0 | 689 |
| 2027 | 696 | 0 | 696 | 0 | 0 | 0 | 0 | 0 | 696 |
| 2028 | 705 | 0 | 705 | 0 | 0 | 0 | 0 | 0 | 705 |

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 | |
| 2009/10 | 804 | 0 | 804 | 0 | 0 | 0 | 0 | 0 | 804 |
| 2010/11 | 665 | 0 | 665 | 0 | 0 | 0 | 0 | 0 | 665 |
| 2011/12 | 612 | 0 | 612 | 0 | 0 | 0 | 0 | 0 | 612 |
| 2012/13 | 553 | 0 | 553 | 0 | 0 | 0 | 0 | 0 | 553 |
| 2013/14 | 579 | 0 | 579 | 0 | 0 | 0 | 0 | 0 | 579 |
| 2014/15 | 656 | 0 | 656 | 0 | 0 | 0 | 0 | 0 | 656 |
| 2015/16 | 589 | 0 | 589 | 0 | 0 | 0 | 0 | 0 | 589 |
| 2016/17 | 539 | 0 | 539 | 0 | 0 | 0 | 0 | 0 | 539 |
| 2017/18 | 704 | 0 | 704 | 0 | 0 | 0 | 0 | 0 | 704 |
| 2018/19 | 550 | 0 | 550 | 0 | 0 | 0 | 0 | 0 | 550 |
| Forecast | | | | | | | | | |
| 2019/20 | 687 | 0 | 687 | 0 | 0 | 0 | 0 | 0 | 687 |
| 2020/21 | 688 | 0 | 688 | 0 | 0 | 0 | 0 | 0 | 688 |
| 2021/22 | 693 | 0 | 693 | 0 | 0 | 0 | 0 | 0 | 693 |
| 2022/23 | 699 | 0 | 699 | 0 | 0 | 0 | 0 | 0 | 699 |
| 2023/24 | 707 | 0 | 707 | 0 | 0 | 0 | 0 | 0 | 707 |
| 2024/25 | 710 | 0 | 710 | 0 | 0 | 0 | 0 | 0 | 710 |
| 2025/26 | 715 | 0 | 715 | 0 | 0 | 0 | 0 | 0 | 715 |
| 2026/27 | 721 | 0 | 721 | 0 | 0 | 0 | 0 | 0 | 721 |
| 2027/28 | 730 | 0 | 730 | 0 | 0 | 0 | 0 | 0 | 730 |
| 2028/29 | 734 | 0 | 734 | 0 | 0 | 0 | 0 | 0 | 734 |

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 | |
| 2009/10 | 804 | 0 | 804 | 0 | 0 | 0 | 0 | 0 | 804 |
| 2010/11 | 665 | 0 | 665 | 0 | 0 | 0 | 0 | 0 | 665 |
| 2011/12 | 612 | 0 | 612 | 0 | 0 | 0 | 0 | 0 | 612 |
| 2012/13 | 553 | 0 | 553 | 0 | 0 | 0 | 0 | 0 | 553 |
| 2013/14 | 579 | 0 | 579 | 0 | 0 | 0 | 0 | 0 | 579 |
| 2014/15 | 656 | 0 | 656 | 0 | 0 | 0 | 0 | 0 | 656 |
| 2015/16 | 589 | 0 | 589 | 0 | 0 | 0 | 0 | 0 | 589 |
| 2016/17 | 539 | 0 | 539 | 0 | 0 | 0 | 0 | 0 | 539 |
| 2017/18 | 704 | 0 | 704 | 0 | 0 | 0 | 0 | 0 | 704 |
| 2018/19 | 550 | 0 | 550 | 0 | 0 | 0 | 0 | 0 | 550 |
| Forecast | | | | | | | | | |
| 2019/20 | 682 | 0 | 682 | 0 | 0 | 0 | 0 | 0 | 682 |
| 2020/21 | 684 | 0 | 684 | 0 | 0 | 0 | 0 | 0 | 684 |
| 2021/22 | 689 | 0 | 689 | 0 | 0 | 0 | 0 | 0 | 689 |
| 2022/23 | 694 | 0 | 694 | 0 | 0 | 0 | 0 | 0 | 694 |
| 2023/24 | 702 | 0 | 702 | 0 | 0 | 0 | 0 | 0 | 702 |
| 2024/25 | 705 | 0 | 705 | 0 | 0 | 0 | 0 | 0 | 705 |
| 2025/26 | 711 | 0 | 711 | 0 | 0 | 0 | 0 | 0 | 711 |
| 2026/27 | 716 | 0 | 716 | 0 | 0 | 0 | 0 | 0 | 716 |
| 2027/28 | 725 | 0 | 725 | 0 | 0 | 0 | 0 | 0 | 725 |
| 2028/29 | 729 | 0 | 729 | 0 | 0 | 0 | 0 | 0 | 729 |

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 | |
| 2009/10 | 804 | 0 | 804 | 0 | 0 | 0 | 0 | 0 | 804 |
| 2010/11 | 665 | 0 | 665 | 0 | 0 | 0 | 0 | 0 | 665 |
| 2011/12 | 612 | 0 | 612 | 0 | 0 | 0 | 0 | 0 | 612 |
| 2012/13 | 553 | 0 | 553 | 0 | 0 | 0 | 0 | 0 | 553 |
| 2013/14 | 579 | 0 | 579 | 0 | 0 | 0 | 0 | 0 | 579 |
| 2014/15 | 656 | 0 | 656 | 0 | 0 | 0 | 0 | 0 | 656 |
| 2015/16 | 589 | 0 | 589 | 0 | 0 | 0 | 0 | 0 | 589 |
| 2016/17 | 539 | 0 | 539 | 0 | 0 | 0 | 0 | 0 | 539 |
| 2017/18 | 704 | 0 | 704 | 0 | 0 | 0 | 0 | 0 | 704 |
| 2018/19 | 550 | 0 | 550 | 0 | 0 | 0 | 0 | 0 | 550 |
| Forecast | | | | | | | | | |
| 2019/20 | 691 | 0 | 691 | 0 | 0 | 0 | 0 | 0 | 691 |
| 2020/21 | 693 | 0 | 693 | 0 | 0 | 0 | 0 | 0 | 693 |
| 2021/22 | 698 | 0 | 698 | 0 | 0 | 0 | 0 | 0 | 698 |
| 2022/23 | 703 | 0 | 703 | 0 | 0 | 0 | 0 | 0 | 703 |
| 2023/24 | 712 | 0 | 712 | 0 | 0 | 0 | 0 | 0 | 712 |
| 2024/25 | 715 | 0 | 715 | 0 | 0 | 0 | 0 | 0 | 715 |
| 2025/26 | 720 | 0 | 720 | 0 | 0 | 0 | 0 | 0 | 720 |
| 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 |

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

| (1) Year | (2) Total Sales | (3) Residential Conservation | (4) Comm./Ind. Conservation | (5) Retail | (6) Wholesale | (7) Utility Use & Losses | (8) Net Energy for Load | (9) Load Factor % |
|---|---|---|---|---|---|---|---|---|
| 2009 | 2,860 | 0 | 0 | 2,860 | 0 | 132 | 2,992 | 48.11% |
| 2010 | 2,966 | 0 | 0 | 2,966 | 0 | 152 | 3,118 | 44.27% |
| 2011 | 2,864 | 0 | 0 | 2,864 | 0 | 29 | 2,893 | 49.67% |
| 2012 | 2,751 | 0 | 0 | 2,751 | 0 | 122 | 2,873 | 53.58% |
| 2013 | 2,831 | 0 | 0 | 2,831 | 0 | 88 | 2,919 | 55.37% |
| 2014 | 2,903 | 0 | 0 | 2,903 | 0 | 103 | 3,006 | 54.73% |
| 2015 | 3,034 | 0 | 0 | 3,034 | 0 | 92 | 3,126 | 54.44% |
| 2016 | 3,030 | 0 | 0 | 3,030 | 0 | 79 | 3,109 | 55.02% |
| 2017 | 3,018 | 0 | 0 | 3,018 | 0 | 68 | 3,086 | 55.02% |
| 2018 | 3,118 | 0 | 0 | 3,118 | 0 | 62 | 3,180 | 54.81% |
| Forecast | | | | | | | | |
| 2019 | 3,104 | 0 | 0 | 3,104 | 0 | 91 | 3,195 | 53.35% |
| 2020 | 3,119 | 0 | 0 | 3,119 | 0 | 91 | 3,210 | 53.37% |
| 2021 | 3,142 | 0 | 0 | 3,142 | 0 | 92 | 3,235 | 53.64% |
| 2022 | 3,171 | 0 | 0 | 3,171 | 0 | 93 | 3,264 | 53.74% |
| 2023 | 3,201 | 0 | 0 | 3,201 | 0 | 94 | 3,296 | 53.83% |
| 2024 | 3,234 | 0 | 0 | 3,234 | 0 | 95 | 3,329 | 53.75% |
| 2025 | 3,265 | 0 | 0 | 3,265 | 0 | 96 | 3,361 | 54.03% |
| 2026 | 3,296 | 0 | 0 | 3,296 | 0 | 97 | 3,393 | 54.14% |
| 2027 | 3,329 | 0 | 0 | 3,329 | 0 | 98 | 3,427 | 54.14% |
| 2028 | 3,367 | 0 | 0 | 3,367 | 0 | 97 | 3,466 | 54.27% |

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 |
| 2009 | 2,860 | 0 | 0 | 2,860 | 0 | 132 | 2,992 |
| 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 |
| Forecast | | | | | | | |
| 2019 | 3,087 | 0 | 0 | 3,087 | 0 | 91 | 3,178 |
| 2020 | 3,102 | 0 | 0 | 3,102 | 0 | 91 | 3,192 |
| 2021 | 3,125 | 0 | 0 | 3,125 | 0 | 92 | 3,217 |
| 2022 | 3,153 | 0 | 0 | 3,153 | 0 | 93 | 3,246 |
| 2023 | 3,183 | 0 | 0 | 3,183 | 0 | 94 | 3,277 |
| 2024 | 3,216 | 0 | 0 | 3,216 | 0 | 94 | 3,310 |
| 2025 | 3,246 | 0 | 0 | 3,246 | 0 | 96 | 3,341 |
| 2026 | 3,277 | 0 | 0 | 3,277 | 0 | 97 | 3,373 |
| 2027 | 3,309 | 0 | 0 | 3,309 | 0 | 98 | 3,407 |
| 2028 | 3,347 | 0 | 0 | 3,347 | 0 | 99 | 3,446 |

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

| (1) Year | (2) Total Sales | (3) Residential Conservation | (4) Comm./Ind. Conservation | (5) Retail | (6) Wholesale | (7) Utility Use & Losses | (8) Net Energy for Load |
|---|---|---|---|---|---|---|---|
| 2009 | 2,860 | 0 | 0 | 2,860 | 0 | 132 | 2,992 |
| 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 |
| Forecast | | | | | | | |
| 2019 | 3,120 | 0 | 0 | 3,120 | 0 | 92 | 3,212 |
| 2020 | 3,136 | 0 | 0 | 3,136 | 0 | 92 | 3,228 |
| 2021 | 3,160 | 0 | 0 | 3,160 | 0 | 93 | 3,253 |
| 2022 | 3,189 | 0 | 0 | 3,189 | 0 | 94 | 3,283 |
| 2023 | 3,219 | 0 | 0 | 3,219 | 0 | 95 | 3,314 |
| 2024 | 3,253 | 0 | 0 | 3,253 | 0 | 95 | 3,348 |
| 2025 | 3,284 | 0 | 0 | 3,284 | 0 | 97 | 3,381 |
| 2026 | 3,315 | 0 | 0 | 3,315 | 0 | 98 | 3,413 |
| 2027 | 3,349 | 0 | 0 | 3,349 | 0 | 99 | 3,448 |
| 2028 | 3,387 | 0 | 0 | 3,387 | 0 | 100 | 3,487 |

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) |
|---|---|---|---|---|---|---|
| | 2018 Actual | | 2019 Forecast | | 2020 Forecast | |
| Month | Peak Demand[1] MW | NEL GWh | Peak Demand[1] MW | NEL GWh | Peak Demand[1] MW | NEL GWh |
| January | 704 | 262 | 684 | 249 | 687 | 349 |
| February | 484 | 214 | 581 | 207 | 584 | 212 |
| March | 452 | 224 | 498 | 244 | 501 | 245 |
| April | 510 | 238 | 546 | 256 | 550 | 257 |
| May | 577 | 260 | 602 | 304 | 607 | 305 |
| June | 621 | 294 | 628 | 296 | 633 | 298 |
| July | 620 | 304 | 645 | 312 | 650 | 314 |
| August | 632 | 317 | 638 | 320 | 643 | 321 |
| September | 637 | 309 | 609 | 281 | 613 | 282 |
| October | 604 | 287 | 572 | 258 | 576 | 259 |
| November | 518 | 237 | 469 | 219 | 471 | 219 |
| December | 506 | 233 | 510 | 249 | 511 | 250 |

[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 | 2018-Actual | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2027 |
| (1) | Nuclear | | Trillion Btu | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | Coal[1] | | 1000 Ton | 392 | 298 | 453 | 539 | 541 | 562 | 542 | 376 | 340 | 328 | 232 |
| (3) | Residual | Steam | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (4) | | CC | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (5) | | CT | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (6) | | Total | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (7) | Distillate | Steam | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (8) | | CC | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (9) | | CT | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 1 |
| (10) | | Total | 1000 BBL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 1 |
| (11) | Natural Gas | Steam | 1000 MCF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (12) | | CC | 1000 MCF | 16,570 | 17,666 | 15,779 | 16,417 | 16,198 | 13,943 | 17,089 | 16,720 | 16,773 | 18,383 | 17,468 |
| (13) | | CT | 1000 MCF | 4 | 41 | 307 | 40 | 107 | 75 | 59 | 104 | 145 | 143 | 206 |
| (14) | | Total | 1000 MCF | 16,574 | 17,707 | 16,086 | 16,457 | 16,305 | 14,018 | 17,148 | 16,824 | 16,918 | 18,526 | 17,674 |
| (15) | Other | | Trillion Btu | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[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 | 2018-Actual | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
| (1) | Inter-Regional Interchange | | GWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | Nuclear | | GWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) | Coal | | GWh | 969 | 673 | 1032 | 1228 | 1238 | 1288 | 1235 | 831 | 753 | 719 | 508 |
| (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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| (11) | | Total | GWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| (12) | Natural Gas | Steam | GWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (13) | | CC | GWh | 2270 | 2472 | 2177 | 2283 | 2211 | 1934 | 2380 | 2327 | 2339 | 2572 | 2455 |
| (14) | | CT | GWh | 0 | 3 | 24 | 4 | 8 | 7 | 4 | 9 | 12 | 11 | 16 |
| (15) | | Total | GWh | 2,270 | 2,475 | 2,201 | 2,287 | 2,219 | 1,941 | 2,384 | 2,336 | 2,351 | 2,583 | 2471 |
| (16) | NUG | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (17) | Solar | | | 26 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| (18) | Other (Purchase/Sales)[1] | | | -85 | 20 | -50 | -307 | -220 | 40 | -317 | 167 | 262 | 97 | 459 |
| (19) | Net Energy for Load | | GWh | 3,180 | 3,195 | 3,210 | 3,235 | 3,264 | 3,296 | 3,329 | 3,361 | 3,393 | 3,427 | 3,466 |

[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 | 2018-Actual | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
| (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 | | % | 30.5% | 21.1% | 32.1% | 38.0% | 37.9% | 39.1% | 37.1% | 24.7% | 22.2% | 21.0% | 14.7% |
| (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 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| (11) | | Total | % | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 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 | % | 71.4% | 77.4% | 67.8% | 70.6% | 67.7% | 58.7% | 71.5% | 69.3% | 69.0% | 75.0% | 70.9% |
| (14) | | CT | % | 0.0% | 0.1% | 0.7% | 0.1% | 0.2% | 0.2% | 0.1% | 0.3% | 0.4% | 0.3% | 0.5% |
| (15) | | Total | % | 71.4% | 77.5% | 68.6% | 70.7% | 68.0% | 58.9% | 71.6% | 69.5% | 69.3% | 75.4% | 71.3% |
| (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 | | % | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% |
| | Other (Specify)[1] | | % | -2.7% | 0.6% | -1.6% | -9.5% | -6.7% | 1.2% | -9.6% | 4.9% | 7.7% | 0.0% | 10.8% |
| (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 | % |
| 2019 | 844 | 0 | 0 | 0 | 844 | 645 | 199 | 31 | 0 | 199 | 31 |
| 2020 | 844 | 0 | 0 | 0 | 844 | 650 | 194 | 30 | 0 | 194 | 30 |
| 2021 | 959 | 0 | 0 | 0 | 959 | 654 | 305 | 47 | 0 | 305 | 47 |
| 2022 | 959 | 0 | 0 | 0 | 959 | 660 | 299 | 45 | 0 | 299 | 45 |
| 2023 | 959 | 0 | 0 | 0 | 959 | 666 | 293 | 44 | 0 | 293 | 44 |
| 2024 | 959 | 0 | 0 | 0 | 959 | 673 | 286 | 42 | 0 | 286 | 42 |
| 2025 | 959 | 0 | 0 | 0 | 959 | 679 | 280 | 41 | 0 | 280 | 41 |
| 2026 | 959 | 0 | 0 | 0 | 959 | 686 | 273 | 40 | 0 | 273 | 40 |
| 2027 | 959 | 0 | 0 | 0 | 959 | 692 | 267 | 39 | 0 | 267 | 39 |
| 2028 | 959 | 0 | 0 | 0 | 959 | 701 | 258 | 37 | 0 | 258 | 37 |

[1]Includes Conservation

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 | % |
| 2019/20 | 890 | 0 | 0 | 0 | 890 | 687 | 203 | 30 | 0 | 203 | 30 |
| 2020/21 | 1015 | 0 | 0 | 0 | 1015 | 688 | 327 | 48 | 0 | 327 | 48 |
| 2021/22 | 1015 | 0 | 0 | 0 | 1015 | 693 | 322 | 46 | 0 | 322 | 46 |
| 2022/23 | 1015 | 0 | 0 | 0 | 1015 | 699 | 316 | 45 | 0 | 316 | 45 |
| 2023/24 | 1015 | 0 | 0 | 0 | 1015 | 707 | 308 | 44 | 0 | 308 | 44 |
| 2024/25 | 1015 | 0 | 0 | 0 | 1015 | 710 | 305 | 43 | 0 | 305 | 43 |
| 2025/26 | 1015 | 0 | 0 | 0 | 1015 | 715 | 300 | 42 | 0 | 300 | 42 |
| 2026/27 | 1015 | 0 | 0 | 0 | 1015 | 721 | 294 | 41 | 0 | 294 | 41 |
| 2027/28 | 1015 | 0 | 0 | 0 | 1015 | 730 | 285 | 39 | 0 | 285 | 39 |
| 2028/29 | 1015 | 0 | 0 | 0 | 1015 | 734 | 281 | 38 | 0 | 281 | 38 |

[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 | T* |

* T = regulatory approval received but not under construction as of 12/31/2018

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<br>Schedule 10: Status Report and Specifications of Proposed<br>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 |