

GEORGIA POWER COMPANY

**BUDGET 2022
LOAD AND ENERGY FORECAST
2022 TO 2041**

**Prepared by:
Georgia Power Company**

Georgia Power Company Budget 2022 Load and Energy Forecast

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1.0 EXECUTIVE SUMMARY OVERVIEW

The purpose of this report is to summarize the Budget 2022 Load and Energy Forecast (“Budget 2022”).

A twenty-year forecast of energy sales and peak demand was developed to meet the planning needs of Georgia Power Company (“Georgia Power” or the “Company”). Budget 2022 includes the following retail classes: residential; commercial; industrial; Metropolitan Atlanta Rapid Transit Authority (“MARTA”); and governmental lighting. The baseline forecast was started in the spring of 2021 and completed in the fall of 2021.

Both the United States and Georgia experienced robust economic growth from 2013-2019. Over this period, US Gross Domestic Product (“GDP”) growth averaged 2.5% per year, and employment growth averaged 1.7% per year. In Georgia, output and employment grew by 3.3% and 2.3% a year, respectively. In 2019, the US unemployment rate dropped as low as 3.5%, while Georgia’s rate fell to 3.3%. The beginning of the Covid-19 pandemic in March of 2020 brought a quick end to this period of economic growth, with a short but deep recession and then a sharp rebound. Georgia lost more than 600,000 jobs from February – April 2020, and the unemployment rate jumped to 12.5%.

Covid-19 had a significant impact on Georgia Power’s sales in 2020. Total retail sales fell by more than 9% in April of 2020, with commercial sales down more than 13% and industrial sales down nearly 18% in April compared to the prior year. Residential sales jumped more than 8% in April as people worked from home and students attended school virtually. Total retail sales improved as the year went on as businesses reopened and people began to resume some of their pre-pandemic activities. Retail sales ended 2020 down 2.2% versus the prior year. Residential sales ended the year up 3.4%, while the commercial and industrial classes were down 5.3% and 4.5%, respectively. Sales continued to recover in 2021. Total retail sales for the year finished above pre-pandemic levels, led by growth in the residential and industrial classes. Sales to the commercial class in 2021 remain below their 2019 level.

Post pandemic, Georgia is expected to return to robust economic growth over the forecast horizon. One factor that will help drive growth is that the state remains an attractive place to do business. Businesses are attracted to Georgia’s low cost of doing business and low cost of living, the deep pool of knowledge and technical workers coming from its university system, its globally connected airport and transportation infrastructure (e.g. ports, highways), and its business-friendly government policies. Positive demographic trends will also drive economic growth in the state. As businesses continue to relocate and expand in

Georgia, the state will experience solid employment growth, which will attract new residents. As a result, population growth will remain above the US average.

Additional businesses and a growing population are expected to provide a boost to energy sales. From 2022-2041, total energy sales are projected to grow at an average annual rate of 0.8%. Residential sales are expected to grow by an average of 1.1% per year over this period as the increase in the number of customers outpaces the reduction in use per customer resulting from energy efficiency. Industrial sales are expected to increase at an average annual rate of 0.9% as overall industrial production grows. Sales to the commercial class are expected to experience modest growth of 0.4% per year due in part to increased energy efficiency. Summer and winter peak demands are expected to increase at an average rate of 0.7% per year. Although Georgia Power is expected to remain a summer-peaking utility over the forecast horizon, the differences between summer and winter peaks are expected to narrow.

A more detailed discussion of customer class energy sales and forecast results is presented below.

1.1 SUMMER AND WINTER PEAK DEMAND

Georgia Power has produced a forecast of both summer and winter peak demand since Budget 2019, which was used in the 2019 IRP. The Company’s all-time peak demand of 17,985 MW occurred on August 9, 2007. Since then, Georgia Power’s total peak demand has not surpassed this level. 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 include electric vehicles and behind-the-meter solar. In addition, external adjustments have been made to reflect the effects of Real Time Pricing (“RTP”) customer response to changes in prices, the impacts of cogeneration and impacts of company-sponsored Demand Side Management (“DSM”) programs.

Figure 1.1-1: Summer Peak Demand Forecast

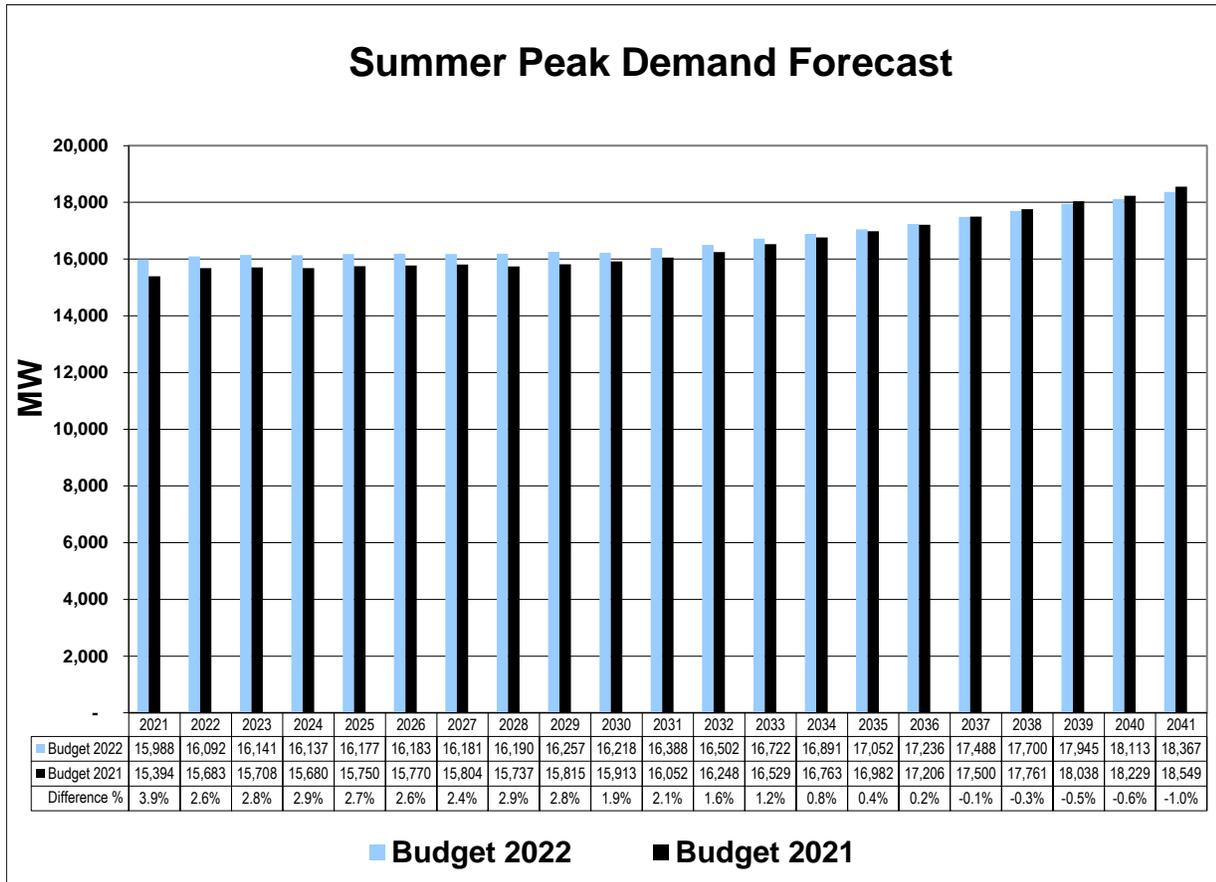
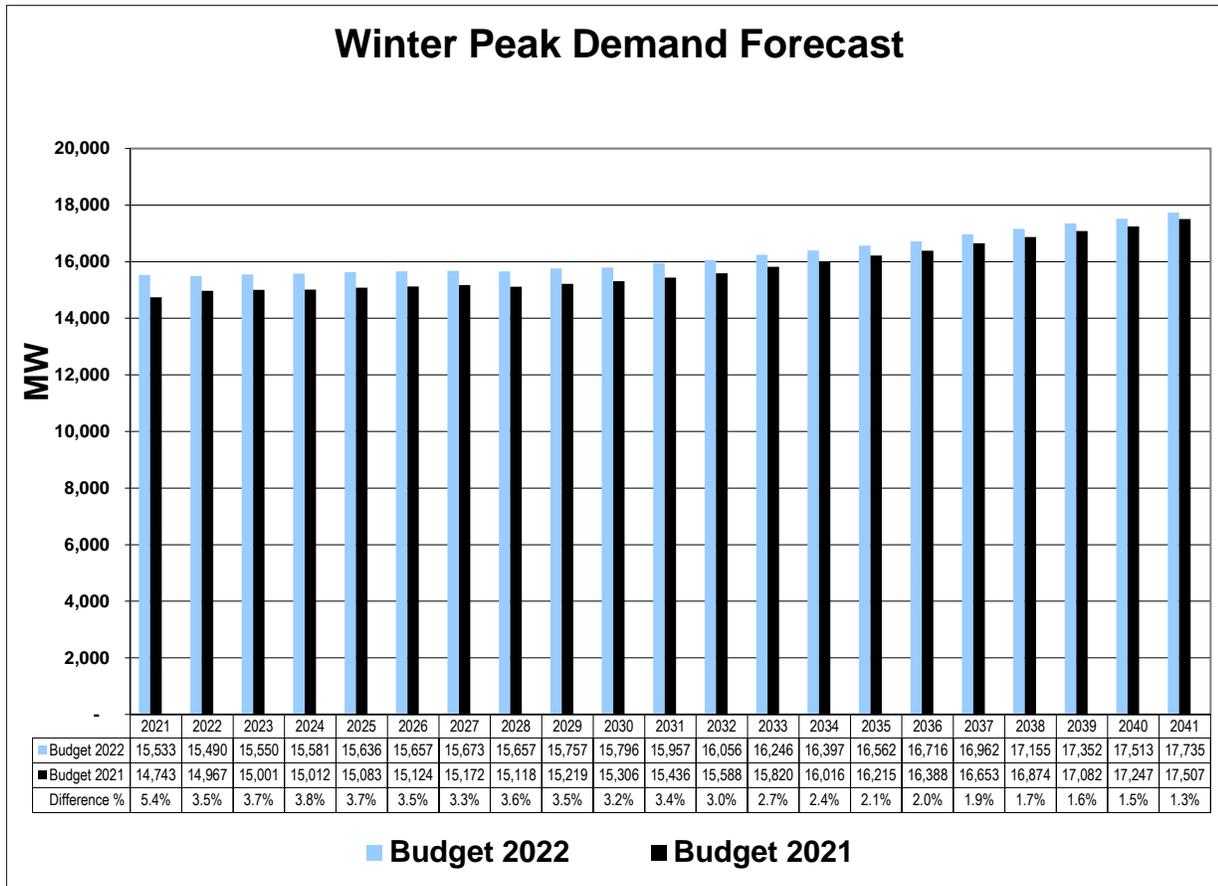


Figure 1.1-1 shows the comparison of the Budget 2022 and Budget 2021 summer peak demand forecasts. In 2022, weather normal peak demand is expected to be 16,092 MW and then to grow to 16,502 MW in 2032. Budget 2022 peaks are higher than Budget 2021 initially, driven in part by lower expected RTP prices. In the latter years of the forecast, Budget 2022 is below Budget 2021 as DSM programs are now assumed to continue through the forecast horizon, rather than tapering off after 12 years, as was done in past forecasts.

Figure 1.1-2: Winter Peak Demand Forecast



The comparison of Budget 2022 and Budget 2021 winter peak demand in Figure 1.1-2 shows a pattern similar to summer peak demand. Budget 2022 peaks are higher, above 3%, in the first half of the forecast due to the impact of lower RTP prices, and then the difference gets smaller as DSM programs are allowed to continue through the end of the forecast.

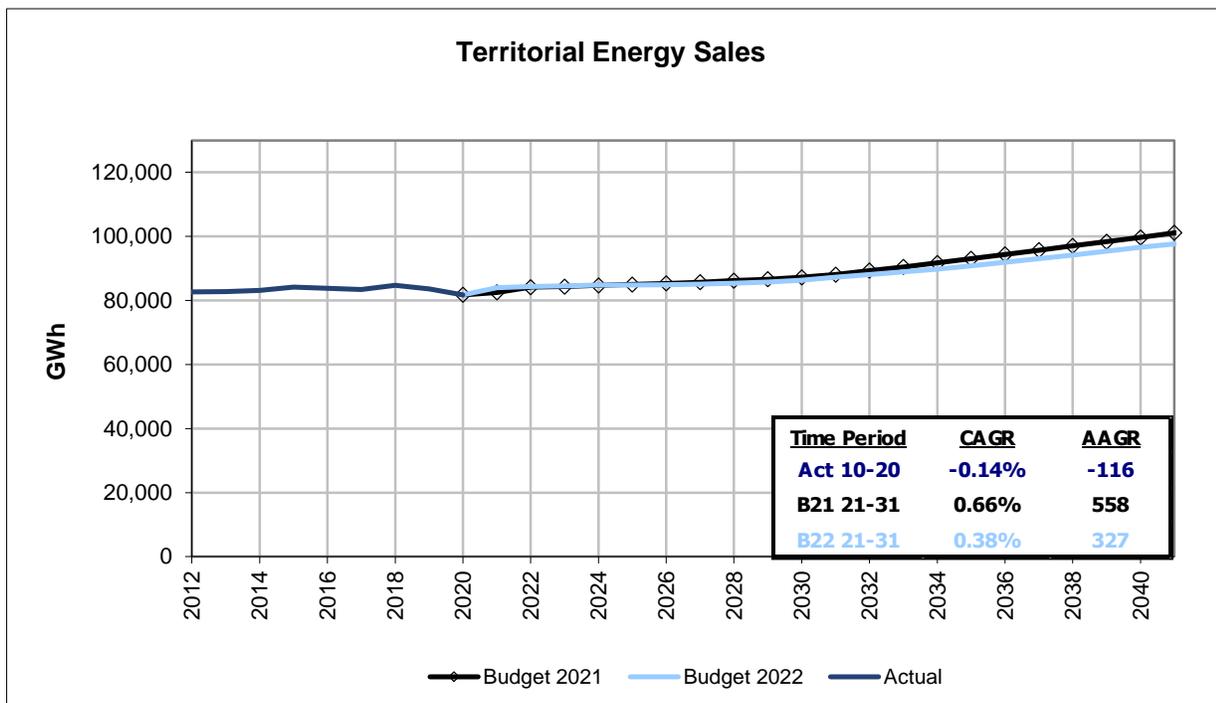
Comparing the summer and winter peaks in Figures 1.1-1 and 1.1-2, it is evident that Georgia Power is expected to remain a summer-peaking utility over the forecast horizon. The difference between summer and winter peaks in Budget 2022 ranges from 422 to 632 MW.

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 2010 to 2020, which includes the Covid-19 pandemic, average growth declined by 116 GWh per year. Budget 2022 anticipates an average growth of 327 GWh each year from 2021-2031, while Budget 2021 predicted growth of 558 GWh per year over this same period.

Figure 1.2.1-1: Territorial Energy Forecast



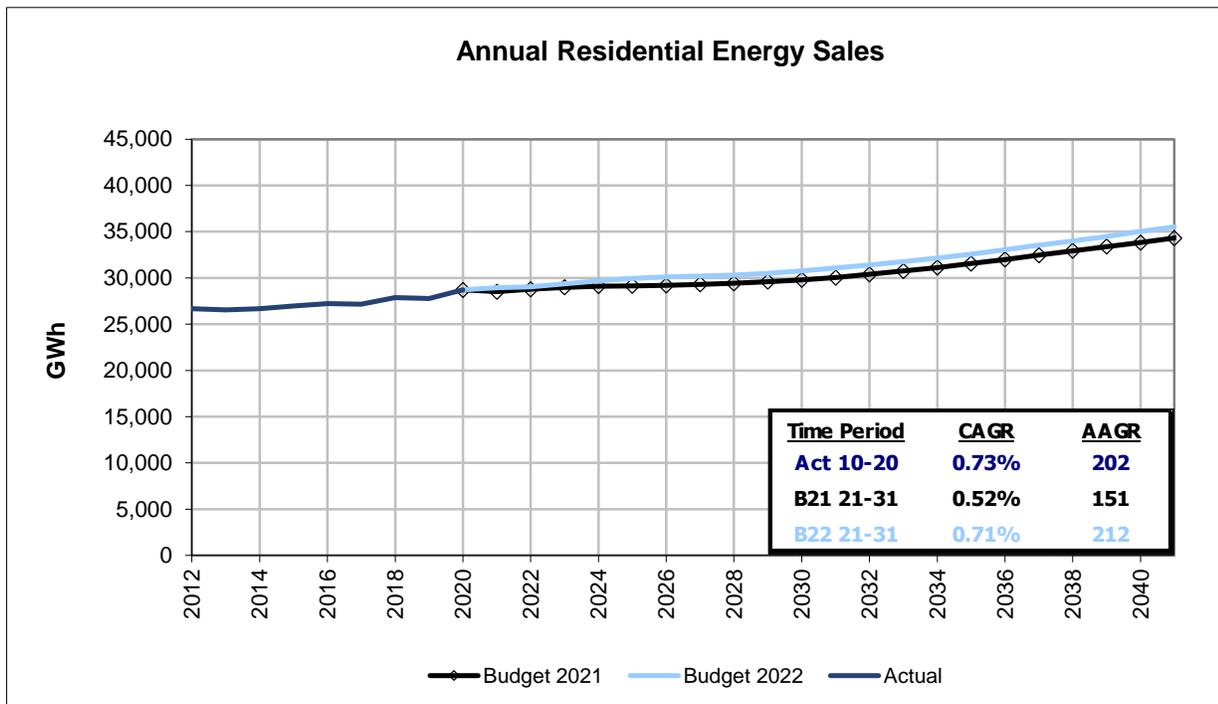
Territorial energy sales is a combination of the following classes: Residential, Commercial, Industrial, Governmental Lighting and MARTA. Understanding what is happening in the forecasts for each class

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 with the Budget 2021 residential energy forecast. Over the 2010-2020 historical period, residential sales grew by an average rate of 202 GWh per year. The B21 forecast, which was completed during the pandemic, had lower growth due to uncertainty about how quickly the economy and electricity sales would recover. Unlike the other classes, residential sales actually received a boost from the pandemic, as people began working and attending school remotely from home. Budget 2022 growth is back in line with history, and is above Budget 2021 over the forecast horizon, driven by robust growth in customers and expected growth in electric vehicles.

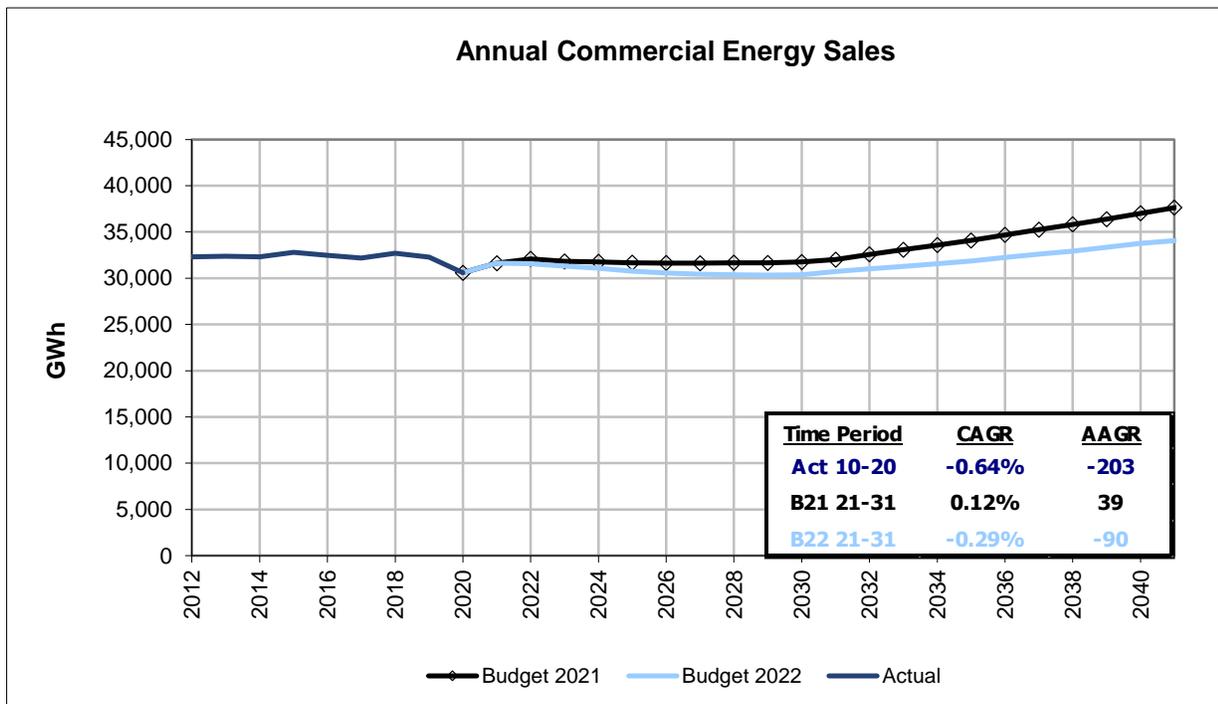
Figure 1.2.2-1 Residential Energy Forecast



1.2.3 Commercial

From 2010-2020, average annual growth in commercial sales has been declining, falling by an average of 203 GWh per year due in part to energy efficiency. Budget 2022 projects annual declines in sales of 90 GWh over the next several years 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 is 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. Budget 2022 is lower than Budget 2021 beyond 2031 due primarily to the change in the assumption allowing DSM to continue through the end of the forecast.

Figure 1.2.3-1: Commercial Energy Forecast

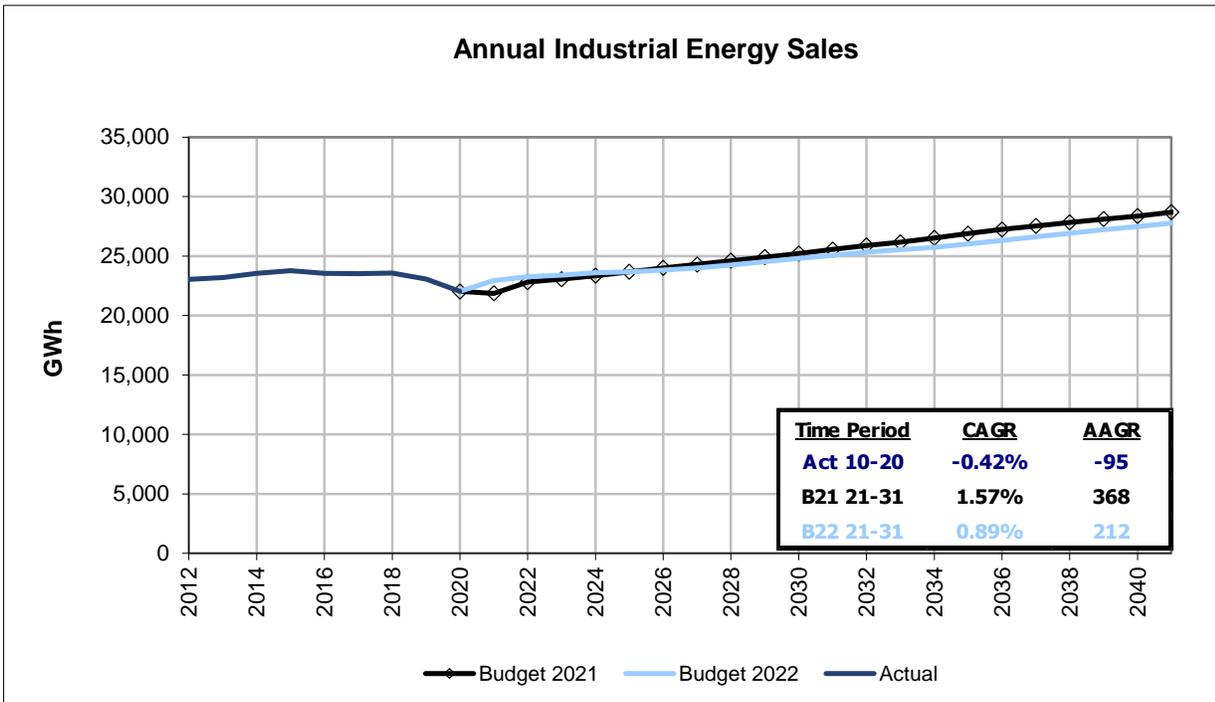


1.2.4 Industrial

Historical industrial sales from 2010-2020 declined by an average of 95 GWh per year. However, this number is driven by the large drop in 2020 resulting from the Covid-19 pandemic. If 2020 were excluded, growth would have been flat since 2010. Figure 1.2.4-1 shows a comparison of Budget 2022 and Budget 2021.

Industrial sales in Budget 2022 bounced back more quickly than expected in the early years of the forecast, but then grew more slowly than Budget 2021 over the rest of the forecast. Growth in the outer years of the forecast is driven primarily by growth in Industrial Production. For both Budget 2022 and Budget 2021, no adjustments were included for large customers expected to come on-line in the near future.

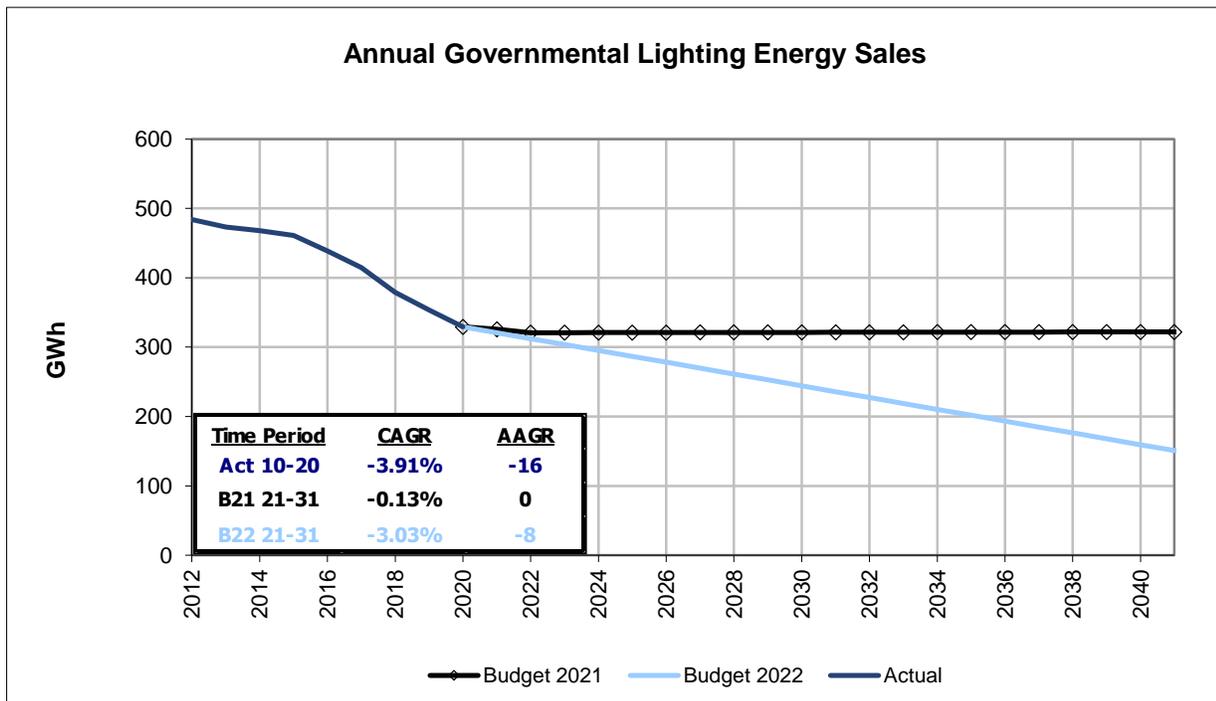
Figure 1.2.4-1: Industrial Energy Forecast



1.2.5 Other Retail: Governmental Lighting, MARTA

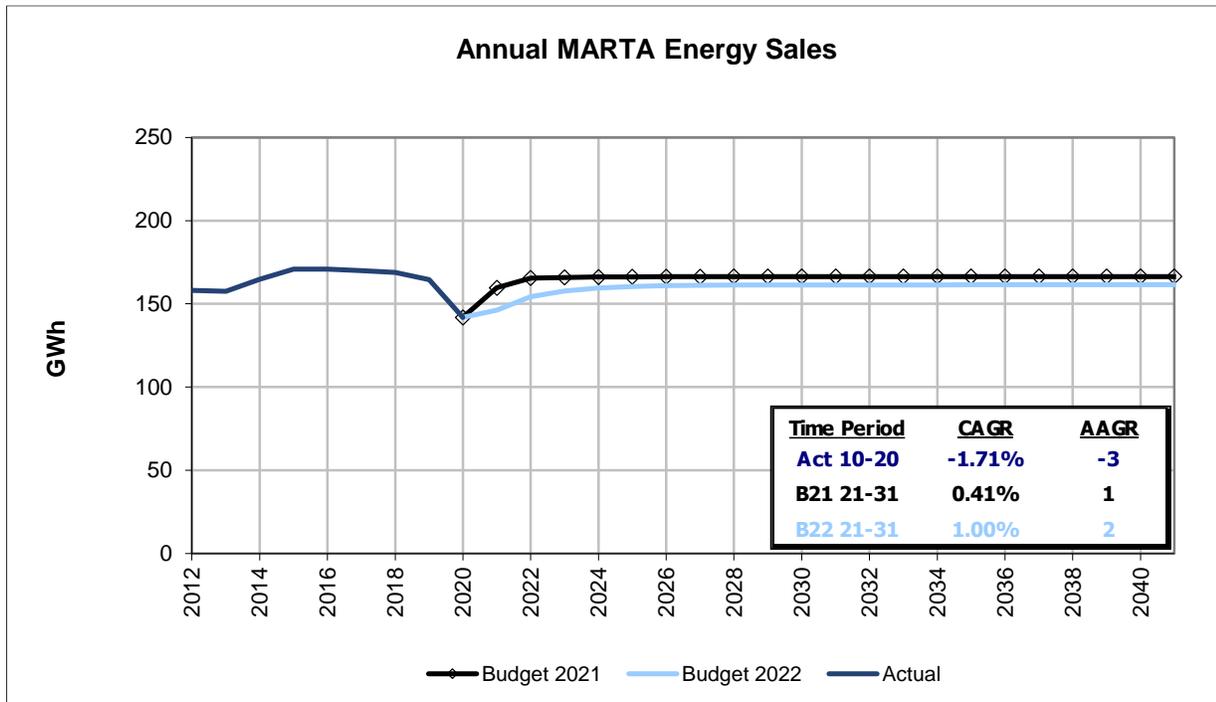
Regulated governmental lighting and MARTA are Georgia Power's two smallest classes. Combined, they account for less than 1% of total sales. The regulated governmental lighting forecast is comprised of roadway lighting and traffic control. Governmental lighting sales have declined significantly since 2014 as Georgia Power worked with local municipalities to convert traditional streetlights to LED lights, which use much less energy. Budget 2021 assumed that by 2021 changeouts would be complete for those areas that wanted them and then assumed modest growth as new lights were added to the system. Budget 2022 recognizes that over time traditional streetlights will be replaced with LEDs as they reach the end of their useful lives. The Budget 2022 governmental lighting forecast is thus lower than Budget 2021 over the forecast horizon, 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 is below Budget 2021 over the forecast horizon. The desire of employees to work from home, as well as worker fears of contracting Covid will likely have a negative impact on energy use for the next few years.

Figure 1.2.5-2: MARTA Energy Forecast



1.3 ECONOMICS

Georgia’s economy continues to recover from the brief recession caused by the Covid-19 pandemic in 2020. Since losing more than 600,000 jobs in April and May 2020, Georgia’s economy has recovered more than 92% of the pre-pandemic number of jobs as of November 2021. Through November 2021, employment in Georgia’s professional and business services, trade and transportation and financial services sectors have surpassed their pre-pandemic levels. The construction, manufacturing, information and education and health services sectors have all recovered more than 90% of their pre-pandemic levels of employment. The leisure and hospitality sector, which lost 223,000 jobs at the beginning of the pandemic, has only regained about 75% of its pre-pandemic employment level. In comparison the US, which lost more than 22 million jobs over the same period, has recovered nearly 83% of the jobs lost at

the beginning of the pandemic. Georgia's unemployment rate dropped from a peak of 12.5% in April 2020 to just 2.8% in November 2021, a historical low for the state. The US unemployment rate fell from April 2020's high of 14.8% to 4.2% in November 2021.

Georgia remains an attractive place to do business. Area Development has ranked Georgia the top state for doing business for eight consecutive years. Although Georgia lost its top spot after eight straight years in Site Selection's Executive Survey of Business Climate rankings for 2021, it still finished at number two. Georgia has been very successful in attracting new businesses to the state, as well as the expansions of existing businesses. Corporate relocations and expansions will help fuel growth in employment, population and incomes.

The state's population growth outpaced that of the US over the past decade. Between 2010-2020, Georgia's population grew by an average of 1.0% per year, compared to 0.7% for the nation as a whole. Since 2010, Georgia added more than 1 million residents and is the 8th most populous state in the nation. Georgia's projected employment outlook and favorable living costs will support in-migration, which in turn drives population growth and household formation. In the forecast, Georgia's population is expected to increase an average of 0.9% per year between 2021 and 2031, while the nation's population is expected to increase by 0.5% per year. From 2010-2020, housing starts averaged 40,000 per year in Georgia. Over the next 10 years, new home construction is projected to increase more strongly, with housing starts averaging nearly 58,000 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 FORECAST ASSUMPTIONS AND METHODS

The assumptions underlying Budget 2022 were developed through the joint effort of Georgia Power and Southern Company Services ("SCS"). The forecast was developed through careful consideration and methodical examination of key demographic and economic variables that historically have been significant indicators of energy consumption. Major assumptions include the economic outlook for the US and Georgia, energy prices, and market profiles for class end uses.

The economic forecast provides 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 Budget 2022 were obtained from IHS Markit, a national provider of economic data and forecasts.

The models used to produce both the 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 1980-2020.

Short-term energy projections for residential, commercial, industrial and MARTA are based on linear regression models. The governmental lighting forecast is developed using information from Georgia Power field personnel. The details of these regression models can be found in Section 4.

The long-term forecast models are end-use models. Budget 2022 uses the Load Management Analysis and Planning (“LoadMAP”) model to produce the long-term residential, commercial, and industrial forecasts. The LoadMAP tool is discussed in greater detail in Section 5.

The long-term MARTA and governmental lighting forecasts are not based on end-use models. The MARTA forecast uses the linear regression model developed for the short-term forecast, while the governmental lighting forecast is based on information from Georgia Power field personnel.

The results of the short-term and long-term models are integrated into a unified forecast. In Budget 2022, the short-term forecast results were used for the years 2022 through 2025 and the long-term results were used for 2026 to 2041. Additional information on methodology can be found in Section 3.

Budget 2022 uses hourly peak demand forecasting models to predict Georgia Power’s weather-normal peak demands. The methodology and assumptions used in the peak demand models are discussed in greater detail in Section 6.

1.5 DEMAND SIDE PROGRAMS

Georgia Power offers energy efficiency programs to promote energy savings to customers. These programs have existed for several years, and the benefits from these programs are embedded in Georgia Power's historical loads and energy sales. The forecasts produced by using historical energy data, therefore, have an embedded effect propagated throughout the forecast. Other conservation measures undertaken by customers, whether explicitly induced by a marketing program or proactively undertaken by a customer for other reasons, will also become embedded in the historical energy data and will be implicitly propagated throughout the forecast. New or ongoing Georgia Power programs that are not fully reflected in historical data are incorporated into the forecast as external adjustments.

An additional type of demand-side impact considered in Budget 2022 is the adopted efficiency standards in the end-use models used for the long-term forecast. These efficiency standards represent the continuing trend of increasing end-use efficiency driven in part by programs such as ENERGY STAR®.

1.6 SENSITIVITIES AND SCENARIOS

Budget 2022 is a base case forecast, using as its foundation the most probable economic scenario and current regulatory environment. Nine scenarios were developed to evaluate the possible load impacts under different regulatory environments with respect to various carbon and fuel price combinations, as well as the impacts of increased electrification, distributed energy resources and energy efficiency.

It is also important to understand the possible impacts of variations in the description of the factors (variables) that are used in the forecast and their impact on the forecast results. Consequently, six forecast sensitivities have also been run: 1) high economic growth; 2) low economic growth; 3) no load growth; 4) load growth with no DSM growth; 5) load growth with aggressive DSM growth; and 6) load growth using a 20-year normal definition of weather, as stipulated in the 2019 IRP. The economic sensitivities were driven by variations in the economic drivers of the forecast provided by IHS Markit. Section 7 provides the results and details of the various scenarios and sensitivities.

2.0 ANNUAL SUMMARY

Attachment 2.0-1: Budget 2022 Forecast Annual Summary¹

Year	Retail Sales (GWh)						Territorial Requirements (GWh)	Territorial Supply (GWh)	Summer Peak Demand (MW)	Winter Peak Demand (MW)
	Res.	Com.	Ind.	Gov. Lighting	MARTA	Total Retail				
2021	28,949	31,624	22,946	321	146	83,985	83,985	87,560	15,988	15,533
2022	29,030	31,579	23,268	312	154	84,343	84,343	87,932	16,092	15,490
2023	29,368	31,301	23,392	304	158	84,522	84,522	88,118	16,141	15,550
2024	29,688	31,092	23,597	295	159	84,831	84,831	88,439	16,137	15,581
2025	29,934	30,743	23,679	287	160	84,803	84,803	88,411	16,177	15,636
2026	30,108	30,559	23,820	278	161	84,926	84,926	88,538	16,183	15,657
2027	30,204	30,436	23,997	270	161	85,068	85,068	88,685	16,181	15,673
2028	30,317	30,366	24,241	261	161	85,346	85,346	88,973	16,190	15,657
2029	30,489	30,345	24,520	253	161	85,768	85,768	89,411	16,257	15,757
2030	30,740	30,361	24,804	244	161	86,310	86,310	89,975	16,218	15,796
2031	31,066	30,728	25,065	236	161	87,256	87,256	90,961	16,388	15,957
2032	31,390	30,999	25,333	227	161	88,111	88,111	91,852	16,502	16,056
2033	31,761	31,279	25,539	219	161	88,960	88,960	92,738	16,722	16,246
2034	32,154	31,558	25,742	210	161	89,826	89,826	93,642	16,891	16,397
2035	32,572	31,840	26,015	202	161	90,791	90,791	94,649	17,052	16,562
2036	33,057	32,229	26,303	193	161	91,944	91,944	95,851	17,236	16,716
2037	33,529	32,588	26,610	185	161	93,073	93,073	97,029	17,488	16,962
2038	33,992	32,940	26,916	176	161	94,187	94,187	98,190	17,700	17,155
2039	34,495	33,336	27,215	168	161	95,375	95,375	99,430	17,945	17,352
2040	35,028	33,761	27,480	159	161	96,591	96,591	100,699	18,113	17,513
2041	35,510	34,057	27,779	151	161	97,659	97,659	101,813	18,367	17,735

¹After the Company completed the Budget 2022 Load and Energy Forecast, two discrepancies were discovered that have a minor impact on the overall forecast results. First, a discrepancy was found in the updated LoadMAP saturations and energy unit intensities that impacted commercial and industrial energy and peak forecast results. The maximum impact on commercial sales in a year was -19 GWh, or 0.06% of commercial sales, while the maximum impact on industrial was just 1 GWh. The maximum impact on summer and winter peaks was just -3 MW. The second discrepancy led to a minor overstatement of supply by not reflecting the BTM solar adjustment through the end of the forecast. Once corrected, the supply forecast is just over 200 GWh lower by 2041, or about 0.2% of total. Peak demand was not impacted by this second discrepancy.

Given the minimal impact on the forecast and the late stage of the planning process when discovered, no changes were made. However, for completeness and transparency, the numbers presented in this appendix incorporate the above changes.

2.1 MONTHLY ENERGY REQUIREMENTS

Attachment 2.1-1: Budget 2022 Monthly Energy Requirements by Class of Service – Forecast

Year	Retail Sales (GWh)						Territorial Requirements (GWh)	Territorial Supply (GWh)	Peak Demand (MW)
	Res.	Com.	Ind.	Gov. Lighting	MARTA	Total Retail			
Jan-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 2.1-1: Budget 2022 Monthly Energy Requirements by Class of Service – Forecast

Year	Retail Sales (GWh)						Territorial Requirements (GWh)	Territorial Supply (GWh)	Peak Demand (MW)
	Res.	Com.	Ind.	Gov. Lighting	MARTA	Total Retail			
Jan-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 2.1-2: Monthly Energy Requirements by Class of Service – Historical

Year	Retail Sales (GWh)						Territorial Requirements (GWh)
	Res.	Com.	Ind.	Gov. Lighting	MARTA	Total Retail	Total Territorial
Jan-18	3,110	2,823	1,895	34	15	7,878	7,878
Feb-18	1,715	2,343	1,796	33	15	5,904	5,904
Mar-18	1,948	2,451	1,978	32	13	6,422	6,422
Apr-18	1,606	2,378	1,874	32	14	5,904	5,904
May-18	2,207	2,847	2,062	32	14	7,162	7,162
Jun-18	2,728	2,995	2,035	30	14	7,802	7,802
Jul-18	2,977	3,150	2,098	30	15	8,270	8,270
Aug-18	2,807	3,187	2,150	30	14	8,188	8,188
Sep-18	2,718	3,094	2,057	30	14	7,914	7,914
Oct-18	1,959	2,685	2,032	36	14	6,726	6,726
Nov-18	2,094	2,489	1,894	31	12	6,519	6,519
Dec-18	2,462	2,514	1,784	30	14	6,805	6,805
Jan-19	2,599	2,662	1,967	30	15	7,274	7,274
Feb-19	1,854	2,279	1,726	30	14	5,903	5,903
Mar-19	1,889	2,465	1,947	30	13	6,345	6,345
Apr-19	1,695	2,457	1,938	30	13	6,133	6,133
May-19	2,489	2,931	2,069	30	14	7,532	7,532
Jun-19	2,555	2,882	1,926	30	14	7,406	7,406
Jul-19	3,116	3,205	2,025	29	15	8,390	8,390
Aug-19	3,028	3,249	2,047	29	14	8,367	8,367
Sep-19	2,784	3,070	1,985	29	14	7,882	7,882
Oct-19	1,902	2,731	1,967	29	14	6,643	6,643
Nov-19	1,998	2,400	1,826	29	12	6,264	6,264
Dec-19	2,292	2,487	1,741	29	14	6,562	6,562
Jan-20	2,343	2,598	1,918	28	13	6,901	6,901
Feb-20	2,168	2,413	1,736	28	14	6,359	6,359
Mar-20	1,898	2,382	1,811	28	14	6,133	6,133
Apr-20	1,699	2,060	1,591	28	11	5,388	5,388
May-20	2,085	2,359	1,697	27	10	6,178	6,178
Jun-20	2,557	2,627	1,811	27	11	7,034	7,034
Jul-20	3,277	3,033	1,933	27	11	8,282	8,282
Aug-20	3,031	2,997	1,989	27	11	8,055	8,055
Sep-20	2,320	2,692	1,898	27	12	6,949	6,949
Oct-20	1,835	2,529	1,995	27	10	6,396	6,396
Nov-20	1,838	2,283	1,851	27	10	6,009	6,009
Dec-20	2,778	2,502	1,810	27	13	7,130	7,130

2.2 CUSTOMERS

Attachment 2.2-1: Budget 2022 Historical and Forecast Customers (Year End)

Year	Residential	Commercial	Industrial	Gov. Lighting	MARTA	Total Retail	Total Territorial
2018	2,220,240	312,474	10,571	9,837	1	2,553,123	2,553,123
2019	2,253,188	315,328	10,622	9,818	1	2,588,957	2,588,957
2020	2,296,077	318,953	10,701	9,670	1	2,635,402	2,635,402
2021	2,330,737	323,047	10,700	9,736	1	2,674,221	2,674,221
2022	2,364,222	326,217	10,703	9,860	1	2,711,003	2,711,003
2023	2,397,681	329,251	10,706	9,973	1	2,747,612	2,747,612
2024	2,431,278	332,315	10,707	10,077	1	2,784,378	2,784,378
2025	2,464,447	335,401	10,708	10,174	1	2,820,731	2,820,731
2026	2,496,682	338,441	10,709	10,267	1	2,856,100	2,856,100
2027	2,528,049	341,425	10,709	10,355	1	2,890,539	2,890,539
2028	2,559,196	344,418	10,710	10,439	1	2,924,764	2,924,764
2029	2,590,285	347,411	10,710	10,520	1	2,958,927	2,958,927
2030	2,621,205	350,359	10,710	10,599	1	2,992,874	2,992,874
2031	2,651,692	353,231	10,710	10,676	1	3,026,310	3,026,310
2032	2,682,199	356,095	10,710	10,751	1	3,059,756	3,059,756
2033	2,712,702	358,913	10,710	10,824	1	3,093,150	3,093,150
2034	2,743,027	361,668	10,710	10,896	1	3,126,302	3,126,302
2035	2,773,201	364,391	10,710	10,966	1	3,159,269	3,159,269
2036	2,803,243	367,081	10,710	11,035	1	3,192,070	3,192,070
2037	2,833,217	369,769	10,710	11,103	1	3,224,800	3,224,800
2038	2,863,081	372,458	10,710	11,170	1	3,257,420	3,257,420
2039	2,892,809	375,137	10,710	11,235	1	3,289,892	3,289,892
2040	2,922,570	377,846	10,710	11,301	1	3,322,428	3,322,428
2041	2,952,265	380,551	10,710	11,365	1	3,354,892	3,354,892

3.0 GENERAL FORECASTING OVERVIEW

This section provides an overview of the modeling methods used to produce Budget 2022 for Georgia Power. The forecast uses a variety of statistical techniques and other methods. The availability of data, characteristics of the market, and uses of the forecast all help determine which method will be used for the particular parts of the forecast.

Budget 2022 uses three primary methods:

- 1) Econometric regression;
- 2) End-use models; and
- 3) Judgment.

3.1 ECONOMETRIC REGRESSION

Econometric regression is a statistical technique with which model parameters are estimated from time series, cross sectional, or a combination of time series and cross sectional (pooled) data. Basic classical regression assumptions apply to the models. These models are well suited for modeling the relationships between energy consumption and explanatory variables such as economics, weather, and changes in behavior such as increases in the use of electronic devices in the home. Georgia Power's customer and short-term energy forecasts (2022-2025) utilize econometric models.

3.2 END-USE MODELS

End-use forecasting models are used to represent the elements of energy use in fine detail. For example, end-use models estimate residential energy use by looking at appliance saturation and penetration surveys and then determining aggregate class usage by adding up all the elements of energy consumption across households. Each major energy-consuming activity – refrigeration, space heating, lighting and the like – is identified, and the corresponding energy consumption is specified. This approach has a strong intuitive appeal because energy consumption is clearly associated with appliance use. The models can also produce energy sales forecasts of end-use equipment with a wide range of efficiency and usage sensitivities with respect to fuel prices, income levels, and other factors.

The detailed nature of end-use models is their major advantage relative to econometric models, but the detailed input requirements are also the major source of their limitations. These models require extensive information about projected appliance market penetration and usage rates. It is a challenge to produce such projections that are sensitive to changes in energy prices, household incomes, and lifestyles.

The end-use models used by Georgia Power for its long-term energy forecasts for the residential, commercial and industrial classes combine the benefits of end-use detail and class segmentation to estimate future energy consumption. These models utilize econometric techniques to model consumer choices of end uses based on economic principles.

3.3 JUDGMENT

Even the best modeling techniques need to be augmented by insights gained through relationships with customers and through discussions with marketing personnel. In cases where on-site generation equipment is added at existing sites, an industrial plant closes, or a large new customer is added to the electrical grid, for example, econometric and end-use models may not be able to adequately capture the impact. In order to supplement these modeling tools, some amount of judgment is used to refine the forecast.

3.4 TOOLS

The tools used to prepare the energy and peak forecasts include EViews (regression software), LoadMAP, MetrixND, MetrixLT and Microsoft Excel.

4.0 SHORT-TERM MODEL DESIGN OVERVIEW

This section describes the quantitative methods used to develop Georgia Power's customer and short-term energy sales forecasts. The forecasts from the short-term energy models cover the period from June 2021 through December 2025. These short-term energy forecasts are then integrated with the long-term results discussed in Section 5. The residential and commercial short-term energy models generate results on a billing month basis, which are then converted to a calendar month basis. Industrial sales are modeled on a calendar month basis. The MARTA and governmental lighting energy forecasts are produced on a billing month basis.

The estimates of the number of customers by class are derived from econometric models that have a twenty-year forecast horizon. The short-term energy forecasts are also developed on a customer class basis and employ a linear regression methodology. Although the drivers vary by customer class, the models include explanatory variables that relate changes in monthly sales or customers to changes in Georgia's economy, weather, energy efficiency, monthly and monthly weather interaction binary variables. Autoregressive variables are included in the models where it is determined that serial correlation is an issue.

The short-term model parameters are estimated with the EViews software package. EViews is a well-established software package used in econometric analysis, forecasting, and simulation. IHS Markit provides the historical and forecasted economic data used in the short-term models. When estimating the model parameters, actual HDH and CDH are used. For the forecast period, "normal" weather is assumed. "Normal" weather for Budget 2022 is defined as the average of CDH and HDH from 1980-2020.

4.1 RETAIL SALES SECTORS

The retail sector includes the residential, commercial, industrial, MARTA, and regulated governmental lighting classes.

4.1.1 Residential Sales

The model of energy sales for the residential class depends on the following factors:

- Number of customers
- Number of days in the billing cycle
- Weather

- Energy efficiency

Residential energy sales (MWh) are forecasted using a linear regression model that relates monthly energy use per customer per billing day to independent variables that capture the impacts of varying weather conditions and energy efficiency. The residential customer forecast is presented in Section 4.2.1.

To eliminate the impact on sales resulting from the variation in the length of billing periods, the use-per-customer (dependent) variable and the monthly weather terms are divided by the number of billing days. Historical average billing days per month are obtained from the Company's annual meter reading schedules. For Budget 2022, average billing days were based on the actual meter schedules for each respective year available from 2021-2023. Subsequent years use a historical average of billing days per period, adjusted as needed to ensure an accurate number of days in the calendar and annual periods.

Weather has a significant effect on residential energy sales. HDH and CDH are used to measure the impact of weather on monthly residential energy sales. The degree hours are computed as an average of the billing cycles. Residential HDH are calculated using a 54°F threshold, and CDH uses a 67°F threshold. Degree hours are averaged over ten National Weather Service stations, and the temperatures at the weather stations are weighted by the residential energy use in the Georgia Power regions that are mapped to the ten weather stations.

As appliances, heating and cooling equipment, lighting and other residential end-uses have become more efficient, Georgia Power has observed a decline in residential electric use per customer. To capture this impact, the residential short-term energy model includes an efficiency variable derived from the long-term energy model. It is calculated using the weighted average of equipment stock efficiency from the previous year's LoadMAP model. The weights are based on the equipment's relative contribution to total residential usage.

A regression model relating residential energy use per customer per billing day to an intercept, twelve monthly weather interaction variables that are divided by the number of billing days, and an energy efficiency variable developed for the short-term residential energy forecast. For the monthly weather interaction variables, CDH per billing day and HDH per billing day are interacted with monthly binary variables to better distinguish their impact on the residential class at various times of the year.

To calculate total forecasted residential billed energy sales, the forecast of residential use per customer per billing day is multiplied by the forecasted number of customers and billing days. Table 4.1.1-1 contains a

summary of the parameter estimates and statistics for the short-term residential energy model.

Table 4.1.1-1 Residential Use per Customer per Billing Day

Residential Short-Term Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	6.04
R_HDH1	REDACTED	21.85
R_HDH2	REDACTED	28.88
R_DH3	REDACTED	16.48
R_DH4	REDACTED	7.24
R_CDH5	REDACTED	9.79
R_CDH6	REDACTED	24.70
R_CDH7	REDACTED	34.92
R_CDH8	REDACTED	36.81
R_CDH9	REDACTED	31.62
R_DH10	REDACTED	17.00
R_DH11	REDACTED	7.97
R_HDH12	REDACTED	17.49
R_EFF	REDACTED	-2.12
AR(1)	REDACTED	2.70

Where:

B_UPC_BD_R	= Residential monthly use per customer per billing day (dependent variable)
CONSTANT	= Regression equation constant term
R_HDH1	= January binary interacted with monthly HDH per billing day
R_HDH2	= February binary interacted with monthly HDH per billing day
R_DH3	= March binary interacted with sum of monthly HDH and CDH per billing day
R_DH4	= April binary interacted with sum of monthly HDH and CDH per billing day
R_CDH5	= May binary interacted with monthly CDH per billing day
R_CDH6	= June binary interacted with monthly CDH per billing day
R_CDH7	= July binary interacted with monthly CDH per billing day
R_CDH8	= August binary interacted with monthly CDH per billing day
R_CDH9	= September binary interacted with monthly CDH per billing day
R_DH10	= October binary interacted with sum of monthly HDH and CDH per billing day
R_DH11	= November binary interacted with sum of monthly HDH and CDH per billing day
R_HDH12	= December binary interacted with monthly HDH per billing day
R_EFF	= Residential Energy Efficiency variable
AR(1)	= Autoregressive term

4.1.2 Commercial Sales

The model of energy sales for the commercial class depends on the following factors:

- Number of customers
- Number of days in the billing cycle
- Weather
- Energy efficiency
- Covid recovery variable

Commercial energy sales (MWh) are projected using a linear regression model that relates monthly energy use per customer per billing day to independent variables that capture the impacts of varying weather conditions and energy efficiency. The commercial customer forecast is presented in Section 4.2.1.

Similar to the residential model, the impact on sales resulting from the variation in the length of the billing period is addressed by dividing the commercial energy use per customer (dependent) variable and the monthly weather terms by the number of billing days. Historical average billing days per month are obtained from the annual meter reading schedules. For Budget 2022, average billing days were based on the actual

meter schedules for each respective year available from 2021-2023. Subsequent years use a historical average, adjusted as needed to ensure an accurate number of days in the calendar and annual periods.

HDH and CDH are used to measure the impact of weather on monthly commercial energy sales. As with the residential class, HDH and CDH are computed as an average of the billing cycles. For the commercial class, HDH are computed using a 51°F threshold and CDH are computed with a 62°F threshold. Degree hours are averaged over ten National Weather Service stations, and the temperatures at the weather stations are weighted by the commercial energy use in the Georgia Power regions that are mapped to the ten weather stations.

As with the residential class, an efficiency variable is derived from the long-term energy model to capture the impact of energy efficiency on sales. It is calculated using the weighted average of equipment stock efficiency from the previous year's LoadMAP model. The weights are based on the equipment's relative contribution to total commercial usage.

Commercial energy sales were hard-hit by the Covid-19 pandemic, dropping by nearly 13% from March to April 2020. To capture the recovery in the short-term forecast model, a trend variable based on the forecast of Georgia's unemployment rate was used. This variable has a value of one in April and May 2020, then declines to zero when the unemployment rate reaches its predicted pre-pandemic level.

The commercial short-term regression model relates monthly commercial energy sales per billing day to an intercept, twelve monthly weather interaction terms that are divided by the number of billing days, an energy efficiency variable and a Covid-19 recovery variable. The monthly weather interaction variables are calculated by multiplying the CDH per billing day and HDH per billing day variables with monthly binary variables. This helps distinguish the impact of HDH and CDH on the commercial class at various times of the year.

The forecast of commercial energy sales per customer per billing day is multiplied by the forecasted number of customers and billing days to get total forecasted commercial billed energy sales. A summary of parameter estimates and statistics for the short-term commercial energy model is found in Table 4.1.2-1.

Table 4.1.2-1: Commercial Use per Customer per Billing Day

**Commercial Short-Term Model
Budget 2022**

<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	11.19
C_HDH1	REDACTED	6.64
C_HDH2	REDACTED	8.34
C_DH3	REDACTED	4.39
C_DH4	REDACTED	4.58
C_CDH5	REDACTED	8.42
C_CDH6	REDACTED	16.04
C_CDH7	REDACTED	22.47
C_CDH8	REDACTED	25.98
C_CDH9	REDACTED	22.88
C_CDH10	REDACTED	15.41
C_DH11	REDACTED	6.98
C_HDH12	REDACTED	4.20
C_EFF	REDACTED	-9.72
COVID_UNEMPLOYMENT_RATE	REDACTED	-11.73

Where:

B_UPC_BD_C	= Commercial monthly use per customer per billing day (dependent variable)
CONSTANT	= Regression equation constant term
C_HDH1	= January binary interacted with monthly HDH per billing day
C_HDH2	= February binary interacted with monthly HDH per billing day
C_DH3	= March binary interacted with sum of monthly HDH and CDH per billing day
C_DH4	= April binary interacted with sum of monthly HDH and CDH per billing day
C_CDH5	= May binary interacted with monthly CDH per billing day
C_CDH6	= June binary interacted with monthly CDH per billing day
C_CDH7	= July binary interacted with monthly CDH per billing day
C_CDH8	= August binary interacted with monthly CDH per billing day
C_CDH9	= September binary interacted with monthly CDH per billing day
C_CDH10	= October binary interacted with monthly CDH per billing day
C_DH11	= November binary interacted with sum of monthly HDH and CDH per billing day
C_HDH12	= December binary interacted with monthly HDH per billing day
C_EFF	= Commercial Energy Efficiency variable
COVID_UNEMPLOYMENT_RATE	= Covid recovery trend variable based on Georgia's unemployment rate

4.1.3 Industrial Sales

The model of energy sales for the industrial class depends on the following factors:

- Weather
- Number of calendar days in the month
- Economics
- Covid binary variable

Industrial energy use per calendar day (MWh) is projected using an econometric regression model with independent variables that capture the impacts of varying weather conditions, economic trends and a Covid-19 binary variable.

The industrial class is not as weather sensitive as the commercial or residential classes. Only CDH are used to measure the impact of weather on monthly industrial energy sales. HDH do not significantly impact industrial sales and are thus not used in the forecast model. Industrial CDH are computed using a 59°F threshold. The CDH are averaged over ten National Weather Service stations, and the temperatures at the weather stations are weighted by the industrial energy use in the Georgia Power regions that are mapped to the ten weather stations.

The economic variable used in the short-term industrial forecast model is the US Industrial Production Index for manufacturing. Also included in the model are two binary variables representing the two-part shutdown of a very large industrial customer, which began in 2016 with the shutdown of one production line and a complete shutdown in 2019.

The regression model relates the total monthly industrial energy sales per calendar day to seven monthly binary variables, four monthly weather interaction terms divided by the number of calendar days, the US Industrial Production Index for manufacturing, two binary variables for the loss of a large industrial customer, and a Covid-19 binary variable for the months of April, May and June of 2020.

The forecast of industrial energy sales per calendar day is multiplied by the forecasted number of calendar days to get total forecasted industrial calendar energy sales. A summary of the parameter estimates and statistics for the short-term industrial energy model is presented in Table 4.1.3-1.

Table 4.1.3-1: Industrial Energy Sales per Calendar Day

Industrial Short-Term Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	4.35
I_JAN	REDACTED	3.64
I_FEB	REDACTED	4.47
I_MAR	REDACTED	5.00
I_APR	REDACTED	6.75
I_MAY	REDACTED	7.81
I_CDH6	REDACTED	11.05
I_CDH7	REDACTED	10.74
I_CDH8	REDACTED	12.05
I_CDH9	REDACTED	10.44
I_OCT	REDACTED	10.71
I_NOV	REDACTED	7.29
I_LARGE CUST1	REDACTED	-2.81
I_LARGE CUST2	REDACTED	-5.98
I_IP_MANUFACTURING	REDACTED	2.19
I_COVID3AMJ_20	REDACTED	-2.61

Where:

C_MWH_CD_I	= Industrial monthly energy sales per calendar day (dependent variable)
CONSTANT	= Regression equation constant term
I_JAN	= January binary
I_FEB	= February binary
I_MAR	= March binary
I_APR	= April binary
I_MAY	= May binary
I_CDH6	= June binary interacted with monthly CDH per calendar day
I_CDH7	= July binary interacted with monthly CDH per calendar day
I_CDH8	= August binary interacted with monthly CDH per calendar day
I_CDH9	= September binary interacted with monthly CDH per calendar day
I_OCT	= October binary
I_NOV	= November binary
I_LARGE CUST1	= Binary variable indicating shutdown of large customer, Part 1
I_LARGE CUST2	= Binary variable indicating shutdown of large customer, Part 2
I_IP_MANUFACTURING	= US Industrial Production Index for Manufacturing
I_COVID3AMJ_20	= Covid binary variable for April, May, June 2020

4.1.4 MARTA Sales

MARTA energy sales, both short-term and long-term, are forecasted using a linear regression model that relates sales to eleven monthly weather interaction terms and a Covid-19 recovery trend variable. Table 4.1.4-1 presents the specific parameter estimates and statistics of the MARTA energy model.

Energy sales to MARTA were hard-hit by the Covid-19 pandemic, dropping by 23% from March to April 2020. To capture the recovery in the short-term forecast model, the same Covid trend variable used in the commercial energy forecast was used. This variable is based on the forecast of Georgia's unemployment rate, with a value of one in April and May 2020, and then declining to zero when the unemployment rate reaches its pre-pandemic level.

Table 4.1.4-1: MARTA Energy Sales

MARTA Short-Term Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	22.03
M_HDH1	REDACTED	15.63
M_HDH2	REDACTED	11.81
M_HDH3	REDACTED	7.68
M_DH4	REDACTED	5.51
M_CDH5	REDACTED	3.85
M_CDH6	REDACTED	7.71
M_CDH7	REDACTED	9.95
M_CDH8	REDACTED	10.71
M_CDH9	REDACTED	12.50
M_CDH10	REDACTED	5.80
M_HDH12	REDACTED	7.67
COVID_UNEMPLOYMENT_RATE	REDACTED	-4.35
AR(2)	REDACTED	5.15
AR(3)	REDACTED	6.85

Where:

B_MWH_M	= MARTA monthly energy sales (dependent variable)
CONSTANT	= Regression equation constant term
M_HDH1	= January binary interacted with monthly HDH
M_HDH2	= February binary interacted with monthly HDH
M_HDH3	= March binary interacted with monthly HDH
M_DH4	= April binary interacted with sum of monthly HDH and CDH
M_CDH5	= May binary interacted with monthly CDH
M_CDH6	= June binary interacted with monthly CDH
M_CDH7	= July binary interacted with monthly CDH
M_CDH8	= August binary interacted with monthly CDH
M_CDH9	= September binary interacted with monthly CDH
M_CDH10	= October binary interacted with monthly CDH
M_HDH12	= December binary interacted with monthly HDH
COVID_UNEMPLOYMENT_RATE	= Covid recovery trend variable based on Georgia's unemployment rate
AR(2), AR(3)	= Autoregressive terms

4.1.5 Governmental Lighting Sales

New outdoor lighting technologies being adopted throughout the Georgia Power system have made it necessary to use internal estimates for the short-term forecast rather than an econometric model. Between 2014 and 2020, regulated governmental lighting energy sales declined by nearly 30% as municipalities changed out older lights and replaced them with new energy efficient lighting fixtures. In Budget 2022, it is assumed that energy usage will continue to decline over the forecast horizon as older lights are replaced with more energy efficient lights.

4.2 CUSTOMER FORECASTS

Budget 2022 customer forecasts for the residential, commercial, industrial, and governmental lighting classes were developed using linear regression models.

4.2.1 Residential Customers

The Georgia Power residential customer forecast was developed using a regression model that relates the annual change in customers to the number of total Georgia housing starts, a 2020 binary variable to account for the impact of Covid 19, Georgia’s unemployment rate and an intercept term. The annual forecasts are then spread across the months using an estimate of the monthly historical pattern. Table 4.2.1-1 presents the specific parameter estimates and statistics for the residential customer model.

Table 4.2.1-1: Residential Customers

Residential Customer Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	6.37
HOUSING_STARTS	REDACTED	5.10
D_2020	REDACTED	24.26
UNEMPLOYMENT	REDACTED	-6.36

Where:

CH_CUS_R	Residential annual customers, change (dependent variable)
CONSTANT	= Regression equation constant term
HOUSING_STARTS	= Total private housing starts, State of Georgia
D_2020	= Binary variable for 2020
UNEMPLOYMENT	= Unemployment rate, State of Georgia

4.2.2 Commercial Customers

The Georgia Power commercial customer forecast uses the annual change in customers, excluding Unmetered Devices, as the dependent variable. Unmetered Device accounts are excluded from total commercial customers because they consume much less energy than a typical commercial customer. By excluding Unmetered Devices, the true growth of typical commercial customers is captured. As a result,

when commercial use per customer results are multiplied by the number of customers, the forecast of commercial energy is not overstated.

The commercial customer regression model includes two independent variables: the number of total housing starts in Georgia and a recession binary variable for years that include a recession. The annual forecasts are then spread across the months using an estimate of the monthly historical pattern. Table 4.2.2-1 presents the specific parameter estimates and statistics for the commercial customer model.

Table 4.2.2-1: Commercial Customers

Commercial Customer Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	-0.14
HOUSING_STARTS	REDACTED	10.26
RECESSION	REDACTED	-2.14

Where:

CUS_C_ADJ_UD_CH	= Commercial annual customers, change (dependent variable)
CONSTANT	= Regression equation constant term
HOUSING_STARTS	= Total Private Housing starts, State of Georgia
RECESSION	= Recession binary variable

4.2.3 Industrial Customers

The Georgia Power industrial monthly customer forecast was developed using a regression model, with a one-month lag of customers as the explanatory variable. Table 4.2.3-1 presents the specific parameter estimates and statistics for the industrial customer model.

Table 4.2.3-1: Industrial Customers

Industrial Customer Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CONSTANT	REDACTED	2.40
CUS_I(-1)	REDACTED	71.27
AR(1)	REDACTED	2.81

Where:

<u>CUS_I</u>	= Industrial monthly customers (dependent variable)
CONSTANT	= Regression equation constant term
CUS_I(-1)	= Lagged dependent variable of one (1) month
AR(1)	= Autoregressive term

4.2.4 Governmental Lighting Customers

The Georgia Power governmental lighting monthly customer forecast was developed using a regression model that includes a one-month lag of customers and the total housing stock in Georgia as explanatory variables. A variable to capture changes in the billing system's identification of Savannah Electric and Power Company's governmental lighting customers in 2008 is also included. The specific parameter estimates and statistics for the governmental lighting customer model are presented in Table 4.2.4-1.

Table 4.2.4-1: Governmental Lighting Customers

Governmental Lighting Customer Model Budget 2022		
<u>Variable</u>	<u>Coefficient</u>	<u>t-Statistic</u>
CUS_GL(-1)	REDACTED	154.35
HOUSING STOCK	REDACTED	3.39
SAV_MERGER_08	REDACTED	3.22
AR(1)	REDACTED	2.92
AR(2)	REDACTED	2.31

Where:

CUS_GL	Governmental Lighting monthly customers (dependent variable)
CUS_GL(-1)	= Lagged dependent variable of one (1) month
HOUSING STOCK	= Total housing stock in the State of Georgia
SAV_MERGER_08	= Binary variable – represents a permanent shift beginning in Jan 2008 for classifying Savannah lighting customers
AR(1), AR(2)	= Autoregressive terms

4.3 CALENDAR MONTH FORECAST

Georgia Power budgeting and accounting records are based on calendar month sales. However, meters are not read according to calendar months. Instead, they are read according to the billing schedule for each class. Separate calendar month sales forecasts, derived from billing month forecasts, are prepared for Georgia Power's residential and commercial classes. Calendar month sales forecasts for the other retail customers are assumed to be equal to their billing month forecasts because their billing periods nearly coincide with actual calendar months.

For the short-term forecast (2022-2025), billing month energy sales are converted into calendar month energy sales by forecasting unbilled energy sales and applying the following equation:

$$\text{Calendar Month Sales} = \text{Billed Sales (current month)} + \text{Net Unbilled Sales}$$

where:

$$\text{Net Unbilled Sales} = \text{Unbilled Sales (Current Month)} - \text{Unbilled Sales (Previous Month)}$$

The unbilled sales forecast is estimated using the same forecast models for residential and commercial as presented in sections 4.1.1 and 4.1.2. All of the inputs are the same, with the exception of the monthly weather interaction terms in the forecast period. In the unbilled model, these monthly weather interaction terms are based on the number of unbilled days, rather than the number of billed days, to account for the impact of variations in the length of the unbilled period. As with the number of billing days, the number of unbilled days is based on the Company's annual meter reading schedule.

The forecast of residential use per customer per unbilled day and commercial energy use per customer per unbilled day are multiplied by the forecasted number of customers and unbilled days to get the respective forecasted unbilled energy sales for each class to be used in the equation above to calculate calendar month sales.

5.0 LONG-TERM MODEL DESIGN

The long-term forecasts for the residential, commercial and industrial customer classes were produced with end-use models. The end-use approach allows for an examination of the end uses that contribute to the energy usage of a customer class. For example, specific assumptions about appliance ownership, appliance efficiency improvements, and consumer choice characteristics are factored into the forecast of each customer class.

For Budget 2022, the long-term forecasts used the Load Management and Planning model (LoadMAP), developed by Applied Energy Group (“AEG”), for the residential, commercial, and industrial sales classes. LoadMAP has been in use since the Budget 2015 forecast. Beginning with Budget 2021, the base year in the LoadMAP models was updated to 2016 (from 2007).

Market profiles are used to quantify electricity use in the base year of the study by sector, segment, end use, and the current set of technologies. As part of the re-baselining process, the market profiles for the residential, commercial, and industrial sectors were rebuilt, moving the base year from 2007 to 2016. Base-year data such as customer counts, historic energy sales, equipment presence (saturation), market floor space (in commercial), Industrial Production and per-unit equipment electricity consumption (UEC/EUI) were updated using the best available sources as described below.

The long-term twenty-year forecast for MARTA was produced using an econometric regression model. The governmental lighting forecast was produced using judgment and internal expectations based on the change-out of existing lights to more efficient LED lights. Detailed model specifications can be found in the short-term model documentation, Section 4, while forecasted values can be found in Section 2.

Table 5.0-1 Model Type List

<u>Class</u>	<u>Short-Term</u>	<u>Long-Term</u>
Residential	Econometric	LoadMAP
Commercial	Econometric	LoadMAP
Industrial	Econometric	LoadMAP
MARTA	Econometric	Econometric
Governmental Lighting	Judgment	Judgment

5.1 LONG-TERM ENERGY SALES

5.1.1 Residential Long-Term Energy Sales

LoadMAP forecasts end-use or appliance-specific residential energy consumption using a variety of demographic, housing, economic, energy, and weather information. It models energy consumption for three main components: housing stock served (customers), share of the housing stock served by appliance end-use by fuel type, and unit energy consumption of the appliance/equipment by fuel type. End-use by fuel type refers to a class of technologies (appliances) that consume a particular fuel (electricity or natural gas) such as electric clothes dryers or gas stovetops. Technologies refer to specific electric clothes dryers such as standard or EnergyStar models. As an example, clothes dryers are in the end use of appliances with two technologies: standard and EnergyStar.

LoadMAP simulates household energy decisions with respect to three basic types of choices — appliance ownership by fuel type, appliance efficiency, and appliance utilization (energy usage). For a given end use and fuel type, consumption is the product of the number of households, the percentage of the segment (households) with the end use, and the average unit energy consumption. The equation that uses these three main components to determine consumption, or sales, is called the central energy equation.

$$Energy = \sum_t (N \times Share_t \times UEC_t \times U_e)$$

Where:

Energy = annual energy use in a particular segment (e.g., residential single-family homes)

t = technology (appliance/equipment)

e = end use (group of like technologies)

N = market size (e.g., number of single-family homes)

Share_t = share of market with the end use (e.g., single-family homes with the end use). This is also referred to as the end-use saturation.

- UEC_t = unit energy consumption in unit of market size (e.g., single-family homes) with the technology
- U_e = utilization index (equals 1.0 in base year)

The elements of the central energy equation in the base year are contained in an energy market profile.

The appliance ownership shares used in the LoadMAP model are calibrated to Georgia Power's service territory and initialized to a base year of 2016.

The residential energy model predicts energy consumption for nine major household end-uses:

1. Cooling
2. Space Heating
3. Water Heating
4. Interior Lighting
5. Exterior Lighting
6. Appliances
7. Electronics
8. Miscellaneous
9. Miscellaneous NEC (Not Elsewhere Classified and is the remaining energy consuming activity)

The model is segmented by housing type (single-family, multi-family, and manufactured housing), and its logic distinguishes between new and existing housing characteristics. Each customer group is described by the combinations of these attributes. As an example, new single-family housing demonstrates characteristic choice behaviors in the selection of the technologies (appliances) and fuel types available to the market. This choice behavior or demonstrated preference for a particular fuel choice technology in a given end-use category is measured by the 2016 Georgia Power Residential Saturation Survey and the South Atlantic regional results from the US Energy Information Administration's ("EIA") Residential Energy Consumption Survey ("RECS") and Annual Energy Outlook ("AEO").

For each of the end uses, LoadMAP forecasts equipment purchases, efficiency, and utilization choices. Within the simulation, the probability of installing a given technology in a dwelling is dependent upon the operating and performance characteristics of the competing alternatives, as well as household and dwelling features. Certain end uses are highly interdependent, such as heating and water heating, which typically use the same fuel type.

Average annual end-use consumption levels (referred to as unit energy consumption or UEC) are from various internally developed and national and regional sources including: Annual Energy Outlook (2019) from the EIA and the US Department of Energy's ("DOE") OpenStudio/Energy Plus building simulation model that has been internally developed for use in Forecasting and DSM program study. UECs are calibrated to Georgia Power base year energy consumption. Average appliance size and efficiency by

appliance vintage are derived from the 2016 Georgia Power saturation survey and the EIA's RECS and AEO. The same sources are used to estimate and represent the gas market. Efficiency data are from SCS Market Intelligence and from several sources including AEG, RECS data, and other national and regional data. Additionally, LoadMAP data leverages AEG's expertise providing the latest intelligence in efficiencies and technologies.

Appliance operating efficiency and utilization rates are simulated as interdependent decisions. Efficiency choice is dependent on operating cost at the planned utilization rate, while actual utilization depends on operating cost given the appliance efficiency. The sensitivity of efficiency and utilization decisions to costs, climate, household and dwelling size, and income have been estimated and calibrated from historical survey data and short-term model results.

Other exogenous variables include fuel prices (electricity and natural gas), average household income, household size, weather (measured in degree hours), natural gas availability, technology availability, and efficiency standards by technology.

Historical natural gas prices are from the EIA State Energy Data System. Forecasts of residential natural gas prices are developed by SCS Forecasting using the commodity price forecasts from SCS Fuel Services and SCS Resource Planning. Historical electricity prices are from Georgia Power's records while projected electricity prices are based on the retail price from the 10-year financial model and extrapolated based on historical trends for the remaining years.

LoadMAP uses a normal weather condition of cooling and heating degree hours in deriving the forecast. This weather condition is a forty-one-year average of cooling and heating degree hours from 1980 through 2020. Economic data are purchased from IHS Markit on an annual basis.

Customers are separately forecasted at an aggregate level using the model presented in Section 4.2.1. This forecast is then disaggregated to single family, multi-family, and manufactured home using housing type trends from the IHS Markit housing stock forecast and calibrated to historic Georgia Power billing data splits.

The residential long-term forecast is modeled and presented on a calendar basis. The long-term forecast is integrated with the short-term forecast (both on a calendar basis) and later both are converted to a billing basis. Attachment 5.1.1-1 shows the unadjusted long-term calendar forecast, as well as the adjusted

calendar and billed forecasts, which are adjusted for reductions in sales resulting from the additional DSM, additional behind the meter distributed solar, and for the additional sales resulting from electric vehicles. See section 8.4 for more information on the adjustments made to the peak demand and energy forecasts.

Several attachments follow which comprise the Budget 2022 Residential Long-term Forecast.

Attachment 5.1.1-1: Total Residential Energy Sales (GWh)

Residential Long-Term Forecast
Budget 2022

Year	LT Calendar End-Use Model	ST Calendar Adjusted	ST & LT Adjusted Calendar	ST & LT Adjusted Billed
2021	28,430	28,949	28,949	29,012
2022	28,970	29,030	29,030	29,035
2023	28,836	29,368	29,368	29,276
2024	28,877	29,688	29,688	29,744
2025	28,883	29,934	29,934	29,908
2026	28,897		30,108	30,082
2027	28,969		30,204	30,178
2028	29,049		30,317	30,290
2029	29,170		30,489	30,462
2030	29,359		30,740	30,712
2031	29,609		31,066	31,038
2032	29,817		31,390	31,362
2033	30,061		31,761	31,733
2034	30,317		32,154	32,126
2035	30,589		32,572	32,544
2036	30,916		33,057	33,029
2037	31,224		33,529	33,500
2038	31,514		33,992	33,964
2039	31,833		34,495	34,466
2040	32,176		35,028	34,999
2041	32,463		35,510	35,481

*In the following tables, values are based on the long-term calendar end-use model. No external adjustments were made.

Attachment 5.1.1-2: GWh/BBtu Sales by End Use – Total Residential

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Cooling				Heating								
	Central AC	Room AC	Air-Source Heat Pump	Geothermal Heat Pump	Air-Source Heat Pump	Geothermal Heat Pump	Furnace (Electric)	Furnace (Gas)	Room Heating (Electric)	Room Heating (Gas)	Secondary (Electric)	Secondary (Gas)	Other Heating (Gas)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-2: GWh/BBtu Sales by End Use – Total Residential (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Water Heating				Appliances												
	Water Heater (<=55 Gal) (Electric)	Water Heater (<=55 Gal) (Gas)	Water Heater (>55 Gal) (Electric)	Water Heater (>55 Gal) (Gas)	Refrigerator	Second Refrigerator	Freezer	Clothes Washer	Clothes Dryer (Electric)	Clothes Dryer (Gas)	Dishwasher	Oven (Electric)	Oven (Gas)	Cooktop (Electric)	Cooktop (Gas)	Microwave	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
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2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
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2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-2: GWh/BBtu Sales by End Use – Total Residential (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted
Budget 2022

Year	Interior Lighting			Exterior Lighting	Electronics						
	General Service	Exempted	Linear	General Service	Desktop Computer	Laptop	Monitor	Television	Imaging Equipment	Set-Top Boxes	Devices and Gadgets
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
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2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-2: GWh/BBtu Sales by End Use – Total Residential (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted
Budget 2022

Year	Miscellaneous								Miscellaneous NEC
	Ceiling Fan	Pool Pump	Well Pump	Furnace Fan	Dehumidifier	Air Purifier	Pool Heater	Hot tub/Spa	Other
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-3: GWh/BBtu Sales by End Use – Residential Single Family

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Cooling				Heating								
	Central AC	Room AC	Air-Source Heat Pump	Geothermal Heat Pump	Air-Source Heat Pump	Geothermal Heat Pump	Furnace (Electric)	Furnace (Gas)	Room Heating (Electric)	Room Heating (Gas)	Secondary (Electric)	Secondary (Gas)	Other Heating (Gas)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-3: GWh/BBtu Sales by End Use – Residential Single Family (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Water Heating				Appliances												
	Water Heater (<=55 Gal) (Electric)	Water Heater (<=55 Gal) (Gas)	Water Heater (>55 Gal) (Electric)	Water Heater (>55 Gal) (Gas)	Refrigerator	Second Refrigerator	Freezer	Clothes Washer	Clothes Dryer (Electric)	Clothes Dryer (Gas)	Dishwasher	Oven (Electric)	Oven (Gas)	Cooktop (Electric)	Cooktop (Gas)	Microwave	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-3: GWh/BBtu Sales by End Use – Residential Single Family (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Interior Lighting			Exterior Lighting	Electronics							
	General Service	Exempted	Linear	General Service	Desktop Computer	Laptop	Monitor	Television	Imaging Equipment	Set-Top Boxes	Devices and Gadgets	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-3: GWh/BBtu Sales by End Use – Residential Single Family (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Miscellaneous								Miscellaneous NEC
	Ceiling Fan	Pool Pump	Well Pump	Furnace Fan	Dehumidifier	Air Purifier	Pool Heater	Hot tub/Spa	Other
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-4: GWh/BBtu Sales by End Use – Residential Multi Family

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Cooling				Heating								
	Central AC	Room AC	Air-Source Heat Pump	Geothermal Heat Pump	Air-Source Heat Pump	Geothermal Heat Pump	Furnace (Electric)	Furnace (Gas)	Room Heating (Electric)	Room Heating (Gas)	Secondary (Electric)	Secondary (Gas)	Other Heating (Gas)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-4: GWh/BBtu Sales by End Use – Residential Multi Family (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Water Heating				Appliances												
	Water Heater (<=55 Gal) (Electric)	Water Heater (<=55 Gal) (Gas)	Water Heater (>55 Gal) (Electric)	Water Heater (>55 Gal) (Gas)	Refrigerator	Second Refrigerator	Freezer	Clothes Washer	Clothes Dryer (Electric)	Clothes Dryer (Gas)	Dishwasher	Oven (Electric)	Oven (Gas)	Cooktop (Electric)	Cooktop (Gas)	Microwave	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-4: GWh/BBtu Sales by End Use – Residential Multi Family (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Interior Lighting			Exterior Lighting	Electronics							
	General Service	Exempted	Linear	General Service	Desktop Computer	Laptop	Monitor	Television	Imaging Equipment	Set-Top Boxes	Devices and Gadgets	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-4: GWh/BBtu Sales by End Use – Residential Multi Family (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Miscellaneous								Miscellaneous NEC
	Ceiling Fan	Pool Pump	Well Pump	Furnace Fan	Dehumidifier	Air Purifier	Pool Heater	Hot tub/Spa	Other
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-5: GWh/BBtu Sales by End Use – Residential Manufactured Home

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Cooling				Heating								
	Central AC	Room AC	Air-Source Heat Pump	Geothermal Heat Pump	Air-Source Heat Pump	Geothermal Heat Pump	Furnace (Electric)	Furnace (Gas)	Room Heating (Electric)	Room Heating (Gas)	Secondary (Electric)	Secondary (Gas)	Other Heating (Gas)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-5: GWh/BBtu Sales by End Use – Residential Manufactured Home (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Water Heating				Appliances												
	Water Heater (<=55 Gal) (Electric)	Water Heater (<=55 Gal) (Gas)	Water Heater (>55 Gal) (Electric)	Water Heater (>55 Gal) (Gas)	Refrigerator	Second Refrigerator	Freezer	Clothes Washer	Clothes Dryer (Electric)	Clothes Dryer (Gas)	Dishwasher	Oven (Electric)	Oven (Gas)	Cooktop (Electric)	Cooktop (Gas)	Microwave	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-5: GWh/BBtu Sales by End Use – Residential Manufactured Home (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Interior Lighting			Exterior Lighting	Electronics							
	General Service	Exempted	Linear	General Service	Desktop Computer	Laptop	Monitor	ou see lap	Imaging Equipment	Set-Top Boxes	Devices and Gadgets	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-5: GWh/BBtu Sales by End Use – Residential Manufactured Home (cont’d)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted
Budget 2022

Year	Miscellaneous								Miscellaneous NEC
	Ceiling Fan	Pool Pump	Well Pump	Furnace Fan	Dehumidifier	Air Purifier	Pool Heater	Hot tub/Spa	Other
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-6: GWh/BBtu Sales by Fuel

Residential Long-Term Forecast (LoadMAP-R) Unadjusted
Budget 2022

Total		
Year	Electric (GWh)	Gas (Bbtu)
2021	28,430	57,439
2022	28,970	57,845
2023	28,836	58,275
2024	28,877	58,698
2025	28,883	59,165
2026	28,897	59,664
2027	28,969	60,162
2028	29,049	60,662
2029	29,170	61,169
2030	29,359	61,770
2031	29,609	62,351
2032	29,817	62,923
2033	30,061	63,385
2034	30,317	63,875
2035	30,589	64,383
2036	30,916	64,910
2037	31,224	65,466
2038	31,514	66,087
2039	31,833	66,734
2040	32,176	67,399
2041	32,463	68,075

Attachment 5.1.1-7: Average UEC (kWh/BBtu)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Cooling				Heating								
	Central AC	Room AC	Air-Source Heat Pump	Geothermal Heat Pump	Air-Source Heat Pump	Geothermal Heat Pump	Furnace (Electric)	Furnace (Gas)	Room Heating (Electric)	Room Heating (Gas)	Secondary (Electric)	Secondary (Gas)	Other Heating (Gas)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-7: Average UEC (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Water Heating				Appliances												
	Water Heater (<=55 Gal) (Electric)	Water Heater (<=55 Gal) (Gas)	Water Heater (>55 Gal) (Electric)	Water Heater (>55 Gal) (Gas)	Refrigerator	Second Refrigerator	Freezer	Clothes Washer	Clothes Dryer (Electric)	Clothes Dryer (Gas)	Dishwasher	Oven (Electric)	Oven (Gas)	Cooktop (Electric)	Cooktop (Gas)	Microwave	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-7: Average UEC (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Interior Lighting			Exterior Lighting	Electronics							
	General Service	Exempted	Linear	General Service	Desktop Computer	Laptop	Monitor	Television	Imaging Equipment	Set-Top Boxes	Devices and Gadgets	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-7: Average UEC (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Miscellaneous								Miscellaneous NEC
	Ceiling Fan	Pool Pump	Well Pump	Furnace Fan	Dehumidifier	Air Purifier	Pool Heater	Hot tub/Spa	Other
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-8: Average Share of Market

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

Year	Cooling				Heating								
	Central AC	Room AC	Air-Source Heat Pump	Geothermal Heat Pump	Air-Source Heat Pump	Geothermal Heat Pump	Furnace (Electric)	Furnace (Gas)	Room Heating (Electric)	Room Heating (Gas)	Secondary (Electric)	Secondary (Gas)	Other Heating (Gas)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-8: Average Share of Market (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted
Budget 2022

Year	Water Heating				Appliances												
	Water Heater (<=55 Gal) (Electric)	Water Heater (<=55 Gal) (Gas)	Water Heater (>55 Gal) (Electric)	Water Heater (>55 Gal) (Gas)	Refrigerator	Second Refrigerator	Freezer	Clothes Washer	Clothes Dryer (Electric)	Clothes Dryer (Gas)	Dishwasher	Oven (Electric)	Oven (Gas)	Cooktop (Electric)	Cooktop (Gas)	Microwave	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-8: Average Share of Market (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted
Budget 2022

Year	Interior Lighting			Exterior Lighting	Electronics						
	General Service	Exempted	Linear	General Service	Desktop Computer	Laptop	Monitor	Television	Imaging Equipment	Set-Top Boxes	Devices and Gadgets
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.1-8: Average Share of Market (cont'd)

Residential Long-Term Forecast (LoadMAP-R) Unadjusted Budget 2022

	Miscellaneous								Miscellaneous NEC
Year	Ceiling Fan	Pool Pump	Well Pump	Furnace Fan	Dehumidifier	Air Purifier	Pool Heater	Hot tub/Spa	Other
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

5.1.2 Commercial Long-Term Energy Sales

The long-term forecast of electric energy sales for Georgia Power's commercial class was produced using LoadMAP. The Commercial LoadMAP model uses floor space by building type, assumed normal weather and fuel price forecasts to produce a commercial energy sales forecast by different technologies for each end use and building type.

The commercial sector is segmented into thirteen building types, ten end uses, and two fuel types. The thirteen building types are:

- | | |
|---------------|-----------------------------|
| 1. Office | 8. Healthcare |
| 2. Restaurant | 9. Lodging |
| 3. Retail | 10. Miscellaneous Buildings |
| 4. Grocery | 11. Religion |
| 5. Warehouse | 12. Public |
| 6. Education | 13. Data Center |
| 7. Amusement | |

The ten end uses modeled for each of the building types listed above are:

- | | |
|---------------------------------|----------------------|
| 1. Primary Heat (Space Heating) | 6. Exterior Lighting |
| 2. Cooling (Air Conditioning) | 7. Interior Lighting |
| 3. Water Heating | 8. Office Equipment |
| 4. Food Preparation | 9. Ventilation |
| 5. Refrigeration | 10. Miscellaneous |

The two fuel types used for the commercial market are electricity and natural gas.

The commercial LoadMAP model forecasts the energy consumption for each technology (appliance/equipment), in each end use in each market segment in the commercial class. Energy consumption is determined by building type, end use, and fuel type. Energy usage varies considerably between building types; therefore, building type is the primary differentiation of the commercial market. This segmentation is done to group together market segments with relatively common characteristics while separately identifying segments with distinctly different characteristics.

The differences in building type reflect differences in operating characteristics as well as differences in the composition and choice of energy consuming activities and energy consuming equipment. These energy-consuming activities that deliver service to the occupants by various devices and equipment are called end uses. An end use is a group of energy-using equipment, referred to as technologies, such as lighting, cooking, or air conditioning. The composition and intensity of energy usage and the energy consuming activities within each building type vary according to the consumer activity and behavior resulting from the business purpose associated with the building. For example, a grocery store contains relatively more refrigeration and lighting while a restaurant has more energy consuming devices related to cooking. Therefore, the relative concentration of the different end uses varies by building type. Also, the energy consumption characteristics of each end use will vary by building type because the selection of equipment to deliver that end-use service is made as appropriate to the function of the activities inside the building.

Consumers have the opportunity to select alternative energy consuming equipment (devices and appliances) that deliver the same service (for example, water heating or cooking) but vary by fuel. Since capital and operating costs vary for similar devices of different fuel types, and consumer preference varies by fuel, fuel costs also have an impact in the selection of end-use equipment.

The commercial LoadMAP model uses information about the operating characteristics, ownership decisions, and behavioral characteristics to determine energy consumption patterns of commercial customers. Factors influencing the energy consumption within a building include the operating characteristics of the building, preferences in the construction of the building, consumer behavior of the occupants of the building, and operational design and influences in the building such as energy management systems and controls.

It also models energy consumption using four main components: building floor space, share of the floor space served by appliance end use and fuel type, energy consumption per square foot of floor space, and an index reflecting changes in energy usage of a fuel type. Appliance end-use by fuel type refers to an end use class of appliances that consume a particular fuel (electricity or natural gas) such as electric cooking or gas room heating. The equation that uses these four main components to determine energy consumption, or sales, is called the central energy equation for the commercial class:

$$Energy = \sum_t (N \times Share_t \times UEC_t \times U_e)$$

Energy = annual energy use in a particular segment (e.g., commercial restaurant)

t = technology

e = end use

- N = market size (e.g., amount of restaurant square footage)
- Share_t = share of market with the end use (e.g., restaurant floor space with the end use). This is also referred to as the end-use saturation.
- UEC_t = unit energy consumption in unit of market size (e.g., restaurant square footage) with the end use
- U_e = utilization index (equals 1.0 in base year)

The elements of the central energy equation in the base year are contained in an energy market profile.

The commercial LoadMAP model uses economic, fuel price, market data, operating characteristics, and weather information to produce the energy forecast for the commercial class. The economic variable used is floor space by building type. The square footage forecast is done in-house by SCS and utilizes historical and short-term forecast square footage data from Dodge Data and Analytics. It is the primary driver of energy consumption in the commercial class. Floor space is measured in square footage of building space.

There are two types of share definitions. The whole building concept measures the share of floor space in buildings with an end use regardless of the portion of each building that is served by the end use. For example, refrigeration in an office building. A building has or does not have refrigeration. The second share concept refers to conditioned floor space and accounts for the fraction of each building that is conditioned by the end use (for example, air conditioning). The Energy Usage Index (“EUI”) is the average annual energy per square foot of floor space that is served by a particular end use and fuel type. The usage index (“UI”) is an index measured relative to the base year that indicates the relative amount of energy service (e.g. lighting) delivered for a specified end use and fuel type within a particular building type. The UI is determined by consumer (occupant) behavior, equipment controls, weather, and other operating characteristics.

The information for each technology’s saturation, energy use intensity, intensity per square foot, and sales for each end use comprise the market profile of energy use for a particular building type/fuel type combination. Market profiles of energy use for a building type are developed for each fuel type. End-use energy consumption by technology, or sales, is the product of intensity per square foot and floor space. The product of the saturation and EUI is called the building intensity or intensity per square foot. Market profiles show this decomposition of energy use. The information for the market profiles in the current Georgia Power commercial model is derived from the DOE’s OpenStudio/Energy Plus building simulation model, EIA’s Commercial Buildings Energy Consumption Survey (“CBECS”) and the Annual Energy Outlook’s national and regional data, and additional substitutes as developed by AEG.

Since fuel share and EUIs reflect the choices among building and energy technology of investment decisions made by building owners, architects, and contractors at the time of new building construction or replacement of equipment the model distinguishes between existing and new/replacement technology and buildings. The choice of whether to include end-use equipment, along with which fuel powers the equipment or technology, affects fuel shares, end-use penetration, and energy consumption. Selection of building design options, energy-using equipment choice, building characteristics, and usage patterns determine the EUI for each fuel. Owner preferences, consumer behavior of the occupants of a building, and decisions made about the frequency and intensity of energy equipment use affect usage levels.

LoadMAP uses a probabilistic logit method to model the decision process regarding which equipment system will be installed in a building. This selection is reduced to decisions related to the fuel and equipment efficiency decisions based on operating and capital costs.

As in the residential model, fuel prices and weather data are specific to the Georgia Power territory. Where Georgia Power data were not available, national and regional data were substituted. Electricity and natural gas prices are forecasted for the commercial sector and used in the commercial LoadMAP model.

The historical energies for the commercial class are derived from Georgia Power specific data, distinguishing each segment using North American Industry Classification System (“NAICS”) codes.

The model calibrates to the historical energy and segment information of the commercial class for the updated base year of 2016.

The commercial long-term forecast is modeled and presented on a calendar basis. The long-term calendar forecast is integrated with the short-term calendar forecast and then both are converted to a billing basis. Attachment 5.1.2-1 shows the unadjusted long-term calendar forecast, as well as the adjusted calendar and billing forecasts, which are adjusted for reductions in sales resulting from additional DSM programs, cogeneration, the projected adoption of behind the meter solar and the additional sales resulting from growth in electric vehicles. The amount of commercial cogeneration expected in Budget 2022 is presented in Attachment 5.1.2-5. See section 8.4 for more information on the adjustments made to the peak demand and energy forecasts.

Several attachments follow which comprise the Budget 2022 Commercial Long-term Forecast.

Attachment 5.1.2-1: Total Commercial Energy Sales (GWh)

Commercial Long-Term Forecast
Budget 2022

Year	LT Calendar End-Use Model	ST Calendar Adjusted	ST & LT Adjusted Calendar	ST & LT Adjusted Billed
2021	33,107	31,624	31,624	31,512
2022	33,304	31,579	31,579	31,600
2023	32,981	31,301	31,301	31,234
2024	33,082	31,092	31,092	31,157
2025	33,202	30,743	30,743	30,736
2026	33,314		30,559	30,552
2027	33,484		30,436	30,429
2028	33,705		30,366	30,359
2029	33,961		30,345	30,339
2030	34,252		30,361	30,355
2031	34,631		30,728	30,721
2032	34,899		30,999	30,993
2033	35,173		31,279	31,273
2034	35,441		31,558	31,552
2035	35,710		31,840	31,834
2036	36,085		32,229	32,223
2037	36,427		32,588	32,582
2038	36,758		32,940	32,933
2039	37,133		33,336	33,330
2040	37,533		33,761	33,755
2041	37,798		34,057	34,050

*In the following tables, values are based on the long-term calendar end-use model. No external adjustments were made.

Attachment 5.1.2-2: Sales by Building Type and Percentage of Class (GWh and Percentages)

Commercial Long-Term Forecast (LoadMAP-C) Unadjusted
Budget 2022

Year	Office	Restaurant	Retail	Grocery	Warehouse	Education	Amusement	Health	Lodging	Misc.	Public	Religion	Datacenter	Total
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.2-4: Average Share of Market

Commercial Long-Term Forecast (LoadMAP-C) Unadjusted
Budget 2022

Year	Primary Heating	Air Conditioning	Water Heating	Cooking	Refrigeration	Outdoor Lighting	Indoor Lighting	Office Equipment	Ventilation	Misc.
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.2-5: Commercial Cogeneration – Energy / Meter (GWh)

Commercial Long-Term Forecast
Budget 2022

Year	GWh
2021	REDACTED
2022	REDACTED
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

5.1.3 Industrial Long-Term Energy Sales

The long-term forecast of electric energy sales for Georgia Power’s industrial class was produced using LoadMAP. The industrial LoadMAP model is used because of its capability to forecast at the end-use level and the increased effectiveness of resource utilization from using the LoadMAP family of long-term forecasting models. The industrial LoadMAP model maintains consistency with the conceptual framework of the residential and commercial long-term models, while providing information appropriate to the industrial class.

The industrial sector is segmented into eleven categories, based on the NAICS and nine end uses. The eleven categories are:

1. NAICS 321 & 322 Forestry (Paper & Lumber)	7. NAICS 331 & 332 Metals
2. NAICS 325 Chemicals	8. NAICS 336 Transportation
3. NAICS 327 Stone, Clay, and Glass	9. NAICS 486 Pipeline
4. NAICS 313 & 314 Textiles	10. Other Industrial
5. NAICS 311 Food Production	11. Unspecified
6. NAICS 326 Rubber & Plastics	

Segment 10, “Other Industrial”, is comprised of multiple segments: Miscellaneous Manufacturing (NAICS 339), Electrical Equipment, Appliances, and Components (NAICS 335), Machinery (NAICS 333), Furniture (NAICS 337), Tobacco (NAICS 312), Printing (NAICS 323), Petroleum and Coal Products (NAICS 324), Computer and Electronic Products (NAICS 334), Apparel (NAICS 315), and Leather and Allied Products (NAICS 316). Segment 11, the “Unspecified” category, comprises all remaining industrial activity.

The nine end uses modeled for each of the NAICS categories listed above are:

- | | |
|----------------------|------------------|
| 1. Cooling | 6. Process |
| 2. Heating | 7. Ventilation |
| 3. Indoor Lighting | 8. Miscellaneous |
| 4. Exterior Lighting | 9. Unspecified |
| 5. Motors | |

In the industrial sector, energy requirements are largely related to the energy-to-output relationship, augmented by the share of alternative equipment choices and fuel options. In the industrial sector, economic output is measured by the amount of industrial production. Energy is required to manufacture the

product. For example, a plant requires a certain amount of motive power (i.e. work from motors) or process heat to produce its product. A textile mill requires a certain amount of motive force (work) to weave a yard of fabric or make a carpet. A plant that melts steel requires a certain amount of energy to melt a ton of steel, which is determined by the process efficiency of converting fuel sources into useful work. These energy requirements are supplied by energy consuming equipment. The amount of energy consumed by the equipment to meet this need is the amount of end-use sales. By installing more efficient equipment, a plant operator can lower the amount of energy needed to meet the requirements of the process. The end-use machinery that supplies the energy requirements of the plant needs a fuel source itself. This could be one of several fuels: electricity, natural gas, oil, or some other fuel. The plant is typically designed and operated to use a combination of equipment that uses different fuel sources and maximizes efficient use of resources while providing end-use service economically and reliably.

The long-term industrial model uses the elements of economic activity, industrial production operations, fuel choices, and equipment (or process) characteristics to model energy requirements arising from the supporting end uses of an industrial activity. The description of the economic activity and production operations of an industry come from industrial production, capacity utilization rates, and output capacity. Output capacity measures the level of output of plants when they are operating at full capacity. From this, a description of the energy required to support a given level of production can be made. Fuel prices are used to model the choice of end-use equipment employed to provide end-use service. These choices, although influenced by the preferences of the decision maker, are largely economic and are captured through analyzing life-cycle costs. The capital costs of equipment also affect the selection of equipment. In addition, the model uses information about the mix of equipment options, sizes, and ratings to determine end-use consumption characteristics.

Efficiencies, equipment size, and usage characteristics determine consumption. Equipment purchase decisions result in the stock and efficiency mix of new equipment. The first type of equipment replacement decision is made at the time of physical decay of a device and is modeled using assumptions about equipment lifetimes. The second type of equipment purchase decision results from plant construction or expansion and is modeled using changes in capacity. Share equations are used to compute market shares for the various efficiency options and are based on a logic function describing equipment purchases based on life cycle costs. Data from available surveys as well as national and regional information are used to describe these parameters for each industry.

The central energy equation for the Industrial LoadMAP model is:

$$Energy = \sum_i (N \times Share_i \times UEC_i \times U_e)$$

Energy = annual energy use in a particular segment (e.g., Chemicals)

t = technology

e = end use

N = market size (e.g., Industrial Production Index level for Chemicals)

Share_t = share of market with the end use (e.g., chemical IP index level with the end use). This is also referred to as the end-use saturation.

UEC_t = unit energy consumption in unit of market size (e.g., Chemical IP Index) with the end use

U_e = utilization index (equals 1.0 in base year)

The elements of the central energy equation in the base year are contained in an energy market profile.

The economic driver used to forecast long-term sales for each NAICS category in the industrial class is industrial production, as measured and tracked by the Federal Reserve and forecasted by IHS Markit. The use of industrial production allows for the explicit modeling of the input-output structure of the economy. Consequently, by using industrial production in the energy models, energy consumption is directly linked to a measure of industrial economic output. Section 8.2.4 addresses industrial activity.

The historical energies for the industrial class are derived from Georgia Power specific data, distinguishing each segment using NAICS codes. Electricity and natural gas prices are forecasted for the industrial class. Other data, such as fuel shares, efficiencies, technologies, etc. were implemented from several sources by AEG, including the Manufacturers Energy Consumption Survey (“MECS”), and other national and regional data.

The industrial LoadMAP model uses a base year of 2016 to establish initial calibration. The model also calibrates to historical energy through 2020. Additionally, it is calibrated to the energy of each economic category, according to NAICS, over the period of the short-term forecast, 2021 through 2025.

Cogeneration is a significant activity for certain industries. In the course of providing general manufacturing production processes, electricity is made available as a by-product. Georgia Power has assembled information to project the energy and demand changes from cogeneration for the near future. This cogeneration forecast is produced independently of the electricity sales forecast of the industrial class. See Section 8.4.2 for additional discussion on cogeneration. The amount of industrial cogeneration expected in the Budget 2022 is presented in Attachment 5.1.3-4.

The industrial long-term forecast is modeled and presented on a calendar basis. The long-term calendar forecast is integrated with the short-term calendar forecast and then both are converted to a billing basis. Attachment 5.1.3-1 shows the unadjusted long-term calendar forecast, as well as the adjusted calendar and billing forecasts, which are adjusted for reductions in sales resulting from cogeneration and solar. See section 8.4 for more information on the adjustments made to the peak demand and energy forecasts.

Several attachments follow which comprise the Budget 2022 Industrial Long-term Forecast.

Attachment 5.1.3-1: Total Industrial Energy Sales (GWh)

Industrial Long-Term Forecast
Budget 2022

Year	LT Calendar End-Use Model	ST Calendar Adjusted	ST & LT Adjusted Calendar	ST & LT Adjusted Billed
2021	24,852	22,946	22,946	22,944
2022	25,492	23,268	23,268	23,282
2023	25,565	23,392	23,392	23,406
2024	25,815	23,597	23,597	23,611
2025	26,117	23,679	23,679	23,693
2026	26,304		23,820	23,834
2027	26,517		23,997	24,011
2028	26,802		24,241	24,255
2029	27,126		24,520	24,534
2030	27,455		24,804	24,818
2031	27,760		25,065	25,079
2032	28,073		25,333	25,347
2033	28,318		25,539	25,553
2034	28,560		25,742	25,756
2035	28,882		26,015	26,029
2036	29,221		26,303	26,317
2037	29,581		26,610	26,623
2038	29,940		26,916	26,930
2039	30,291		27,215	27,228
2040	30,606		27,480	27,494
2041	30,959		27,779	27,792

*In the following tables, values are based on the long-term calendar end-use model. No external adjustments were made.

Attachment 5.1.3-2: Industrial Sales by NAICS Category (GWh and Percentages)

Industrial Long-Term Forecast (LoadMAP-I) Unadjusted Budget 2022

GWh Sales

	Forestry (Paper & Lumber)	Chemicals	Textiles	Stone Clay and Glass	Food Production	Pipeline	Rubber & Plastics	Transportation	Metals	Other Industrial	Unspecified	Total
NAICS	321 & 322	325	313 & 314	327	311	486	326	336	331 & 332			
Year												
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.3-2: Industrial Sales by NAICS Category (GWh and Percentages) (cont'd)

Industrial Long-Term Forecast (LoadMAP-I) Unadjusted
Budget 2022

Percentage of Total Sales

	Forestry (Paper & Lumber)	Chemicals	Textiles	Stone Clay and Glass	Food Production	Pipeline	Rubber & Plastics	Transportation	Metals	Other Industrial	Unspecified	Total
NAICS	321 & 322	325	313 & 314	327	311	486	326	336	331 & 332			
Year												
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 5.1.3-4: Industrial Cogeneration – Energy / Meter (GWh)

Industrial Long-Term Forecast
Budget 2022

Year	GWh
2021	REDACTED
2022	REDACTED
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

5.2 ANNUAL TO MONTHLY BASED ENERGY FORECASTS AND SHORT-TERM INTEGRATION

In a stipulation from the 2019 IRP, Georgia Power agreed to investigate methodologies for allocating long-term annual energy sales for each class to monthly amounts to account for anticipated trends in seasonal energy sales. A new methodology was developed and implemented in Budget 2022. The Company utilized hourly segment level end-use load shapes to project energy use by segment and by end use to ultimately project energy use on a monthly basis for each class. The monthly energy by segment and end use is calibrated to history and the short-term energy forecast. The calibration helps allocate long-term energy projections across segment and at the end-use level by class. By allocating on a monthly basis and utilizing the long-term LoadMAP forecast results, the forecast now captures the changing monthly trends through time.

6.0 PEAK DEMAND FORECAST

Georgia Power used MetrixND and MetrixLT in Budget 2022 to develop peak demand forecasts. These are Itron products used to make regression models and calibrate the hourly models to monthly energy forecasts. These models were originally developed for Budget 2021 forecasts and are re-evaluated each year to track with recent data.

MetrixND uses historical hourly load research data for each customer class to derive regression models that utilize the day's weather, day of week, holiday flags, month of year, and other pertinent independent variables. To predict class demands, the following components are used: the relationships of load and weather developed in MetrixND from the historical load research data, the description of "typical" weather and the class monthly energy forecast. Both the coincident and non-coincident demands by class are produced with the model.

The Georgia Power hourly load forecasting models use load shapes primarily based on class to define its territory. Currently, there are the five primary classes: residential, commercial, industrial, governmental lighting and MARTA; plus two additional categories: electric vehicles and behind the meter solar. Most of the class input historical load shapes use load research historical data from 2015, 2016, 2017, and 2018. The electric vehicle and behind the meter solar categories require several specific load shapes to properly capture their expected behavior. In Budget 2022, four load shapes were used for electric vehicles (representing different charging patterns), and three were used for behind the meter solar.

The methodology determining "typical" weather uses 41 years of average daily temperatures which were rank ordered and then averaged to form a "temperature duration curve". The most representative pattern of actual temperatures was chosen using a least sum of squares criteria. The temperature duration curve was then re-sorted to the chronological order of the representative pattern.

The final component in the development of the demand forecast is the input of the monthly calendar-based energies. The forecasted energies are based on a 41-year average weather assumption. Using the forecasted energies directly in the peak demand model maintains consistency between projected energy sales and the forecast demands.

The hourly load forecasting models also expand the monthly sales data to supply level (sales plus losses) for generation required for the projected energy and demands. The models use expansion factors, in Attachment 6.0-7, to go from sales to the customer to the supply level energy and demands. The expansion factors used in Budget 2022 were derived using the results from the Georgia Power 2021 loss study with updated 2019 peak and energy load data.

The results from the peak model are unadjusted for RTP response, additional cogeneration projects and additional DSM programs that were previously approved by the Commission. Estimates for RTP response, cogeneration, and DSM are made for the reduction in demand and incorporated externally into the peak demand forecast. The estimated adjustment for the RTP Response is derived from a model provided by Christensen Associates Energy Consulting. The Real Time Pricing response model, updated in the Spring of 2021, estimates load response at various prices. As with the previous model developed in 2018, the updated study used metered hourly data for each RTP customer and segmented the responses by Hour Ahead and Day Ahead customers. This model estimates the historical MW response and applies this relationship to estimate the projected MW response. SCS Resource Planning develops an expected RTP forecast that is used in the Christensen model to forecast the projected MW response.

See section 8.4 for more information on adjustments made to the peak demand and energy forecasts.

Attachment 6.0-1: Annual/Summer Coincident Demand with Adjustments (MW)

Calendar Based
Budget 2022

Year	Unadjusted Class Coincident Demand					Unadjusted Coincident Demand	Load Factor (%)	Adjustments (MW)			Adjusted Peak Demand
	Res	Com	Ind	Gov Lighting	MARTA			RTP	CoGen	DSM	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,988
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,092
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,141
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,137
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,177
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,183
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,181
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,190
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,257
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,218
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,388
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,502
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,722
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,891
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,052
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,236
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,488
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,700
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,945
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	18,113
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	18,367

* Georgia Power is a summer peaking utility over the entire forecast horizon.

Attachment 6.0-2: Winter Coincident Demand with Adjustments (MW)

Calendar Based
Budget 2022

Year	Unadjusted Class Coincident Demand					Unadjusted Coincident Demand	Adjustments (MW)			Adjusted Peak Demand
	Res	Com	Ind	Gov Lighting	MARTA		RTP	CoGen	DSM	
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,533
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,490
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,550
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,581
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,636
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,657
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,673
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,657
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,757
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,796
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	15,957
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,056
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,246
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,397
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,562
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,716
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	16,962
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,155
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,352
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,513
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	17,735

Attachment 6.0-3: Summer Unadjusted Non-Coincident Demand (MW)

Calendar Based
Budget 2022

Summer Unadjusted Class Non-Coincident Demand					
Year	Res	Com	Ind	Gov Lighting	MARTA
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-4: Winter Unadjusted Non-Coincident Demand (MW)

Calendar Based
Budget 2022

Winter Unadjusted Class Non-Coincident Demand					
Year	Res	Com	Ind	Gov Lighting	MARTA
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-5: Monthly Coincident Demand with Adjustments (MW)

Calendar Based
Budget 2022

Date	Unadjusted Class Coincident Demand					Unadjusted Coincident Demand	Adjustments (MW)			Adjusted Peak Demand
	Res	Com	Ind	Gov Lighting	MARTA		RTP	CoGen	DSM	
Jan-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-5: Monthly Coincident Demand with Adjustments (MW) (cont'd)

Calendar Based
Budget 2022

Date	Unadjusted Class Coincident Demand					Unadjusted Coincident Demand	Adjustments (MW)			Adjusted Peak Demand
	Res	Com	Ind	Gov Lighting	MARTA		RTP	CoGen	DSM	
Jan-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-6: Monthly Unadjusted Non-Coincident Demand (MW)

Calendar Based
Budget 2022

Date	Unadjusted Class Non-Coincident Demand				
	Res	Com	Ind	Gov Lighting	MARTA
Jan-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-6: Monthly Unadjusted Non-Coincident Demand (MW) (cont'd)

Calendar Based
Budget 2022

Date	Unadjusted Class Non-Coincident Demand				
	Res	Com	Ind	Gov Lighting	MARTA
Jan-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-7: Expansion Factors

Budget 2022

T&D Loss Multipliers - Expansion Factors												
Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Residential	REDACTED											
Commercial	REDACTED											
Industrial	REDACTED											
Govt Lighting	REDACTED											
MARTA	REDACTED											

Attachment 6.0-8: Annual Supply with Adjustments (GWh)

Calendar Based
Budget 2022

Year	Unadjusted Supply (GWH)	Adjustments (GWH)		Adjusted Supply (GWH)
		CoGen	DSM	
2021	REDACTED	REDACTED	REDACTED	87,560
2022	REDACTED	REDACTED	REDACTED	87,932
2023	REDACTED	REDACTED	REDACTED	88,118
2024	REDACTED	REDACTED	REDACTED	88,439
2025	REDACTED	REDACTED	REDACTED	88,411
2026	REDACTED	REDACTED	REDACTED	88,538
2027	REDACTED	REDACTED	REDACTED	88,685
2028	REDACTED	REDACTED	REDACTED	88,973
2029	REDACTED	REDACTED	REDACTED	89,411
2030	REDACTED	REDACTED	REDACTED	89,975
2031	REDACTED	REDACTED	REDACTED	90,961
2032	REDACTED	REDACTED	REDACTED	91,852
2033	REDACTED	REDACTED	REDACTED	92,738
2034	REDACTED	REDACTED	REDACTED	93,642
2035	REDACTED	REDACTED	REDACTED	94,649
2036	REDACTED	REDACTED	REDACTED	95,851
2037	REDACTED	REDACTED	REDACTED	97,029
2038	REDACTED	REDACTED	REDACTED	98,190
2039	REDACTED	REDACTED	REDACTED	99,430
2040	REDACTED	REDACTED	REDACTED	100,699
2041	REDACTED	REDACTED	REDACTED	101,813

Attachment 6.0-9 Monthly Supply by Class (GWh)

Calendar Based
Budget 2022

Date	Unadjusted Class Supply (GWH)					Unadjusted Total Supply	Adjustments (GWH)		Adjusted Total Supply
	Res	Com	Ind	Gov Lighting	MARTA		CoGen	DSM	
Jan-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-21	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-22	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-9 Monthly Supply by Class (GWh) (cont'd)

Calendar Based
Budget 2022

Date	Unadjusted Class Supply (GWh)					Unadjusted Total Supply	Adjustments (GWh)		Adjusted Total Supply
	Res	Com	Ind	Gov Lighting	MARTA		CoGen	DSM	
Jan-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-23	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jan-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-24	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-10: Coincident & Non-Coincident Historical Peak Demand by Class (MW)

Georgia Power Company Coincident Peak Demands (MW) by Class, 2018-2020					
	Residential	Commercial	Industrial	Gov. Lighting	MARTA
Jan-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
	Residential	Commercial	Industrial	Gov. Lighting	MARTA
Jan-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
	Residential	Commercial	Industrial	Gov. Lighting	MARTA
Jan-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 6.0-10: Coincident & Non-Coincident Historical Peak Demand by Class (MW) (cont'd)

Georgia Power Company Non-Coincident Peak Demands (MW) by Class, 2018-2020					
	Residential	Commercial	Industrial	Gov. Lighting	MARTA
Jan-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-18	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
	Residential	Commercial	Industrial	Gov. Lighting	MARTA
Jan-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-19	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
	Residential	Commercial	Industrial	Gov. Lighting	MARTA
Jan-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Feb-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Mar-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Apr-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
May-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jun-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Jul-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Aug-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Sep-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Oct-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Nov-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Dec-20	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

7.0 SENSITIVITY AND SCENARIO DEVELOPMENT OVERVIEW

Budget 2022 is a base case forecast using the economic forecast from IHS Markit, a 41-year average normal weather definition, and an electricity price forecast based on results of financial planning models and information from the Department of Energy. The economic forecast for the base case represents a description of the economic environment that is most likely to take place absent climate legislation or new environmental rulemaking. There are many possible events or actions that could occur, however, to change the characteristics of the economy or business environment of Georgia Power and, consequently, forecasted energy sales. Similarly, there is a possibility of deviation from the price assumptions and current regulatory environment. In order to evaluate the impact of changes to some of these key assumptions and variables, sensitivities around the key forecast variables and scenarios around potential carbon and fuel price outcomes were developed.

7.1 SENSITIVITIES

In the current application, a sensitivity is defined as a specified collection of univariate changes occurring coincidentally. Six sensitivities were developed for Budget 2022 relative to the "Base Case" forecast. The sensitivities presented below include: 1) high economic growth; 2) low economic growth; 3) no load growth; 4) load growth with no DSM; 5) load growth with aggressive DSM; and 6) a 20-year normal weather definition. This last sensitivity is the result of a stipulation from the 2019 IRP. It includes a weather normal definition based on the most recent 20 years of weather data. The high and low economic growth sensitivities are based on the Optimistic and Pessimistic scenarios developed by IHS Markit. The no load growth sensitivity holds sales and peaks constant at 2022 levels. One of the DSM sensitivities assumes that there is no DSM over the forecast horizon, while the other includes additional DSM above what is included in the base case. These sensitivities were performed to identify impacts to the energy and peak demand forecasts pursuant to the specified changes in economic variables utilized in the energy forecast.

The variables and results of the sensitivities on energy and demand are identified in the following attachments.

Attachment 7.1-1: Annual Energy Sensitivity Summary (GWh)

Year	Budget 2022	Economic Sensitivities			Other Sensitivities		
	BASE CASE for Energy Model (GWh)	HIGH ECON GROWTH for Energy Model (GWh)	LOW ECON GROWTH for Energy Model (GWh)	NO LOAD GROWTH for Energy Model (GWh)	20-YEAR WEATHER NORMAL for Energy Model (GWh)	NO DSM for Energy Model (GWh)	AGGRESSIVE DSM for Energy Model (GWh)
2021	87,560	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	87,932	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	88,118	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	88,439	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	88,411	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	88,538	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	88,685	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	88,973	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	89,411	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	89,975	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	90,961	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	91,852	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	92,738	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	93,642	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	94,649	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	95,851	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	97,029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	98,190	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	99,430	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	100,699	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	101,813	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 7.1-2: Annual/Summer Peak Demand Sensitivity Summary (MW)

Year	Budget 2022	Economic Sensitivities			Other Sensitivities		
	BASE CASE for Peak Model (Summer MW)	HIGH ECON GROWTH for Peak Model (Summer MW)	LOW ECON GROWTH for Peak Model (Summer MW)	NO LOAD GROWTH for Peak Model (Summer MW)	20-YEAR NORMAL WEATHER for Peak Model (Summer MW)	NO DSM for Peak Model (Summer MW)	AGGRESSIVE DSM for Peak Model (Summer MW)
2021	15,988	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	16,092	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	16,141	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	16,137	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	16,177	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	16,183	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	16,181	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	16,190	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	16,257	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	16,218	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	16,388	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	16,502	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	16,722	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	16,891	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	17,052	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	17,236	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	17,488	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	17,700	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	17,945	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	18,113	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	18,367	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 7.1-3: Winter Peak Demand Sensitivity Summary (MW)

Year	Budget 2022	Economic Sensitivities			Other Sensitivities		
	BASE CASE for Peak Model (Winter MW)	HIGH ECON GROWTH for Peak Model (Winter MW)	LOW ECON GROWTH for Peak Model (Winter MW)	NO LOAD GROWTH for Peak Model (Winter MW)	20-YEAR NORMAL WEATHER for Peak Model (Winter MW)	NO DSM for Peak Model (Winter MW)	AGGRESSIVE DSM for Peak Model (Winter MW)
2021	15,533	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	15,490	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	15,550	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	15,581	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	15,636	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	15,657	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	15,673	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	15,657	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	15,757	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	15,796	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	15,957	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	16,056	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	16,246	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	16,397	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	16,562	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	16,716	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	16,962	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	17,155	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	17,352	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	17,513	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	17,735	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

7.2 SCENARIOS

The Company considers multiple views of the future price of natural gas, the future pressure on the Company's carbon dioxide ("CO₂") emissions, the future cost and performance of generating technologies, and future electricity consumption. For B2022, the Company assembled multiple views in those four areas into the 11 scenarios summarized in Table 1. For more information on the scenarios, please see Chapter 7 in the 2022 IRP Main Document.

Table 1: B2022 Scenario Design

Scenario	Natural gas view	Greenhouse gas pressure view	Technology cost & performance view	Load view	Short name
1	Moderate price path	\$0 fee	SCS Gen-Tech App Stds ¹	SCS Forecasting ²	MG0
2	Moderate price path	\$20+ fee	SCS Gen-Tech App Stds	SCS Forecasting + MG20 delta	MG20
3	\$50 CO ₂ price path	\$50+ fee	SCS Gen-Tech App Stds	SCS Forecasting + \$50 delta	\$50
4	Low price path	\$0 fee	SCS Gen-Tech App Stds	SCS Forecasting + LG0 delta	LG0
5	Low price path	\$20+ fee	SCS Gen-Tech App Stds	SCS Forecasting + LG20 delta	LG20
6	High price path	\$0 fee	SCS Gen-Tech App Stds	SCS Forecasting + HG0 delta	HG0
7	High price path	\$20+ fee	SCS Gen-Tech App Stds	SCS Forecasting + HG20 delta	HG20
8	Moderate price path	\$0 fee	SCS Gen-Tech App Stds	Electrification-influenced load growth ³	HL ³
9	Moderate price path	\$0 fee	SCS Gen-Tech App Stds	DER/EE-influenced load growth ⁴	LL ⁴
10	Moderate price path	\$0 fee	Lower costs of zero-CO ₂ technologies ⁵	SCS Forecasting	Tech
11	Moderate price path	2050 CO ₂ Intensity ⁶	SCS Gen-Tech App Stds	SCS Forecasting	2050 CI

Notes:

1. Southern Company Services' Technology Application Standards, which contains company assumptions on technology cost and performance benchmarks
2. Standard forecasts produced by operating company load forecasting and SCS load forecasting
3. Higher load growth based on EPRI electrification study provided by SCS Forecasting
4. Lower load growth based on aggressive adoption of distributed resources and efficiency improvements provided by SCS Forecasting
5. Costs and performance of solar, wind, storage, and 4th gen nuclear provided by SCS Generation Planning & Development and SCS Research & Development
6. The CO₂ Intensity view is based on current legislative ideas

The consumption of electricity, the price of natural gas and the level of any fee on CO₂ emissions are interrelated. This interrelationship is not straightforward because natural gas is both an input to electricity production and a substitute for electricity in some end uses. Moreover, pricing of CO₂ emissions affects natural gas and electricity differently. Thus, the Company has developed a set of load growth adjustments used in scenarios with CO₂ pricing and with higher or lower future prices of natural gas. These load growth adjustments are derived from analyses using an integrated model of the US energy economy. Such analyses yielded different electricity consumption paths associated with different views of future natural gas prices and different views of future CO₂ pressure reflecting the important feedbacks in those relationships.

For the B2022 planning process, the Company has utilized the work that Charles River Associates (“CRA”) did prior to B2020 to derive these series of load adjustments. Before B2020, the CRA modeling process produced a series of load adjustments used in scenarios with CO₂ pricing and with higher or lower future prices of natural gas. The Company analyzed the historical load adjustment data from three years of these analyses and averaged the observed adjustments to smooth out the year-to-year differences in the degree of adjustment. These adjustments were then applied to the base load forecast.

Seven of the scenarios were developed for Budget 2022 to evaluate the effects of different potential combinations of CO₂ and fuel forecasts at a regional level. Additionally, scenarios were created to 1) estimate the impacts of higher DSM and behind-the-meter solar PV adoption and 2) contemplate increased adoption of electric vehicles and electrification of more space heating end use. The final two scenarios in the table above are related to changes in how the Company would supply energy to customers and loads are unchanged from the MG0 case.

The percent change in electricity consumption by class and year for each scenario, provided by SCS Resource Planning, are converted to multipliers relative to the base case (MG0, where MG0 = 1.0). The factors represent potential changes to electricity consumption in the Southeastern region and are used to perturb each of the Southern Company’s operating companies’ base forecasts. This is done for the residential, commercial, and industrial classes. Energy by class for each scenario is simply the multiplication of the class scenario factor multiplied by the base case (MG0) class energy forecast. The total energy to be supplied is the sum of the three classes plus losses, from the consumption level to the generation level, plus other energy (governmental lighting and MARTA) that does not vary with the scenarios.

The monthly peak demand is calculated by class using class load factors taken from the base case forecasts. The unadjusted class demands are summed and a ratio is calculated using the scenario sum of class demands divided by the sum of MG0 base case class demands. That ratio is then multiplied by the MG0 total demand. This gives monthly scenario peak demand at the supply level. For the first three years, 2021-2023, all scenarios by month are set equal to the base case scenario (MG0) and then each scenario by month is smoothed back to the original scenario result by interpolating by month over a three-year period (i.e. 2024 and 2025 have interpolated values between 2023 and 2026 results, and 2026 has the original scenario result). Hourly load for each scenario is calculated by calibrating the hourly shape of the base case to the monthly scenario supply (MWh) and demand (MW).

PUBLIC DISCLOSURE

The exception to this process is for the Low Load Growth Scenario (“Low Growth”). The Low Growth scenario is a combination of increased energy efficiency programs and behind-the-meter solar photovoltaic (solar PV) generation. The energy efficiency piece is calculated in the usual way by using factors to change the MGO base case load. However, the behind-the-meter solar PV energy is put through a solar load shape to get hourly solar energy. The hourly energy (negative) from solar PV generation is added to the hourly energy from the energy efficiency component to get the hourly energy for the Low Load Growth Scenario.

Attachments 7.2-1, 7.2-2 and 7.2-3 reflect Georgia Power’s portion of the Southern Company System Scenario Summary.

Attachment 7.2-1: Annual Energy Scenario Summary (GWh)

Year	\$0 CO ₂			\$20 CO ₂			\$50 CO ₂	Growth Scenarios	
	Low Gas (GWh)	Medium Gas (GWh)	High Gas (GWh)	Low Gas (GWh)	Medium Gas (GWh)	High Gas (GWh)	(GWh)	Low Growth (GWh)	High Growth (GWh)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 7.2-2: Annual/Summer Peak Demand Scenario Summary (MW)

Year	\$0 CO ₂			\$20 CO ₂			\$50 CO ₂	Growth Scenarios	
	Low Gas (MW)	Medium Gas (MW)	High Gas (MW)	Low Gas (MW)	Medium Gas (MW)	High Gas (MW)	(MW)	Low Growth (MW)	High Growth (MW)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 7.2-3: Winter Peak Demand Scenario Summary (MW)

Year	\$0 CO ₂			\$20 CO ₂			\$50 CO ₂	Growth Scenarios	
	Low Gas (MW)	Medium Gas (MW)	High Gas (MW)	Low Gas (MW)	Medium Gas (MW)	High Gas (MW)	(MW)	Low Growth (MW)	High Growth (MW)
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

8.0 FORECAST ASSUMPTIONS OVERVIEW

Budget 2022 assumptions were jointly developed by Georgia Power's Market Planning and Financial Planning and Analysis departments, along with the SCS Forecasting, Marketing, Fuel Services, and System Planning departments. Major assumptions include the economic outlook for the US and Georgia, as well as the long-term outlook for fuel prices and market profiles for class end uses.

IHS Markit provides comprehensive and timely research of all the components that drive the economy. IHS Markit's research examines the factors that drive economic growth at the US, regional, state and metropolitan areas. Their research covers specialized topics such as housing markets, labor markets, demographics, consumer behavior, Covid-19 impacts, fiscal and monetary policy and other trends that are highly relevant to business planning. Clients from a broad range of industries depend on IHS Markit's research and forecasts to better manage the risks and opportunities stemming from a rapidly changing economy, as well as for strategic planning, demand assessment, consumer lending and general investment research. IHS Markit produces monthly updates to its US macroeconomic and state level forecasts. Georgia Power used the May 2021 vintage of the IHS forecast for Budget 2022.

IHS Markit's national model is a large-scale structural econometric model that is grounded in mainstream economic theory and estimated using modern econometric techniques. The model uses an income-expenditure structure in which short-term fluctuations in GDP are caused primarily by changes in aggregate demand. A distinguishing characteristic is that the steady-state properties of key equations are derived from neoclassical theory, imparting to the model a well-defined growth path in the long run. This emphasis on theory leads to an internally consistent structure that renders the model well-suited for short-run forecasting, long-term policy analysis and the development of internally consistent macroeconomic scenarios. With respect to regional modeling, each area (e.g., state or metro area) is modeled individually and then linked to a national system. Instead of forecasting regional growth as simple proportions of US totals, the models focus on each area's internal growth dynamics and differential business cycle response.

As a part of the forecasting process, prices for electricity and natural gas are reviewed and analyzed. Electricity price forecasts were based on results of internal financial planning models. Projections of natural gas prices were developed by SCS Forecasting using the commodity forecasts from the SCS Fuel Services and SCS Resource Planning groups. Georgia Power's long-term forecasting models incorporate these retail fuel prices when modeling the fuel choices and efficiency decisions of consumers and decision-makers.

Other factors, such as the impacts of appliance efficiency standards, were also considered in the long-term forecast. The end-use models for the long-term energy forecast incorporate minimum standards for new appliances as well as replacement options.

The short-term and long-term energy models use a 41-year average of CDH and HDH to define “normal” weather.

8.1 SHORT-TERM ENERGY MODEL ECONOMIC ASSUMPTIONS

The Budget 2022 short-term models use economic and demographic inputs from the Georgia forecast produced by IHS Markit. The short-term energy forecasts rely on the monthly interpolations derived from quarterly projections of demographic and economic variables, including the number of Georgia housing starts, Georgia’s unemployment rate, Georgia’s total housing stock and US industrial production.

8.2 LONG-TERM ENERGY MODEL ECONOMIC ASSUMPTIONS

8.2.1 Overview

The Budget 2022 long-term energy models used economic and demographic inputs developed from the Georgia forecast produced by IHS Markit. The key variables used in the long-term energy models are discussed below.

8.2.2 Income per Household

The long-term residential energy forecast is produced using real income per household by housing type as the key economic driver. It represents single-family income per household. For multifamily and manufactured homes, income per household is calculated as a percentage of single-family income based on 2005 RECS data. It is assumed that this economic metric adequately represents the household income for the residential customers of Georgia Power.

In the Budget 2022 long-term commercial forecast model, income per household is used as the primary economic driver in the Restaurant and Retail sectors, which accounts for the impact of income on these commercial sectors.

8.2.3 Floor Space (Commercial Activity)

The commercial LoadMAP model uses a floor space (square footage) forecast by building type to produce the long-term forecast of commercial energy sales. The square footage forecast is produced by SCS and utilizes historical and short-term forecast square footage data from Dodge Data and Analytics.

8.2.4 Industrial Production (Industrial Activity)

The industrial LoadMAP model used in Budget 2022 uses annual industrial production by selected NAICS categories as a driver to forecast long-term energy sales. This driver describes the output of each NAICS category in the industrial class. Since the energy requirements of each group are closely related to the quantity of output produced, this measure is a good choice for a driver of the industrial forecast. The base year consumption (GWh) provides a scale for each segment, which is then modified by the Industrial Production Index over time.

8.2.5 Demographics

Demographic trends in Georgia are an integral part of the Georgia economy and play an important role in energy consumption trends. Consequently, several demographic variables are key indicators for the various energy and customer models used in Budget 2022 such as the number of households and housing stock.

8.2.6 Persons per Household

The residential LoadMAP model uses annual projections of the number of persons per household. It represents single-family persons per household. Persons per household for multi-family and manufactured homes are calculated as a percentage of single-family persons per household based on 2005 RECS data. This economic metric represents the characteristics of household size for the residential customers of Georgia Power.

8.2.7 Housing Type Distribution

The long-term residential energy model is configured to forecast energy sales by housing type: single-family, multi-family and manufactured homes. The forecast is disaggregated into these groups using

trends in housing types based on the IHS housing stock forecast and calibrated to historic Georgia Power billing data splits.

8.2.8 Commercial Employment Rate (Commercial Activity)

The long-term commercial energy model uses the employment rate as a driver of the long-term energy forecast. The employment rate is derived by subtracting the Unemployment Rate from the total percentage (i.e. Employment Rate = 1 – Unemployment Rate). Unlike Floor Space, it is not calculated by building economic categories (building types). However, the long-term commercial model does account for the fact that the impact of the employment rate varies across the commercial sectors.

8.3 FUEL PRICE ASSUMPTIONS

8.3.1 Forecasts by Fuel Type: Electricity and Natural Gas

Forecasts of retail fuel prices were required for the energy models of three customer classes: residential, commercial, and industrial.

The long-term residential, commercial, and industrial energy models require forecasted fuel prices as an exogenous input. The electricity price forecasts are based on results of financial planning models produced by Georgia Power's Financial Planning and Analysis group. These models produce electricity price forecasts assuming a specific company construction plan, the financial needs of Georgia Power, and economic conditions. The electricity price forecasts were developed in the spring of 2021. The natural gas prices are developed based on commodity price projections from SCS Fuel Services and SCS Resource Planning. The long-term forecasting models incorporate these retail fuel prices when modeling the fuel choices and efficiency decisions of consumers and decision-makers. Electricity and natural gas retail price projections for the residential, commercial, and industrial classes are presented in Attachment 8.6-1.

8.3.2 Substitution of Electricity with Competing Fuels

Fuel choice is an important factor to consider in the development of the forecast. Each customer responds, in various ways, to the price of electricity relative to the price of alternative fuels. The responsiveness of the customer, or decision-maker, depends on the customer's preference and ability to change. These factors are recognized and are incorporated into the Georgia Power forecast.

The residential, commercial, and industrial long-term energy models all use the same modeling and conceptual framework. Using a logit model, the choice of new technology is determined by evaluating the life cycle of each technology for a given end-use. The life-cycle cost is a function of capital cost plus operating costs and any additional O&M costs discounted for the time value of money.

As the prices vary among the alternative fuels (e.g., electricity and gas), the operating cost will also vary and will affect the choices of end-use fuel types made by the consumer. Likewise, as the capital cost of the technologies of alternative fuel choices vary, the choices of technology will also vary. In this manner, the long-term commercial and industrial energy models capture the effects of competing fuels in end uses.

8.4 FORECAST ADJUSTMENTS

Demand side strategies and customer actions, existing Distribution Efficiency Program (“DEP”) impacts, and the effects of Time of Use (“TOU”) rates are captured directly in the forecast since they are in the historical data. The impacts of company-sponsored DSM programs, electric vehicles, Behind the Meter (“BTM”) solar and cogeneration are captured in the energy forecast through adjustments outside of the forecast models. External adjustments to the peak model include company-sponsored DSM programs, RTP response and cogeneration. Electric Vehicles and BTM solar are embedded in the peak forecast using load shapes, so an external adjustment is not needed. The annual external adjustments to the energy and peak forecasts are included in Attachments 8.6-2 through 8.6-4.

8.4.1 Demand Side Strategies and Customer Actions

Budget 2022 incorporates adjustments for load responses by customers to changes in price, as well as for demand side programs being offered to customers that are anticipated to result in reductions in energy use and in peak demand. There are two types of impacts incorporated directly in the forecast: (1) the historical set of customer actions embedded in the historical data that are implicitly propagated throughout the forecast, and (2) adopted efficiency standards in the end-use models.

Georgia Power offers DSM programs to its residential and commercial customers to promote energy savings. These programs have existed for more than a decade and the benefits from the programs are embedded in Georgia Power’s historical load and energy sales. Therefore, the forecasts produced by using historical energy data and the embedded energy effects have an implicit effect propagated

throughout the forecast. Other conservation measures undertaken by customers, whether explicitly induced by a marketing program or proactively undertaken by a customer for some other reason will become embedded in the historical energy data and will be implicitly propagated throughout the forecast.

Additional DSM adjustments are made to reflect new or ongoing Georgia Power programs that are not fully reflected in the historical data. Since company-sponsored DSM programs reduce residential and commercial energy sales and peak demand, the impacts are subtracted from the energy and peak forecasts as an external adjustment. In Budget 2022, DSM programs are assumed to continue through the forecast horizon, rather than tapering off after 12 years, as was done in past forecasts.

An additional type of demand side impact considered in Budget 2022 is the adopted efficiency standards in the residential and commercial end-use models. The efficiency standards represent the continuing trend of increasing end-use efficiency driven in part by programs such as ENERGY STAR®.

8.4.2 Cogeneration

The effects of cogeneration are incorporated into Budget 2022. Available near-term information for known and expected cogeneration projects was obtained by Georgia Power Sales and Marketing personnel from interviews with customers with an announced project. A probability that each reported new cogeneration project will materialize was estimated. The probability-weighted MW announcements were then used to project the amount of additional cogeneration to incorporate into the peak forecast. The estimated MW cogeneration load is converted into a MWh energy impact using a common load factor to project the amount of cogeneration to include in the energy forecast. Since cogeneration reduces energy sales and peak demand, the impacts of new cogeneration projects are subtracted from the commercial and industrial energy and peak forecasts as an external adjustment.

8.4.3 Real Time Pricing and Time of Use

The RTP rate is designed to enable large commercial and industrial customers to take advantage of the variations in hourly system marginal costs. This gives the customer the opportunity to control their own cost in using electricity by changing their load shape in response to hourly price signals. A model developed by Christensen Associates Energy Consulting is used to estimate customer responsiveness to changes in the RTP price.

TOU rates also give customers the incentive to control their costs by the differentiation of the prices of energy depending on time of day. Customers have been on TOU rates for a number of years and the impact of their usage patterns is being captured in the class load shapes that were used in development of the peak demand model.

8.4.4 Electric Vehicles

The impacts of expected growth in electric vehicles in Georgia have been incorporated into the Budget 2022 forecast. The impact of existing electric vehicles is already embedded in the historical data that is implicitly propagated throughout the forecast. Growth in electric vehicle sales represents a positive adjustment to the Budget 2022 forecast, since more electric vehicles in Georgia lead to higher electric sales. The forecast of electric vehicles in Georgia is based on a scenario by the Electric Power Research Institute (“EPRI”), which produces forecasts for states across the nation. Georgia Power selected the “medium” EPRI scenario for use in Budget 2022.

Electric vehicles are incorporated into the Budget 2022 peak demand forecast using load shapes for the residential and commercial classes.

8.4.5 Behind-The-Meter Solar

BTM solar is a solar energy system that produces power intended for on-site use in a home, office building, or other commercial or industrial facility. Thus, a BTM system allows an owner to use the energy produced from their system first, before using energy from the grid. Such systems directly reduce the energy consumed and the demand from the residential, commercial and industrial classes. An external adjustment is made to the energy forecast to account for the impact of BTM solar. BTM solar directly reduces the amount of energy that would be purchased from the grid.

BTM solar is incorporated into the Budget 2022 peak demand forecast using load shapes for the residential, commercial and industrial classes.

8.5 IMPACTS OF APPLIANCE EFFICIENCY STANDARDS

The efficiency of technologies and devices selected by decision-makers and consumers has a substantial impact on the energy requirements of the forecast. Market forces and conditions, economic valuation,

and convenience have considerable impact on the choice of technologies. Various state and federal regulatory bodies and legislation, however, have also made provisions to ensure increases in technology efficiency. Notable instruments that serve to ensure the efficient use of electricity and thermal building integrity include the Georgia State Energy Code for Buildings, the National Energy Policy Act of 1992 (“NEPA”, also known as “EPACT”), the Energy Policy Act of 2005, the National Appliance Energy Conservation Act of 1987 (“NAECA”) and the Energy Independence and Security Act of 2007 (“EISA”). In addition to these, new review and rule-making proceedings are routinely conducted at the state and federal levels.

These Acts contain a wide variety of provisions that impact the demand of electricity, specifically that of Heating Ventilation & Air Conditioning (“HVAC”) and lighting technologies. In 2006, the minimum air conditioning efficiency standard was changed from a Seasonal Energy Efficiency Ratio (“SEER”) 10 to SEER 13. From 2012 to 2014, EISA established new lighting standards requiring new bulbs to be at least 25% more efficient than traditional incandescent bulbs. The types of bulbs fitting these standards include: halogen incandescents, compact fluorescents and LEDs. In 2012, the National Cable and Telecommunications Association (“NCTA”) signed the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes, which agreed to start selling Energy Star Version 3.0 compliant set-top boxes. From 2013 to 2015, the Association of Home Appliance Manufacturers (“AHAM”) implemented new efficiency standards for various home appliances. In 2014, electric water heater efficiency improved from 90% to 95%. In 2015, the minimum SEER standard for the southern US improved from SEER 13 to SEER 14. In 2016, the DOE finalized new standards for commercial rooftop air conditioning units, which is a two-step process going into effect in 2018 and 2023 raising the integrated energy efficiency ratio to higher levels based upon the size of the unit. Also, in 2017, the DOE approved new standards for Walk-In Coolers and Freezers that took effect in 2020. In Georgia, new residential building codes were implemented on January 1, 2020, which require new buildings to be much more energy efficient.

8.6 Budget 2022 Energy Prices and Forecast Adjustments

Attachment 8.6-1: Class Retail Energy Prices

Year	Deflator (2012)	Residential		Commercial		Industrial	
		Electric cents/kWh	Gas \$/MMBtu	Electric cents/kWh	Gas \$/MMBtu	Electric cents/kWh	Gas \$/MMBtu
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 8.6-2: Budget 2022 Forecast Adjustments – Energy / Meter (GWh)

Year	DSM	EVs	BTM Solar	Cogeneration
	GWh	GWh	GWh	GWh
2021	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 8.6-3: Budget 2022 Forecast Adjustments – Energy / Generator (GWh)

Year	DSM	EVs	BTM Solar	Cogeneration
	GWh	GWh	GWh	GWh
2021	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED

Attachment 8.6-4: Budget 2022 Forecast Adjustments – Peak Demand / Generator (MW)

Year	Summer			Winter		
	DSM	RTP	Cogeneration	DSM	RTP	Cogeneration
	MW	MW	MW	MW	MW	MW
2021	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2022	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2023	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2024	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2025	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2026	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2027	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2028	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2029	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2030	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2031	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2032	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2033	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2034	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2035	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2036	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2037	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2038	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2039	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2040	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
2041	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

8.7 RESOURCE SIDE DEMAND SIDE OPTIONS

Demand Side Options (“DSO”) that are used as capacity resources do not affect the Peak Demand forecast directly. DSOs that fall into this category include the Demand Plus Energy Credit (“DPEC”) interruptible tariff, Conservation Voltage Reduction (“CVR”), Extreme RTP Response, and the Residential Thermostat Demand Response program.

9.0 FINAL IRP REQUIREMENT OVERVIEW

This section is a supplement to the Budget 2022 documentation book (the standard documentation) for the Georgia Power Budget 2022 Load and Energy Forecast. It supplements the standard documentation to ensure the IRP rules are completely satisfied.

9.1 DESCRIPTION OF WEATHER NORMALIZATION

The purpose of weather normalizing energy and peak demand is to isolate the portion of variance between forecasted and actual values that arise from factors other than weather. Methods for accounting for variances from weather for energy are similar to those used for peak demand. Both are appropriate and justifiable.

Traditionally, energy forecasts are built using econometric models. That is, energy sales may be dependent on some economic and demographic variables and weather. A regression model will yield parameters that explain that relationship. To build an econometric forecast of energy sales requires a forecast for the economic and demographic variables and weather. For weather, the assumption is that future weather will be defined as the average of the prior 41 years, which is termed “normal weather.” Then, using normal weather with the regression models yields a prediction of energy sales under average weather conditions. To weather normalize after a period is over requires only the actual weather to be used with the model. The difference between the normal weather-predicted energy sales and the actual weather-predicted energy sales is the amount of variance due to weather.

Beginning with Budget 2021, MetrixND and Metrix LT were used to develop the hourly peak demand forecast and for weather normalization². The peak forecast uses a normal weather assumption for forecasted energies and future weather outcomes. To weather normalize actual peak demand, the forecast model is evaluated under actual and normal weather conditions. The difference between the normal weather-predicted peak demand and the actual weather-predicted peak demand is the amount of variance due to weather. This process is used to weather normalize both the summer and winter peaks.

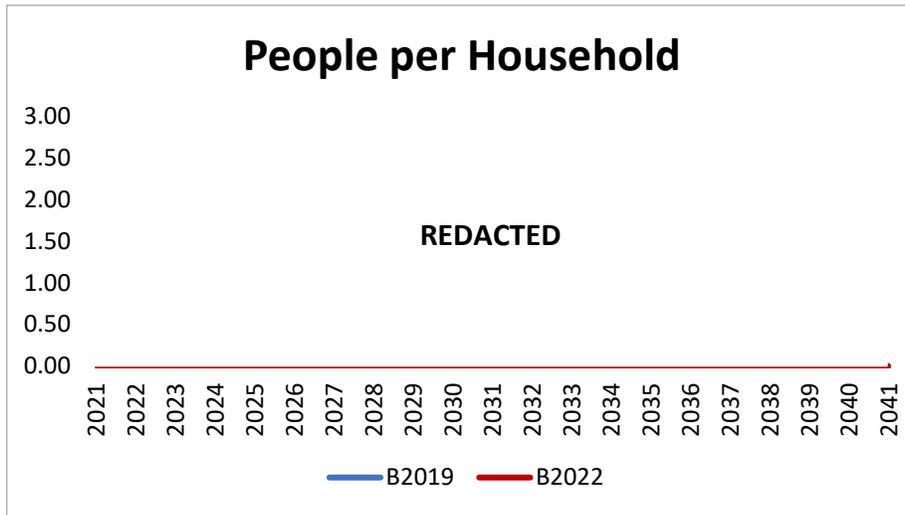
² Prior to Budget 2021, the Peak Demand Model (“PDM”) was used.

9.2 REVIEW OF ECONOMIC INPUT AND LOAD PROFILES

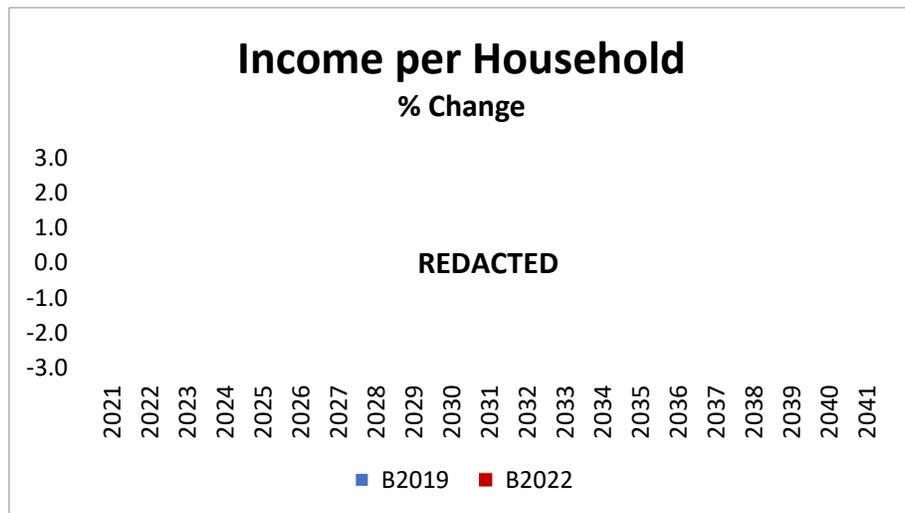
Georgia Power's forecasting organization carefully reviews all forecast inputs from internal and external sources for reasonableness and accuracy and requires data providers to document assumptions and justify results that represent significant deviations from previous trends or expectations. If the supporting documentation or explanation is inadequate, Georgia Power works with the information provider to reach a mutually agreed upon solution.

For Budget 2022, the Georgia Power forecasting group reviewed the economic forecast inputs provided by IHS Markit and was satisfied that the economic forecast inputs were reasonable and consistent with those of other economic forecasters at the time the energy and load forecasts were developed.

There are three areas of particular concern in previous IRPs that continue to be monitored – 1) the number of persons per household, 2) growth in average household income, and 3) the level of miscellaneous household energy consumption. Comparisons of the 2019 and 2022 assumptions for these three variables are shown in the graphs below. Other economic data used to prepare Budget 2022 are discussed in the various sections pertaining to each of the customer classes.

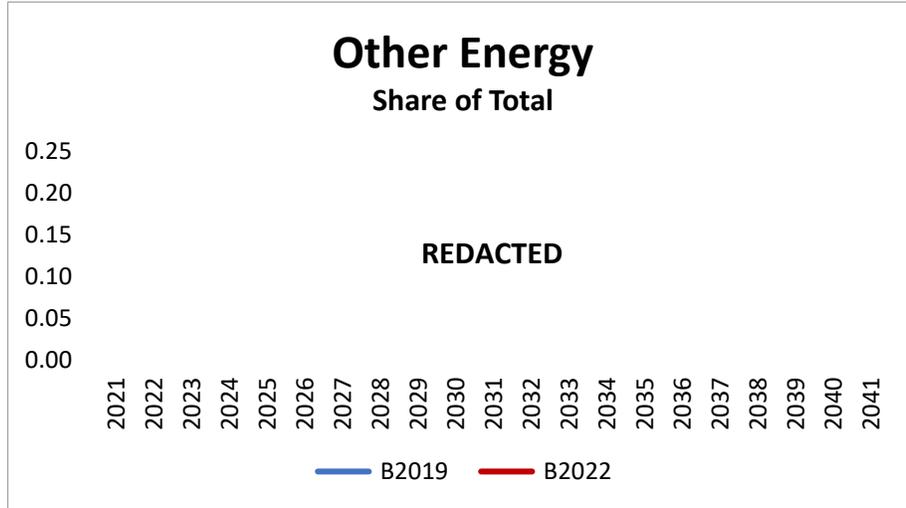


Total population and the number of households are slightly lower in Budget 2022 than in Budget 2019, following the national trends. However, the number of people per household in the state of Georgia has changed very little since the last IRP, according to IHS Markit.



Income per household in the economic forecast data for Budget 2022 reflects the impacts of the recovery from the Covid pandemic and a slightly lower forecast of the number of Georgia households. Real personal income growth was elevated during the pandemic as fiscal stimulus spending increased income in 2020

and 2021. The expected negative growth in 2022 is largely the result of government transfer payments coming to an end.



In Budget 2022, Other Energy is a much smaller share of total residential energy compared to Budget 2019. This is the result of the rebaselining of the LoadMAP models done in Budget 2021. When rebaselining was done, there was a redistribution of Miscellaneous NEC to other known technologies.

To view the historical hourly load profiles for 2018-2020, please see Technical Appendix Volume 1 Load and Energy Forecast (Hourly Load Profile Data), as filed electronically.

9.3 ACTUAL & EXPECTED INTERRUPTIBLE DEMAND

Attachment 9.3-1: Budget 2022 Actual & Expected Interruptible Demand

Georgia Power Company Demand Plus Energy Credit (DPEC) History and Projections			
Year	DPEC Load (MW)	DPEC Custs	Actual Interruption (MW)
Actual			
2018	195	58	
2019	191	56	
2020	164	52	
Projected			
2021	141	47	
2022	144	47	
2023	144	47	
2024	144	47	
2025	144	47	
2026	144	47	
2027	144	47	
2028	144	47	
2029	144	47	
2030	144	47	
2031	144	47	
2032	144	47	
2033	144	47	
2034	144	47	
2035	144	47	
2036	144	47	
2037	144	47	
2038	144	47	
2039	144	47	
2040	144	47	
2041	144	47	
Note:	Assumed demand reductions from customers on DPEC are not included as forecast adjustments, rather the reductions are captured in the resource plan. MW values are not ICed.		

9.4 EVALUATION OF PREVIOUS FORECASTS

This section describes an evaluation of the last four forecasts developed over the past five years. This includes Budget 2017, Budget 2018, Budget 2019, and Budget 2020. This section will show comparisons of actual and weather normalized energy and demand to the various budgets. This section will also give a

qualitative assessment of the general changes that were made in the development of each forecast and the specific major changes that have been made in the development of recent forecasts.

Georgia Power monitors the performance of the current forecast on a monthly basis. This is done through a forecast variance report. The monthly forecast variance report compares the forecast of class sales for the current month to the actual class sales of the current month. This report also identifies how much of the energy variance is a result of the deviation between the actual weather conditions for the month and those used in the forecast. Actual and weather normalized actual sales (by class) are compared to the energy forecast. Reports of this sort help detect deviations from the forecast and help identify discrepancies that may be systematic.

Certain changes are made from year to year in response to the evaluation of previous forecasts, in order to incorporate additional information, and to meet new or enhanced informational needs. These changes are generally described in two categories: (1) general activities and procedures used to produce new forecasts and (2) specific enhancements made to improve the forecasts.

Attachment 9.4-1 shows comparisons of actual and weather adjusted (weather normalized) energy versus budget by class of service for Georgia Power. The report contains comparisons for residential, commercial, industrial, governmental lighting, MARTA, retail, and territorial.

Attachment 9.4-1: Energy Comparisons by Class (Calendar data)

Georgia Power Company Actual Territorial Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	84,873	84,405	0.6%						
2017	82,401	84,481	-2.5%	84,359	-2.3%				
2018	85,492	85,178	0.4%	85,010	0.6%	84,133	1.6%		
2019	84,700	87,082	-2.7%	86,522	-2.1%	84,763	-0.1%	84,554	0.2%
2020	80,814	87,905	-8.1%	86,554	-6.6%	85,580	-5.6%	85,505	-5.5%

Georgia Power Company Weather Adjusted Territorial Energy (GWh)									
Year	Weather Adjusted	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	83,834	84,405	-0.7%						
2017	83,457	84,481	-1.2%	84,359	-1.1%				
2018	84,689	85,178	-0.6%	85,010	-0.4%	84,133	0.7%		
2019	83,639	87,082	-4.0%	86,522	-3.3%	84,763	-1.3%	84,554	-1.1%
2020	81,782	87,905	-7.0%	86,554	-5.5%	85,580	-4.4%	85,505	-4.4%

Georgia Power Company Actual Retail Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	84,873	84,405	0.6%						
2017	82,401	84,481	-2.5%	84,359	-2.3%				
2018	85,492	85,178	0.4%	85,010	0.6%	84,133	1.6%		
2019	84,700	87,082	-2.7%	86,522	-2.1%	84,763	-0.1%	84,554	0.2%
2020	80,814	87,905	-8.1%	86,554	-6.6%	85,580	-5.6%	85,505	-5.5%

Georgia Power Company Weather Normal Retail Energy (GWh)									
Year	Weather Adjusted	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	83,834	84,405	-0.7%						
2017	83,457	84,481	-1.2%	84,359	-1.1%				
2018	84,689	85,178	-0.6%	85,010	-0.4%	84,133	0.7%		
2019	83,639	87,082	-4.0%	86,522	-3.3%	84,763	-1.3%	84,554	-1.1%
2020	81,782	87,905	-7.0%	86,554	-5.5%	85,580	-4.4%	85,505	-4.4%

Georgia Power Company Actual Residential Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	27,585	27,387	0.7%						
2017	26,144	27,550	-5.1%	27,422	-4.7%				
2018	28,331	27,571	2.8%	27,536	2.9%	27,434	3.3%		
2019	28,201	27,957	0.9%	27,831	1.3%	27,670	1.9%	27,973	0.8%
2020	27,829	28,258	-1.5%	27,915	-0.3%	27,891	-0.2%	28,190	-1.3%

Georgia Power Company Weather Adjusted Residential Energy (GWh)									
Year	Weather Adjusted	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	27,216	27,387	-0.6%						
2017	27,169	27,550	-1.4%	27,422	-0.9%				
2018	27,863	27,571	1.1%	27,536	1.2%	27,434	1.6%		
2019	27,764	27,957	-0.7%	27,831	-0.2%	27,670	0.3%	27,973	-0.7%
2020	28,704	28,258	1.6%	27,915	2.8%	27,891	2.9%	28,190	1.8%

Georgia Power Company Actual Commercial Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	32,932	32,779	0.5%						
2017	32,155	32,878	-2.2%	32,482	-1.0%				
2018	32,958	33,090	-0.4%	32,436	1.6%	32,522	1.3%		
2019	32,818	33,479	-2.0%	32,399	1.3%	32,168	2.0%	32,385	1.3%
2020	30,476	33,859	-10.0%	32,160	-5.2%	32,027	-4.8%	32,147	-5.2%

Georgia Power Company Weather Normal Commercial Energy (GWh)									
Year	Weather Adjusted	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	32,457	32,779	-1.0%						
2017	32,178	32,878	-2.1%	32,482	-0.9%				
2018	32,700	33,090	-1.2%	32,436	0.8%	32,522	0.5%		
2019	32,288	33,479	-3.6%	32,399	-0.3%	32,168	0.4%	32,385	-0.3%
2020	30,584	33,859	-9.7%	32,160	-4.9%	32,027	-4.5%	32,147	-4.9%

Georgia Power Company Actual Industrial Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	23,746	23,656	0.4%						
2017	23,518	23,514	0.0%	23,870	-1.5%				
2018	23,655	24,012	-1.5%	24,497	-3.4%	23,637	0.1%		
2019	23,163	25,159	-7.9%	25,779	-10.1%	24,411	-5.1%	23,678	-2.2%
2020	22,040	25,303	-12.9%	25,968	-15.1%	25,163	-12.4%	24,658	-10.6%

Georgia Power Company Weather Adjusted Industrial Energy (GWh)									
Year	Weather Adjusted	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	23,550	23,656	-0.4%						
2017	23,524	23,514	0.0%	23,870	-1.5%				
2018	23,579	24,012	-1.8%	24,497	-3.8%	23,637	-0.2%		
2019	23,068	25,159	-8.3%	25,779	-10.5%	24,411	-5.5%	23,678	-2.6%
2020	22,022	25,303	-13.0%	25,968	-15.2%	25,163	-12.5%	24,658	-10.7%

Georgia Power Company Actual Governmental Lighting Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	439	412	6.6%						
2017	415	366	13.5%	415	0.0%				
2018	379	330	14.7%	368	3.1%	369	2.8%		
2019	354	312	13.3%	341	3.7%	341	3.7%	353	0.1%
2020	329	310	6.2%	337	-2.3%	325	1.2%	346	-4.9%

Georgia Power Company Actual MARTA Energy (GWh)									
Year	Actual	B17	%Diff	B18	%Diff	B19	%Diff	B20	%Diff
2016	171	171	-0.2%						
2017	169	174	-2.8%	170	-0.6%				
2018	170	174	-2.8%	172	-1.5%	172	-1.2%		
2019	164	174	-5.8%	173	-4.8%	173	-4.9%	165	-0.2%
2020	141	174	-19.4%	173	-18.7%	173	-18.8%	165	-14.9%

Attachment 9.4-2: Actual and Budget Summer Peak Demand

GEORGIA POWER COMPANY TOTAL SUMMER DEMAND (MW)						
Year	ACTUAL	<u>Budget</u> 2017	<u>Budget</u> 2018	<u>Budget</u> 2019	<u>Budget</u> 2020	<u>Budget</u> 2021
2017	16,002	16,298	16,283			
2018	15,748	16,433	16,340	16,230		
2019	16,572	16,747	16,565	16,406	16,017	
2020	15,831	16,866	16,536	16,481	16,156	14,827
2021		16,951	16,540	16,519	16,241	15,394
2022		17,049	16,574	16,537	16,283	15,683
2023		17,178	16,649	16,487	16,303	15,708
2024		17,187	16,721	16,600	16,408	15,680
2025		17,381	16,790	16,715	16,505	15,750
2026		17,529	16,817	16,759	16,625	15,770
2027		17,731	16,953	16,859	16,769	15,804
2028		17,968	17,141	17,035	16,812	15,737
2029		18,312	17,428	17,290	17,010	15,815
2030		18,664	17,713	17,554	17,253	15,913
2031		19,014	18,011	17,808	17,483	16,052
2032		19,391	18,324	18,065	17,806	16,248
2033		19,773	18,653	18,347	18,131	16,529
2034		20,143	18,971	18,645	18,478	16,763
2035		20,519	19,291	18,949	18,833	16,982
2036		20,897	19,608	19,267	19,205	17,206
2037		21,282	19,936	19,583	19,574	17,500
2038		21,672	20,275	19,919	19,959	17,761
2039		22,019	20,586	20,233	20,362	18,038
2040		22,313	20,869	20,539	20,772	18,229
2041		22,584	21,155	20,850	21,193	18,549

Attachment 9.4-3: Actual and Budget Winter Peak Demand

GEORGIA POWER COMPANY TOTAL WINTER DEMAND (MW)						
Year	ACTUAL	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021
2017	13,894	14,781	14,621			
2018	15,372	15,301	14,535	15,490		
2019	14,394	14,542	14,694	15,030	15,532	
2020	14,425	14,704	14,891	15,196	15,316	14,471
2021		14,765	14,909	15,213	15,537	14,743
2022		14,872	14,930	15,218	15,592	14,967
2023		14,971	14,967	15,121	15,636	15,001
2024		15,054	15,009	15,208	15,721	15,012
2025		15,202	15,067	15,307	15,835	15,083
2026		15,327	15,134	15,424	15,962	15,124
2027		15,496	15,255	15,543	16,095	15,172
2028		15,695	15,429	15,709	16,212	15,118
2029		15,983	15,703	15,957	16,399	15,219
2030		16,278	15,978	16,216	16,624	15,306
2031		16,570	16,266	16,466	16,839	15,436
2032		16,884	16,567	16,717	17,116	15,588
2033		17,204	16,881	16,994	17,403	15,820
2034		17,511	17,186	17,284	17,709	16,016
2035		17,824	17,493	17,580	18,020	16,215
2036		18,139	17,798	17,888	18,346	16,388
2037		18,458	18,113	18,194	18,669	16,653
2038		18,782	18,439	18,520	19,006	16,874
2039		19,071	18,735	18,815	19,357	17,082
2040		19,318	18,999	19,104	19,713	17,247
2041		19,542	19,351	19,397	20,080	17,507

Attachment 9.4-4: Comparison of Forecast and Actual Summer Demand

GEORGIA POWER COMPANY SUMMER DEMAND (MW)						
<u>Year</u>	<u>ACTUAL</u>	<u>Budget</u> <u>2017</u>	<u>Budget</u> <u>2018</u>	<u>Budget</u> <u>2019</u>	<u>Budget</u> <u>2020</u>	<u>Budget</u> <u>2021</u>
2017	16,002	-1.8%	-1.7%			
2018	15,748	-4.2%	-3.6%	-3.0%		
2019	16,572	-1.0%	0.0%	1.0%	3.5%	
2020	15,831	-6.1%	-4.3%	-3.9%	-2.0%	6.8%

Attachment 9.4-5: Comparison of Forecast and Weather Normal Summer Demand

GEORGIA POWER COMPANY SUMMER DEMAND (MW)						
<u>Year</u>	<u>WN Demand</u>	<u>Budget</u> <u>2017</u>	<u>Budget</u> <u>2018</u>	<u>Budget</u> <u>2019</u>	<u>Budget</u> <u>2020</u>	<u>Budget</u> <u>2021</u>
2017	16,551	1.6%	1.6%			
2018	16,149	-1.7%	-1.2%	-0.5%		
2019	16,678	-0.4%	0.7%	1.7%	4.1%	
2020	15,694	-6.9%	-5.1%	-4.8%	-2.9%	5.8%

Attachment 9.4-6: Comparison of Forecast and Actual Winter Demand

GEORGIA POWER COMPANY WINTER DEMAND (MW)						
<u>Year</u>	<u>ACTUAL</u>	<u>Budget</u> <u>2017</u>	<u>Budget</u> <u>2018</u>	<u>Budget</u> <u>2019</u>	<u>Budget</u> <u>2020</u>	<u>Budget</u> <u>2021</u>
2017	13,894	-6.0%	-5.0%			
2018	15,372	0.5%	5.8%	-0.8%		
2019	14,394	-1.0%	-2.0%	-4.2%	-7.3%	
2020	14,425	-1.9%	-3.1%	-5.1%	-5.8%	-0.3%

Attachment 9.4-7: Comparison of Forecast and Weather Normal Winter Demand

GEORGIA POWER COMPANY WINTER DEMAND (MW)						
<u>Year</u>	<u>WN Demand</u>	<u>Budget</u> <u>2017</u>	<u>Budget</u> <u>2018</u>	<u>Budget</u> <u>2019</u>	<u>Budget</u> <u>2020</u>	<u>Budget</u> <u>2021</u>
2017	15,156	2.5%	3.7%			
2018	14,655	-4.2%	0.8%	-5.4%		
2019	15,398	5.9%	4.8%	2.4%	-0.9%	
2020	15,861	7.9%	6.5%	4.4%	3.6%	9.6%

9.4.1 General Enhancements

Whenever possible, each new forecast incorporates changes in a variety of areas that will improve the quality of the forecast. New and revised data relating to the economy, demographic conditions, and fuel, for example, are included. In addition, existing models are enhanced or are replaced with new models that take advantage of better data or improved estimation techniques. Model specification, parameters, and equations are reviewed, assessed, and changed as appropriate each year.

Data: Each energy and demand forecast uses a recent, comprehensive set of consistent economic and demographic variables such as income, households, commercial floor space, housing stock, housing starts and employment. The latest available forecasts of the prices of alternative fuels (generally gas and electricity) and the latest available saturation data are also incorporated where appropriate. End-use device standards are reassessed and updated as available information permits. Market profile data from survey and end-use research are assembled and used as newer or better data become available. Weather files are updated annually.

Models: Model specifications are reviewed and adjusted as necessary to account for new products, data availability, and significant events that may affect model accuracy. New explanatory variables may be added to the short-term econometric models to capture recent changes, while variables that no longer explain the variable being forecasted are removed.

Model Coefficients: Whenever new data are available or model specifications change, the forecasting equations are re-estimated, and new model coefficients are generated.

Judgment: Based on new research, information, and experience, the collective expertise available to the Company is used to refine model results to produce the best possible forecast.

9.4.2 Specific Enhancements

Research, new information, and reviews of previous forecasts often reveal findings that enable the Company to make improvements to the forecast. The changes identified below chronicle the evolution of the Budget 1998 forecast through the current Budget 2022 forecast. Budgets are typically completed in the Fall of the previous year (Budget 2022 was completed during Fall 2021). The major changes are identified below:

Budget 1998

Modeling of the economic and demographic forecasts and production of the economic forecast for the state of Georgia were outsourced to Regional Financial Associates. Data Resources Incorporated provided the national economic forecast.

The existing commercial and industrial models were replaced by EPRI models, COMMEND and INFORM. This was done to maximize resource efficiency, minimize costs, and maximize resource expertise. Forecasts for all three major energy classes were developed using EPRI products (REEPS for residential). The EPRI products were well recognized nationally throughout the utility industry and employ consistent frameworks in each model while specifically targeting the necessary elements unique to each class.

Budget 2000

Trend-regression (econometric) methods used to develop residential, commercial, and industrial short-term energy models.

Budget 2001

Consistent 15-year weather normal definition adopted for both the econometric (short-term) and end-use (long-term) models for the energy sales forecast.

Adopted HELM to determine peak demand weather normalization, beginning with 2000's peak. Regression model used for years prior to 2000.

Updated HELM with new class load data and included multiple years in the development.

Budget 2004

Normal weather definition in HELM changed from a 30-year average to a 15-year average, making HELM normal weather consistent with the energy models.

Budget 2006

Updated the RTP response model.

Made adjustments in data to capture continuing customer reclassification.

Budget 2007

Energy histories further adjusted for customer reclassification.

Transmission and distribution loss factor methodology updated.

Savannah merger impacts:

Energy histories updated

Weather history updated

REEPS, COMMEND and INFORM and HELM updated

Budget 2009

Added price variables to short-term energy models.

Budget 2010

Replaced industrial Gross State Product ("GSP") with industrial production to measure output in the short-term industrial energy models. Replaced 15-year weather with 20-year weather to improve forecast consistency across operating companies.

Budget 2011

In the long-term residential model, added several new end uses, including computers, ceiling fans, DVRs, pool pumps, well pumps; split lighting into two types (traditional and fluorescent); split television into 2 types (conventional and other technologies such as plasma & LCD).

In the long-term commercial model, revised base year EUIs for education and warehouses due to addition of some base year share for office equipment. Added office occupancy rate as an exogenous variable to capture downturn in the economy.

In the residential customer model, the number of households variable was replaced with housing stock and housing starts to capture new housing activity.

A number of changes were made in the short-term commercial model. The data range was shortened to begin in 2000 rather than 1990. Also, the interaction of the weather variables (heating and cooling degree days) with square footage was dropped because of the increase in the commercial vacancy rate associated with the Great Recession. The billing days variable was dropped, and Atlanta population was added as a variable to capture new business formation.

In the short-term industrial model, cooling degree days interacted with monthly binaries replaced individual monthly dummy variables.

Budget 2012

In the long-term residential model, the following changes were made:

- Base year was changed from 1999 to 2007
- Vintages for shares/size/efficiency were updated so that prior to 2005 was “old” and 2005 to current was “new”
- Base year “existing” shares obtained from 2007 Saturation Survey
- Penetration “new” shares obtained from 2010 Saturation Survey
- Changed UEC source (for all end uses except HVAC) from national RECS data to EnerSim results run in-house, in order to get a more realistic picture of usage specific to the Georgia Power service territory
- Split COOK into two categories (oven and stovetop)
- Split water heating from two to five end uses (electric resistance, electric HP, electric tankless, gas, gas tankless)
- Updated income and home size elasticities

In the residential customer model, the data range was shortened to begin in 2000 rather than 1990. The unemployment rate replaced housing starts as an economic variable.

Budget 2013

Historical data ranges were shortened in the short-term residential, commercial, and industrial models. For residential, the data for the new model began in 2002 rather than 1999, and for commercial and industrial, it began in 2005 rather than 2000. In the industrial energy model, manufacturing employment was dropped.

Budget 2014

The new long-term energy model (LoadMAP) and peak model (PDM) were run in parallel with the previous models, REEPS, COMMEND, INFORM, and HELM.

In the short-term energy models, the sample periods over which the models were estimated changed. In the residential model, the sample period began in 2000, rather than 2002 as was the case in the Budget 2013 forecast. The commercial and industrial sample periods were also lengthened, with commercial beginning in 2001 rather than 2005, and with industrial beginning in 2000 rather than 2004.

Other changes included dropping the humidity variable from the residential use-per-customer model and using the Georgia Industrial Production Index instead of the Georgia Industrial Production Index for Manufacturing.

Budget 2015

REEPS, COMMEND, INFORM and HELM were not used. LoadMAP and PDM became the official long-term energy and peak models. LoadMAP models used 2007 as the base year. Load shape representations used in the PDM were from 2010 and 2011.

The sample periods for the commercial and industrial models were extended back one year to 2000 and 1999, respectively. The autoregressive term that had been included in the commercial model previously was no longer necessary. In the industrial model, the US Industrial Production Index replaced the Georgia Industrial Production Index used in Budget 2014, and manufacturing employment was included as an additional driver.

Budget 2016

The short-term residential use-per-customer model underwent two significant changes. The first was that the summer weather variables are no longer divided by the SEER index. The second change was that real personal income was replaced as a driver by the total housing stock in Georgia. A strong forecast of real personal income resulted in unrealistic growth rates for residential use-per-customer. Thus, real personal income was not used as a driver in the model.

The short-term commercial energy forecast model also underwent significant revisions for Budget 2016. The key economic driver of the commercial model is total Georgia population. This replaces Atlanta population and real Georgia Commercial GDP, which had been used as drivers in previous years. Lastly, the beginning year of the sample period was changed to 2001 from 2000.

The short-term industrial energy forecast model used the Georgia Industrial Production Index instead of the US Industrial Production Index.

The RTP response model was updated by Christensen Associates Energy Consulting, LLC.

Budget 2017

In Budget 2017, the ratio of multi-family housing stock to total housing stock was used to capture the lower energy usage of the growing multi-family sector.

Budget 2018

Budget 2018 included updates to the weather variables used in the short and long-term energy forecast models. The number of weather stations used and the weighting of each station; the breakpoints used to calculate HDH and CDH; and the definition of normal weather were updated with recent historical data to capture changing customer trends.

There were three changes to the short-term forecast models. First, an energy efficiency variable was included in the residential and commercial forecast models, as suggested by the Georgia Public Service Commission (“Commission”) staff in the 2016 IRP. Second, the ratio of multi-family housing stock to total housing stock was dropped as a driver of residential energy usage. Lastly, the number of Georgia households replaced population as a driver of residential customers and commercial energy.

There were also a few changes to the long-term and peak demand forecast models. Navigant lighting saturation assumptions were adopted in the residential, commercial and industrial LoadMAP models. The load shape representations used in the peak demand model were re-estimated using actual 2015 and 2016 load data.

Budget 2019

Changed economic service providers from Moody's Analytics to IHS Markit following the issuance of a Request For Proposals in 2017. IHS Markit became Georgia Power's provider of economic data and forecasts in January 2018 and these economic forecasts were used to produce Budget 2019.

The short-term econometric forecast models were tested for structural breaks and it was determined that the estimation periods needed to be shortened to better capture the changing relationships impacting energy use. The time period used to estimate the residential model begins in January 2011; the commercial model begins in January 2009; and the industrial model begins in January 2010. In addition, electricity prices were excluded as a driver in the short-term energy models, although a price variable remains in the long-term models. Lastly, the short-term commercial model no longer includes households as a driver of energy use, and the short-term industrial model no longer includes the Georgia Industrial Production Index as a driver.

The commercial LoadMAP model was updated to better capture the impacts of energy efficiency and customer behavior. Specifically, the model used updated technology specifications, such as EERs and unit energy consumption, throughout the end-use categories.

The RTP response model was updated by Christensen Associates Energy Consulting, LLC.

Budget 2020

The residential and commercial customer models were changed from those in Budget 2019. Residential changed from an annual change model to a monthly model and included the year-over-year change in Georgia households and the Georgia unemployment rate as explanatory variables. The commercial customer model remained an annual model and the driver of the model was the number of Georgia households. The estimation periods for these models were also shortened.

Residential electric vehicle load shapes developed by EPRI were first used in the PDM. The EPRI shapes replaced the internally developed shapes previously used. Both sets of shapes represent charging upon returning home from work and overnight charging. The EPRI shapes also considers diversity among customers.

Budget 2021

The Covid-19 pandemic was just beginning as Budget 2021 was being developed. There was a great deal of uncertainty about the impact on economic growth and on electricity sales and customers. Covid variables, based on the Georgia GSP forecast from IHS Markit, were included in the commercial and industrial short-term forecast models. In addition, the estimation period for the short-term energy forecast models was shortened to pick up more recent trends in usage. The industrial model included a binary variable to capture the impact of a large customer shutting down part of its plant. The residential customer model was an annual model, with the change in Georgia housing stock as the explanatory variable. The commercial customer model included the change in the number of Georgia Households and a recession binary variable as explanatory variables.

The LoadMAP models were re-baselined. Market profiles are used to quantify electricity use in the base year of the study by sector, segment, end use, and the current set of technologies. The re-baselining process rebuilt the market profiles for the residential, commercial, and industrial sectors, and updated the base year from 2007 to 2016. Base-year data such as customer counts, historic energy sales, equipment presence (saturations), market floor space (in commercial), Industrial Production and per-unit equipment electricity consumption (UEC/EUI) were updated.

Budget 2022

As the impacts of Covid-19 continued, the estimation period for the short-term commercial and industrial models was shortened. Covid variables were once again included in the commercial and industrial models. The commercial included a Covid variable based on the forecast of the Georgia unemployment rate, while the industrial included a binary variable for April, May and June 2020.

In addition to the Covid binary variable, changes to the drivers of the Budget 2022 industrial model included the US Industrial Production Index for manufacturing and a second binary variable to capture the impact of a large customer shutting down its manufacturing plant.

Drivers of the residential customer model included Georgia housing starts, the Georgia unemployment rate and a 2020 binary variable. The commercial customer included Georgia housing starts and a recession binary variable as explanatory variables.

For Budget 2022, the forecast adjustments for Company-sponsored DSM programs are now assumed to continue through the forecast horizon, rather than tapering off after 12 years, as was done in past forecasts.

In a stipulation from the 2019 IRP, Georgia Power agreed to investigate methodologies for allocating long-term annual energy sales for each class to monthly amounts to account for anticipated trends in seasonal energy sales. A new methodology was developed and implemented in Budget 2022. The Company utilized hourly segment level end-use load shapes to project energy use by segment and by end use to ultimately project energy use on a monthly basis for each class. The monthly energy by segment and end use is calibrated to history and the short-term energy forecast. The calibration helps allocate long-term energy projections across segment and at the end-use level by class. By allocating on a monthly basis and utilizing the long-term LoadMAP forecast results, the forecast now captures the changing monthly trends through time.

The RTP response model was updated by Christensen Associates Energy Consulting, LLC.

9.5 ENERGY RESEARCH PLAN

The following sections contain a description of Georgia Power's Energy Research Plan for 2022-2025. This plan will allow Georgia Power to meet the Commission's requirements, including required filing of information, development of forecasts, and evaluation of demand and supply side resources.

9.5.1 Introduction

In compliance with the Commission's rules, Georgia Power submits its four-year Research Plan, 2022-2025. This plan contains three major sections:

1. Survey Research
2. Load Research
3. Analysis

The research program addresses specific requirements of the Commission rules. It includes only that research which is designed to meet specific filing requirements or is associated with meeting data requirements to support the filing of an integrated resource plan. Research programs associated with evaluation plans for demand side program certification are contained in the respective program filing. Table 9.5.1-1 summarizes the specific sections of the rules, and the proposed research program.

Table 9.5.1-1: Research Requirements for Complying with Commission Rules 515-3-4

Section	Requirement	Research Program
515-3-4.03 (1) - (2) (b) Energy and demand forecasting requirements	Historical peak demands, load factors, energy consumption by class.	Perform a continuous class load research study.
515-3-4.03 (3) (a) Forecast methodology	Most current data on end-use penetration and saturation; penetration and saturation of the market of competing fuel end uses; behavioral factors affecting energy use.	Identify and incorporate secondary sources of data and behavioral factors affecting energy use.
515-3-4.03 (3) (c) Data requirements	Develop a data base of electricity consumption patterns by customer class and end use.	Maintain and leverage existing end-use load shape information with Energy Simulation tools.
515-3-4.03 (3) (e)	Identify and describe ongoing and planned load research	Continuous load research studies of all customer classes. The quality of each sample is checked periodically, and the sample is replaced if needed.
515-3-4.04 (4). Potential new demand side resources	Data to support analysis of new demand side resources, including identification of customer needs, and assessment of market potential.	Evaluate energy efficiency measures that are suitable for Georgia Power customers, climate, residences, buildings, and facilities. Conduct an energy efficiency technical, economic, and achievable potential study.

9.5.2 Survey Research

9.5.2.1 Regulatory Requirements

Commission rules require the filing of information on the saturation and penetration of end-use equipment, including both electrical and alternative fueled end uses. In addition, the rules require that the forecast be based on a disaggregated end-use method or some other comparable forecasting methodology, which requires information on the saturation and penetration of end-use equipment. Further, the rules require the development of an end-use technology catalog based on service area specific information, including information on equipment efficiencies, useful life, and energy and capacity impact information. To the extent that the disaggregated end-use methodology is used to develop the forecast, this research program will provide the data necessary to support this analysis and development of the forecast.

9.5.2.2 Data Collection and Utilization Plan

Use readily available information such as the US Energy Information Administration's RECS, CBECS and MECS for the South Atlantic Region to develop end-use penetration and saturation trends and measure customer building characteristics.

9.5.3 Load Research

9.5.3.1 Regulatory Requirements

Commission rules require the filing of information on the demand and energy characteristics of each of the utility's classes, including load profiles, on-peak, off-peak, and shoulder kWh, and summer, winter and annual peak demands, for the most recent three years of history and the first three years of the forecast period.

The rules require the development and filing of load and consumption information for each customer class. In addition, the rules require that the forecast used in the Integrated Resource Plan filing be based on disaggregated end-use methods or some other comparable forecasting methodology.

The load research component of this research plan will provide the data to meet these requirements.

9.5.3.2 Class Load Research Project

Georgia Power uses continuous load studies of the residential, commercial and industrial classes that include a series of studies designed to the rate/class level. Over 2,000 customers are selected for these studies. The studies have a combination of census groups for small populations and statistical samples for larger customer groups served at secondary distribution. These studies have installed load metering equipment on a sample of customers from each rate/class combination. Combined with over 3,000 customers with interval metering equipment used for billing, the studies provide half hour data for each rate/class combination.

9.5.4 Analysis

9.5.4.1 Regulatory Requirements

Commission Rule 515-3-4 has the following requirements that will continue to be met through analysis of data collected in the preceding described research projects and/or review of existing currently available data from other sources:

Development of a data base of electricity consumption patterns by customer class and end use.
(Commission Rule 515-3-4-.03 (3) (c))

9.5.4.2 Analysis Projects

9.5.4.2-1 End-Use Load Shape Catalog

Georgia Power, in support of the development of the technical potential study, develops a catalog of end-use load profiles. These profiles are based on engineering studies that are supplemented with the best available internal and external end-use load research. Additionally, Georgia Power conducts an annual rate and class load research study that is used in the Company's cost of service studies and forecasts.

Going forward Georgia Power plans to continue to update the end use load catalog as needed to support future Technical Potential Studies and continue its annual load research program at the rate and class level.

9.5.4.2-2 End-Use Load Shape Modeling

An energy simulation tool is being used to develop end-use and total premise load shapes based on both previously collected empirical data and engineering simulation. It is an engineering-based simulation tool that enables the user to develop energy use profiles and load shapes for various building types and energy system combinations.

10.0 ACRONYM & ABBREVIATION GLOSSARY

Acronym	Definition
AAGR	Average Annual Growth Rate
AEG	Applied Energy Group
AEO	Annual Energy Outlook
AHAM	Association of Home Appliance Manufacturers
BTM	Behind-The-Meter
BTU	British Thermal Unit
Budget 2022	Budget 2022 Load and Energy Forecast
CAGR	Compound Annual Growth Rate
CBECS	Commercial Building Energy Consumption Survey
CDH	Cooling Degree Hours
Commission	Georgia Public Service Commission
CP	Coincident Peak
CRA	Charles River Associates
CVR	Conservation Voltage Reduction
DEP	Distribution Efficiency Program
DOE	US Department of Energy
DPEC	Demand Plus Energy Credit
DSM	Demand Side Management
DSO	Demand Side Options
EIA	Energy Information Administration
EISA	Energy Independence and Security Act of 2007
EPACT	Energy Policy Act of 2005
EPRI	Electric Power Research Institute
EUI	Energy Usage Index
GDP	US Gross Domestic Product
GSP	Gross State Product
HDH	Heating Degree Hours
HVAC	Heating Ventilation & Air Conditioning
LoadMAP	Load Management Analysis and Planning
LT	Long Term
MARTA	Metropolitan Atlanta Rapid Transit Authority
MECS	Manufacturing Energy Consumption Survey
NAECA	National Appliance Energy Conservation Act of 1987
NAICS	North American Industry Classification System

Acronym	Definition
NCP	Non-Coincident Peak
NCTA	National Cable and Telecommunications Association
NEPA	National Energy Policy Act of 1992
PDM	Peak Demand Model
RECS	Residential Energy Consumption Survey
RTP	Real Time Pricing
SCS	Southern Company Services
SEER	Seasonal Energy Efficiency Ratio
ST	Short Term
TOU	Time of Use
UEC	Unit Energy Consumption
UI	Usage Index