2023 IRP Update Load and Energy Forecast

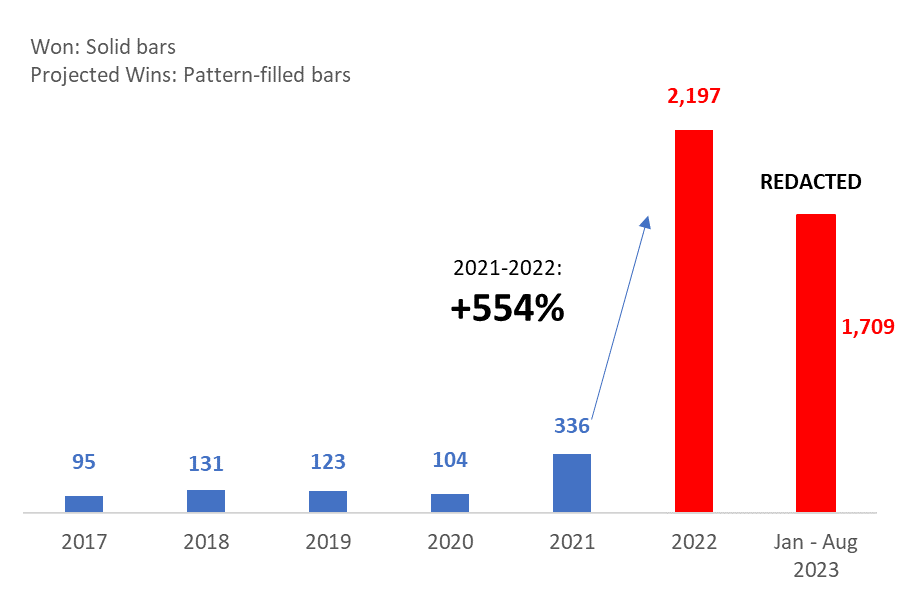
# 1.0 Executive Summary Overview

In support of the 2023 Integrated Resource Plan (“IRP”) Update, this document presents the 2023 IRP Update Load and Energy Forecast (“2023 IRP Update Load Forecast”).

The 2023 IRP Update Load Forecast provides a twenty-year forecast of energy sales and peak demand to meet the planning needs of Georgia Power Company (“Georgia Power” or the “Company”). The 2023 IRP Update Load Forecast includes the following retail classes: residential; commercial; industrial; Metropolitan Atlanta Rapid Transit Authority (“MARTA”); and governmental lighting.

Georgia has seen unprecedented growth in economic development activity since Georgia Power’s 2022 Integrated Resource Plan. Numerous new businesses and industries have come to Georgia, including significant new load related to manufacturing, clean energy technology, and data centers. This growth falls outside of the historical norms in terms of both the size and speed of development, with some projects surpassing 1,000 MW. As reflected in Figure 1.0-1, large load projects that Georgia Power was selected to serve in 2022 represented almost 2,200 MW. This is more than six times greater than in 2021 and nearly 22 times greater than the approximately 100 MW of large load the Company was selected to serve per year from 2017 to 2020. This growth has sustained in 2023. From January through August 2023, the Company was selected to serve more than 1,700 MW of new customer load and total Company selections in 2023 are estimated to be more than **REDACTED** MW.

**Figure 1.0-1: New Large Load Customers Selecting Georgia Power by Year (MW)**



Large load projects for calendar year 2022 forward have been characterized by two prominent features:

• **Large Size**: Many projects, especially data centers, have load greater than 100 MW and may even reach 1,000+ MW.

• **Dynamic Project Specifications**: Project specifications frequently change in terms of location, commercial operation date (“COD”), and load ramp-up.

The load forecast must account for several project uncertainties, including state selection, electric provider selection, project delays, and load materialization. If the Company does not account for new large customer loads before project initiation, the Company risks underestimating the need for generating capacity to reliably serve customers. On the other hand, the Company must take a measured approach that avoids overestimating the resources needed to serve customers and the costs associated with surplus resources.

To balance its projections, the Company has developed a probabilistic approach to evaluate the range and likelihood of potential load growth from new large load customers. This balanced approach is evidenced by the external adjustments applied to the Company’s updated baseline load and energy forecast. The methodology used to develop external adjustments is discussed in detail in Section 1.5 below.

# 1.1 SUMMER AND WINTER PEAK DEMAND

Georgia Power has produced a forecast of both summer and winter peak demand since the Budget 2019 forecast, which was used in the 2019 IRP. The Company’s all-time peak demand of 17,985 MW occurred on August 9, 2007. Georgia Power’s highest winter peak demand of 16,308 MW occurred during a polar vortex on January 7, 2014.

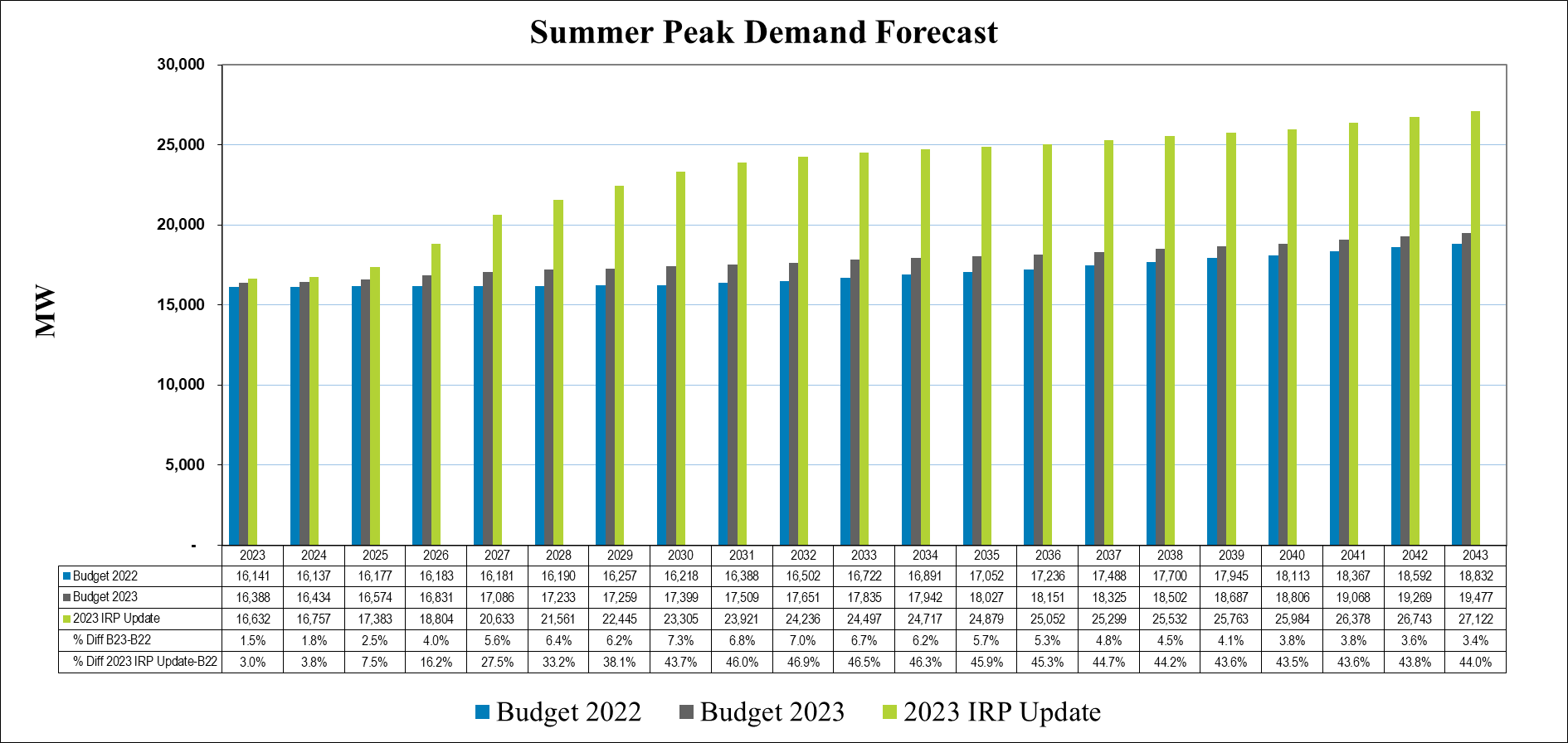
The summer and winter peak demand forecasts are based on normal weather. Both forecasts also include load represented by electric vehicles and behind-the-meter solar. In addition, Georgia Power has traditionally incorporated external adjustments to reflect the effects of the impacts of cogeneration and of company-sponsored Demand Side Management (“DSM”) programs.

With the introduction of new load due to the extraordinary economic development taking place in Georgia, the Company established a new forecasting methodology to reflect the unique characteristics of the new loads and incorporate those characteristics, as appropriate, in the form of an additional external adjustment to its load forecast. Georgia Power currently anticipates a rapid increase in its summer and winter peak demands due to new loads expected in the Commercial and Industrial classes.

The probabilistic model the Company developed evaluates a hundred thousand potential combinations for existing and potential economic development loads. These combinations can be sorted and ranked by total MW and MWh to determine the probability of certain load levels. For example, the P50 value corresponds to the median load level within the range of potential outcomes. Similarly, P95 indicates a load level where 95% of all potential combinations fall at or below this level, and 5% of the load combinations fall above it. The 2023 IRP Update Load Forecast includes the P95 load value.

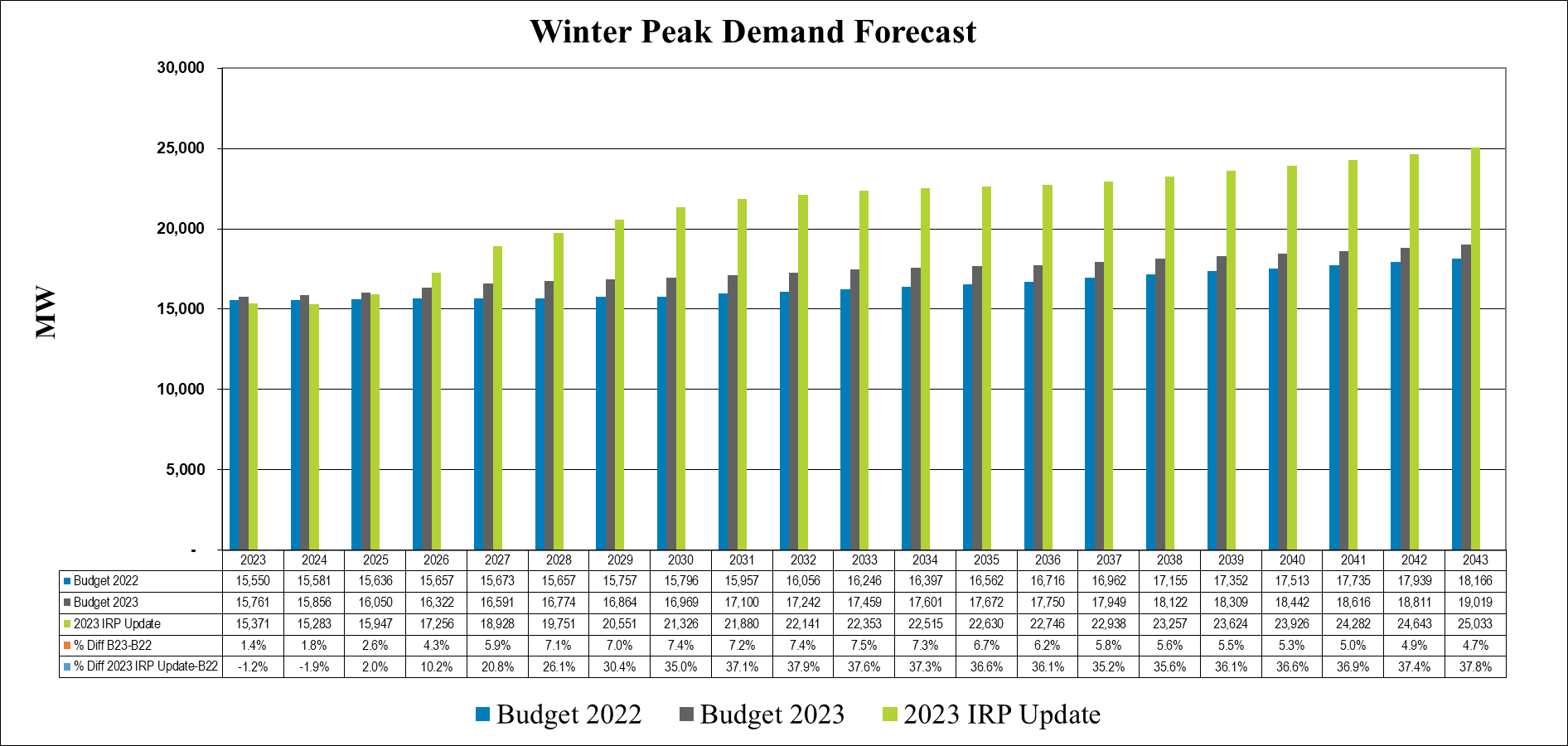
The high-level impacts on peak demands resulting from new large customer loads are presented in Figure 1.1-1 and 1.1-2. These charts contain a comparison of Budget 2022 peaks, which were used in the 2022 IRP, with the Budget 2023 Load and Energy Forecast (“Budget 2023") and the 2023 IRP Update Load Forecast.

**Figure 1.1-1: Summer Peak Demand Forecast**

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For the period from 2024 through 2031, the 2023 IRP Update Load Forecast reflects summer load growth of more than 7,100 MW. This is approximately 28 times greater than the Budget 2022 summer load growth of approximately 250 MW for the same period. It is nearly seven times greater than the Budget 2023 summer load growth of 1,075 MW for 2024-2031.

**Figure 1.1-2: Winter Peak Demand Forecast**

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The years in Figure 1.1-2 represent December of the year and January through February of the year shown. For the period from 2024 through 2031, the 2023 IRP Update Load Forecast reflects winter load growth of approximately 6,600 MW. This is approximately 17 times greater than the Budget 2022 winter load growth of approximately 400 MW for the same period. It is more than five times greater than the Budget 2023 winter load growth of approximately 1,250 MW for 2024-2031.

# 1.2 ENERGY SALES

## 1.2.1 Territorial

Figure 1.2.1-1 shows the expected growth in territorial energy sales over the forecast horizon. In absolute terms, the amount of GWh growth is indicated by the average annual growth rate (“AAGR”). During the historical period from 2012 to 2022, which includes the Covid-19 pandemic, average growth increased by 335 GWh per year. The 2023 IRP Update Load Forecast anticipates an average growth of 6,122 GWh each year from 2023-2033, compared to Budget 2022 and Budget 2023 predicted growth of 444 GWh and 1,280 GWh per year, respectively, over this same period.

**Figure 1.2.1-1: Territorial Energy Forecast**



Territorial energy is a combination of the following classes: Residential, Commercial, Industrial, Governmental Lighting and MARTA. Understanding what is happening in the forecasts for each class thus provides insight into the total territorial forecast. The forecasts for each of these classes are discussed in the sections below.

## 1.2.2 Residential

Figure 1.2.2-1 shows the comparison of Budget 2022 and Budget 2023 with the 2023 IRP Update Load Forecast residential energy forecast. Over the 2012-2022 historical period, residential sales grew by an average rate of 255 GWh per year. The Budget 2022 forecast, which was completed during the Covid pandemic, had lower growth due to uncertainty about how quickly the economy and electricity sales would recover. Growth in the 2023 IRP Update Load Forecast is back in line with the historical rate and is above Budget 2022 and Budget 2023 over the forecast horizon, driven by robust growth in customers and higher expected growth in electric vehicles. Since the new large load activity only impacts the Commercial and Industrial classes, there is no additional external adjustment needed or applied to the baseline Residential, Governmental Lighting and MARTA classes.

**Figure 1.2.2-1 Residential Energy Forecast**



## 1.2.3 Commercial

From 2012-2022, average annual growth in commercial sales rose slightly, rising by an average of 22 GWh per year due in part to energy efficiency partially offsetting the impacts of customer growth. Budget 2022 projected annual declines in sales of 2 GWh from 2023-2033 before growth picks up in the outer years of the forecast, as seen in figure 1.2.3-1 below. The modest decline in sales through 2030 was driven primarily by continued growth in energy efficiency. In the latter years of the forecast, growth picks up due to expected growth in commercial square footage and electric vehicles. The 2023 IRP Update Load Forecast includes medium- and heavy-duty electric vehicles in addition to light-duty vehicles. The 2023 IRP Update Load Forecast begins to grow quickly beginning in 2025 as new large customer loads come online, with sales expected to increase 4,534 GWh from 2023-2033. Growth in the 2023 IRP Update Load Forecast is even stronger over this period, increasing by 4,534 GWh per year. By 2030, expected sales in the 2023 IRP Update Load Forecast are more than double the expected GWh sales of Budget 2022.

**Figure 1.2.3-1: Commercial Energy Forecast**



## 1.2.4 Industrial

Historical industrial sales from 2012-2022 rose by an average of 78 GWh per year. Figure 1.2.4-1 shows a comparison of Budget 2022, Budget 2023 and the 2023 IRP Update Load Forecast.

Industrial sales in Budget 2022 were expected to grow slowly after the pandemic, and then pick up in the outer years of the forecast, driven primarily by growth in Industrial Production. The 2023 IRP Update Load Forecast begins to grow quickly in 2025 and beyond as new large customer load projects come online. Over the 2023-2033 period, the 2023 IRP Update Load Forecast is expected to add 1,304 GWh per year compared to just 215 GWh per year in Budget 2022 and 345 GWh per year in Budget 2023.

**Figure 1.2.4-1: Industrial Energy Forecast**



## 1.2.5 Other Retail: Governmental Lighting, MARTA

Regulated Governmental Lighting and MARTA are Georgia Power’s two smallest classes. Combined, they account for about 0.5% of total sales. The regulated governmental lighting forecast is comprised of roadway lighting and traffic control. Governmental lighting sales have declined significantly since 2014 as Georgia Power worked with local municipalities to convert traditional streetlights to LED lights, which use much less energy. Budget 2022 and Budget 2023 recognized that over time traditional streetlights will be replaced with LEDs as they reach the end of their useful lives. The 2023 IRP Update Load Forecast governmental lighting forecast follows a similar trajectory over the forecast horizon for the same reason, as shown in Figure 1.2.5-1.

**Figure 1.2.5-1: Governmental Lighting Energy Forecast**



Energy sales to MARTA dropped significantly in 2020 as ridership fell due to the Covid-19 pandemic. As seen in Figure 1.2.5-2, the Budget 2022 MARTA energy forecast assumed that sales would recover, although not to pre-pandemic levels over the forecast horizon. However, actual sales were relatively flat from 2020-2022 as workers travelled to the office less, and worker fears of contracting Covid continued to have a negative impact on MARTA ridership. Energy use is expected to remain at this lower level over the 2023 IRP Update Load Forecast horizon.

**Figure 1.2.5-2: MARTA Energy Forecast**



**1.2.6 Forecast Summary**

**Figure 1.2.6-1 2023 IRP Update Load Forecast Annual Summary**



**Figure 1.2.6-2 2023 IRP Update Load Forecast Customer Annual Summary (Year End)**



# 1.3 ECONOMICS

Georgia’s economy has solidly recovered from the impact of the pandemic and is outpacing the U.S. in terms of employment, unemployment, and Gross Product. Georgia was one of the first 10 states to surpass its pre-pandemic level of total employment. As of August 2023, the state’s total number of jobs is 250,000, or 5.3%, higher than before the pandemic. Total U.S. employment, by comparison is up only 2.7% over its pre-pandemic level. Through August, Georgia has added more than 68,000 jobs, up 1.4% since last year, while the U.S. is up 1.2% since last year. Georgia’s unemployment rate, at 3.3% in August 2023, remains near its historic low, and is below the U.S. rate of 3.8%.

With respect to real (i.e., inflation adjusted) output since the pandemic, Georgia has grown faster than the overall U.S. economy. As of Q1-2023, Georgia’s real Gross State Product was 6.8% higher than its pre-pandemic peak, compared to 5.6% for the U.S. In Q1-2023, the Georgia economy grew at a 2.4% annual pace compared to a 2% pace for the U.S.

Georgia is benefitting from strong population growth and is currently the eighth most populous state in the nation. Since the 2020 Census, the state has added nearly 201,000 residents, which is the fourth highest increase in the U.S. In terms of percentage growth, Georgia’s population has grown 1.9% from 2020-2022 compared to 0.6% growth for the U.S. Net domestic migration accounted for nearly 64% of the population increase since 2020, as the state welcomed over 128,000 residents from other states. This is the seventh highest increase in residents among the 50 states. International migration added over 38,000 residents, while natural growth, calculated as births minus deaths, increased by just over 33,000 from 2020-2022, which is the sixth highest increase in the nation. Robust population growth over the past few years has supported a steady increase in Georgia’s labor force, which is essential to continued economic growth.

Georgia’s projected employment outlook and favorable living costs will support migration to the state which in turn drives population growth and household formation. In the forecast, Georgia’s population is expected to increase an average of 0.8% per year between 2023 and 2043, while the nation’s population is expected to increase by 0.4% per year. Increases in Georgia’s population, households and business formations are expected to provide a firm foundation for robust long-term economic growth in the state.

# 1.4 LOAD FORECAST ASSUMPTIONS AND METHODOLOGY

Although the Company introduced a new methodology for forecasting the load of large new customers to account for the state’s extraordinary growth, it used the same methodologies employed in the 2022 IRP to prepare its baseline load forecast for the 2023 IRP Update Load Forecast. The underlying baseline forecast was prepared using the economic outlook for the United States and Georgia, energy prices, and market profiles for class end uses. The economic forecast continues to provide a description of the economy for the next 20 years and includes many elements of the economy such as gross product, population, employment, commercial building square footage, and industrial production. The economic and demographic forecasts for the 2023 IRP Update Load Forecast were obtained from S&P Global (formerly IHS Markit), a national provider of economic data and forecasts.

Consistent with the approach taken in the 2022 IRP, the models used to produce the 2023 IRP Update Load Forecast short- and long-term energy forecasts include a variety of economic and demographic variables as drivers of energy use. Weather, income, employment, historical load data, and industry standards for electrical equipment are among the variables used in the forecasting models. “Normal” weather is defined as the average of Cooling Degree Hours (“CDH”) and Heating Degree Hours (“HDH”) from 1980-2022.

Short-term energy projections for residential, commercial, industrial, governmental lighting, and MARTA are based on linear regression models. Except for governmental lighting and MARTA, the long-term forecast models are end-use models. The 2023 IRP Update Load Forecast uses the Load Management Analysis and Planning (“LoadMAP”) model to produce the long-term residential, commercial, and industrial forecasts. The governmental lighting and MARTA long-term forecasts use the linear regression models developed for the short-term forecast.

The short- and long-term models forecast organic growth based on historical trends, including net customer additions, historic adoption of energy efficiency, the future effect of existing energy efficiency standards, changes in economic conditions and demographics, and trends that develop over time that are part of the Company’s historical data, which get propagated throughout the forecast.

The results of the short-term and long-term models are integrated into a unified forecast. In the 2023 IRP Update Load Forecast, the short-term forecast results were used for the years 2023 through 2027 and the long-term results were used for 2028 to 2043. The 2023 IRP Update Load Forecast uses hourly Metrix Peak Demand models (“MPD”) for each class to predict Georgia Power’s weather-normal peak demands over the 2023 – 2043 forecast period.

# 1.5 FORECAST ADJUSTMENTS FOR LARGE CUSTOMERS: METHODOLOGY AND ASSUMPTIONS

As mentioned previously, Georgia Power’s 2023 IRP Update Load Forecast utilizes a probabilistic approach to evaluate the range and likelihood of future potential outcomes of the load growth from new large customers. The results of this approach support the external adjustment applied to the Commercial and Industrial load and energy forecasts. This section describes the methodology and assumptions behind the probabilistic approach that is used.

In the 2023 IRP Update Load Forecast, the Company made an external adjustment to its baseline forecast to account for the increased large load additions described herein. An external adjustment is needed for these loads since Georgia’s unprecedented economic development growth would not otherwise be captured in the historical trends underlying the baseline forecast. Georgia Power has made external adjustments for large new customers in the past. For example, the Company adjusted its forecast in the 2016 and 2019 IRPs to account for the addition of the Elba Island Liquified Natural Gas facility, which represented a completely new industry to the state.

Notwithstanding prior large load external adjustments to the forecast, the Company has never seen such a significant number of new large customer projects materialize in such a short period of time. As a result, Georgia Power has had to develop a way to estimate the impacts of these projects on its system, while also addressing the inherent uncertainties around whether such projects will ultimately locate in Georgia, select Georgia Power as the electric service provider, and come online with the anticipated load. The probabilistic model Georgia Power developed to address these considerations is discussed in the section below.

## 1.5.1 MODEL OVERVIEW

### 1.5.1.1 Known Project Inputs

For each large load project the Company has evaluated and included in the 2023 IRP Update Load Forecast, the following information is provided:

• **Commercial Operation Date**: When the initial load is expected to start.

• **Ramp-Up**: A year-by-year load trajectory.

• **Announced Load**: The design capacity for the project load. This corresponds to the maximum load of the ramp-up schedule provided by each customer. The Company’s Power Delivery organization uses this information to properly size the facilities and purchase equipment to serve the new load.

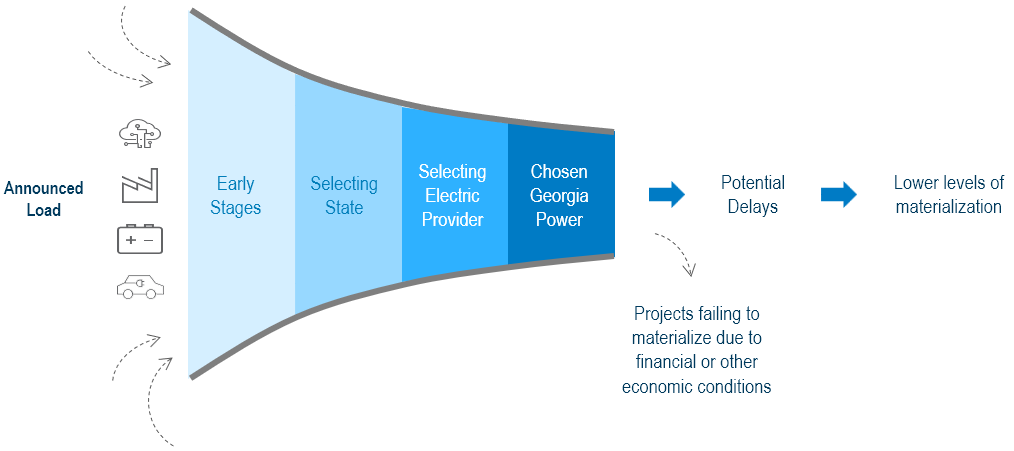
• **Class**: Industrial or Commercial.

• **Segment**: This criterion corresponds to the particular segment of a business within a customer class, such as cryptocurrency, datacenter, warehouse, battery manufacturing, chemicals, and solar.

### 1.5.1.2 Modeling Project Uncertainty

Each large load project contains multiple dimensions of uncertainty that must be considered and analyzed. The first element of uncertainty to consider is whether the potential customers will choose to locate in Georgia. A customer may ultimately end up choosing a different state as the location of a project despite initial indications of interest in Georgia. If a large load customer elects to locate in Georgia, there is still uncertainty due to the competitive nature of the bidding process for large load customers among electric service providers in the state, and a customer may choose an electric service provider other than Georgia Power. There is even some uncertainty once a customer selects Georgia Power as its electric service provider, as the project could fail to materialize due to unforeseen circumstances such as financial or other economic conditions. In addition, based on Georgia Power’s experience, the load announced by a customer is only an estimate of its metered load, which can materialize at a lower level than that at the time of the customer’s initial announcement. Finally, the commercial operation date of a project can be delayed, thus causing load to materialize later than initially expected. Figure 1.5.1.2-1 below illustrates the Company’s process and sequencing for the evaluation of uncertainties related to large load projects.

**Figure 1.5.1.2-1: Sequencing of Large Load and Sources of Uncertainty**



### 1.5**.**1.3 Project Success

The Company uses a probabilistic approach to account for the uncertainties described in the previous section to determine the likelihood of success or failure of an individual project. The success of a project requires each of the following three events:

1. Georgia is chosen as the location of the project.
2. Georgia Power is chosen as the electric service provider for the project.
3. The project reaches commercial operation after a contract has been signed with Georgia Power.

### 1.5.1.4 State Selection

Customers often evaluate sites in multiple states before finalizing the location of a project. Mathematically, state selection can be treated as a binary event, with one (1) assigned for customers that select Georgia and zero (0) for customers that select a different state. For those customers contemplating Georgia as a place for doing business, a probability (referred to as P1) can be assigned for the likelihood of state selection. Likelihood can be estimated based on a historical selection rate that is calculated based on the number of projects that chose Georgia versus the number of projects that did not.

### 1.5.1.5 Electric Service Provider

Whether a customer chooses Georgia Power as its electric service provider can also be treated as a binary event. The probability of Georgia Power being chosen as the provider (referred to as P2) is determined by the Company based on factors such as competition from other electric service providers, an existing relationship with a customer, and the progress of discussions with a customer.

### 1.5.1.6 Project Reaching COD

The probability of projects reaching commercial operation (referred to as P3) is determined by reviewing the number of projects that reached commercial operation versus the total number of projects Georgia Power was selected to serve.

For a new large load project to be considered successful, all three of the above events (i.e., state selection, Georgia Power being chosen as electric service provider, and the project reaching commercial operation) must occur. In other words, project success or failure is a binary event that is reflected by the probability formula P=P1\*P2\*P3.

### 1.5.1.7 Announced Load vs. Metered Load

To account for the potential difference between the metered load being served, as measured at the customer’s meter, versus the load announced by the customer, the ratio (in %) between metered load and announced load is treated as a range. In the absence of actual historical data, the Company identifies minimum and maximum values for this range, as well as a most likely outcome. For example, in the case of data centers, the range is between **REDACTED**% and **REDACTED**% of the customer’s announced load, with a   
most likely outcome of **REDACTED**%. Mathematically, this is modeled with a triangular distribution (see Section 1.5.3 for more technical details).

Table 1.5.1.7-1 below demonstrates the parameter inputs for modeling the metered load compared to the announced load, based on the customer class and segment.

**Table 1.5.1.7-1: Specifications of Triangular Distributions for Metered vs. Announced**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Class* | *Segment* | *Low* | *Mid* | *High* |
| Commercial | Cryptocurrency | **REDACTED** | **REDACTED** | **REDACTED** |
|  | Datacenter | **REDACTED** | **REDACTED** | **REDACTED** |
|  | Miscellaneous | **REDACTED** | **REDACTED** | **REDACTED** |
|  | Warehouse | **REDACTED** | **REDACTED** | **REDACTED** |
|  | Distribution | **REDACTED** | **REDACTED** | **REDACTED** |
| Industrial | All Segments | **REDACTED** | **REDACTED** | **REDACTED** |

### 1.5.1.8 Commercial Operations Date Delay

Projects often experience delays in their commercial operation date. The expected delays are shown in Table 1.5.1.8-1 and can range between **REDACTED REDACTED REDACTED REDACTED REDACTED**. The parameter inputs for modeling the probability of delays in commercial operation are based on the Company’s estimates.

**Table 1.5.1.8-1: Specifications of Triangular Distributions for Delay**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Class* | *Segment* | *Low* | *Mid* | *High* |
| Commercial | All segments | **REDACTED** | **REDACTED** | **REDACTED** |
| Industrial | All Segments | **REDACTED** | **REDACTED** | **REDACTED** |
|  |  |  |  |  |

## 1.5.2 MODELING THE PORTFOLIO

The portfolio of large load projects being assessed by the Company consists of projects in numerous phases of development, ranging from early stages, such as the state selection or site selection phases, to those under construction and projected to be served by the Company. This creates multiple dimensions of uncertainty for each project that requires a Monte Carlo simulation model to quantify a range of expected load to serve.

Monte Carlo simulation is a mathematical technique that is used to estimate the possible outcomes of a portfolio with uncertain events. Unlike a normal forecasting model, Monte Carlo simulation predicts a set of outcomes based on an estimated range of values versus a set of fixed input values. The simulation assigns random values to input variables with uncertainty based on probability distributions such as triangular distributions mentioned in Section 1.5.1.7 and calculates an outcome. It then repeats the process over and over (at least thousands of times typically), each time using a different set of random inputs, to produce a large number of outcomes.

### 1.5.2.1 Model Implementation

The model described in this appendix is implemented in Excel with a third-party add-in called @Risk. @Risk allows incorporating probability distributions into an Excel spreadsheet so that Monte Carlo simulation and analysis can be done to track the range of potential outcomes and calculate a wide array of statistics (average, standard deviation, percentiles, etc.).

For each project in the model, there are three random numbers being drawn for success/failure, metered/announced ratio, and delay in COD from the distributions described in Section 1.5.1. For a particular draw, if the success/failure random number is 0, or failure, the load of the project is 0 and the project is excluded from the portfolio. If the success/failure random number is 1, or success, the announced load ramp-up gets scaled by the metered/announced ratio random number and then shifted according to the timing of the ramp-up by the number of months determined by the delay in COD random number. Finally, this adjusted and shifted ramp-up is aggregated year by year into the portfolio level.

### 1.5.2.2 Simulation Results

The procedure described in section 1.5.2.1 is repeated 100,000 times. Then, these 100,000 load iterations get ranked for each year in order to calculate load percentiles, which helps the Company to understand the load range and compare the likelihood of load outcomes for the portfolio. The table below shows the external adjustments included in the 2023 IRP Update Load Forecast, which are consistent with the 95th percentile of simulated load.

**Table 1.5.2.3-1 2023 IRP Update Load Forecast External Adjustments**

|  |  |
| --- | --- |
| *Year* | *Load (MW)* |
| 2023 | **REDACTED** |
| 2024 | **REDACTED** |
| 2025 | **REDACTED** |
| 2026 | **REDACTED** |
| 2027 | **REDACTED** |
| 2028 | **REDACTED** |
| 2029 | **REDACTED** |
| 2030 | **REDACTED** |
| 2031 | **REDACTED** |
| 2032 | **REDACTED** |
| 2033 | **REDACTED** |
| 2034 | **REDACTED** |
| 2035 | **REDACTED** |
| 2036 | **REDACTED** |
| 2037 | **REDACTED** |
| 2038 | **REDACTED** |
| 2039 | **REDACTED** |
| 2040 | **REDACTED** |
| 2041 | **REDACTED** |
| 2042 | **REDACTED** |

## 1.5.3 TRIANGULAR DISTRIBUTION

The triangular distribution is a continuous probability distribution with the following parameters:

a: a ∈ (-∞, ∞)

b: a < b

c: a ≤ c ≤ b

In the case of metered versus announced uncertainty, *a* represents the minimum metered/announced ratio, *b* represents maximum metered/announced ratio and *c* represents the most likely metered/announced ratio.

**Figure 1.5.3-1: Probability Density Function for a Triangular Distribution**

**REDACTED**

**Figure 1.5.3-2: Probability Density Function of Triangular Distribution with**

**a= REDACTED%, c=REDACTED% and b=REDACTED%**

**REDACTED**

Triangular distributions are chosen for this model for the following reasons:

* A triangular distribution has a finite range while other commonly used probability distributions such as normal and lognormal distributions have an infinite range and can even be negative, which is inappropriate to depict the actual/announced ratio.
* The min/max/most likely parametric setup of triangular distributions is intuitive and straightforward to interpret. In contrast, the parameters of some other commonly used distributions are somewhat opaque. For example, normal distributions are defined in terms of mean and standard deviation. Additional calculation is needed to translate those into the range of outcomes that are more appropriate for the context of actual vs. announced load.
* Other than the standard min/max/most likely parametric setup, triangular distributions can also be defined by a combination of percentiles, min, max and most likely, which offers more flexibility to fine-tune the model.