Exhibit 3:

CUSTOMER AND LOAD FORECAST

Exhibit 3: Customer And Load Forecast

Tab 1 (of 2): Load and Revenue Forecast

HISTORICAL & FORECAST VOLUMES

Exhibit 3 Tab 1 Schedule 1 Attachment 1 is the Weather Normalized Distribution System Load Forecast: 2023 Cost of Service report prepared by Elenchus Research Associates Inc. (Elenchus) on behalf of Kingston Hydro.

Kingston Hydro's 2023 Test Year load forecast volumes have been populated into the Revenue Requirement Workform, Tab 10 and the Load Forecast analysis is filed in live Excel format.

Attachment 1 (of 1):

Load Forecast Report

2 Toronto Street, Suite 222
Toronto, Ontario, M5C 2B5
elenchus.ca

Weather Normalized Distribution System Load Forecast: 2023 Cost of Service

Report prepared by
Andrew Blair
Elenchus Research Associates Inc.

Prepared for:
Kingston Hydro

13 April 2022

Table of Contents

Page Intentionally Blank

1 INTRODUCTION

This report outlines the results of, and methodology used to derive, the weather normal load forecast prepared for Kingston Hydro Corporation ("Kingston Hydro") for its Cost of Service application for 2023 rates.

The regression equations used to normalize and forecast Kingston Hydro's weather sensitive load use monthly heating degree days and cooling degree days as measured at Environment Canada's Kingston Climate weather station to take into account temperature sensitivity. Kingston Hydro typically experiences relatively large heating load in the winter and relatively small cooling loads in the summer so its peak load is generally in the winter. Environment Canada defines heating degree days and cooling degree days as the difference between the average daily temperature and 18°C for each day (below for heating, above for cooling). Heating and cooling degree days with base temperatures other than 18°C have also been considered.

To isolate the impact of CDM, persisting CDM as measured by the IESO is added back to rate class consumption to simulate the rate class consumption had there been no CDM program delivery. This is labelled as "Actual No CDM" throughout the model. The effect is to remove the impact of CDM from any explanatory variables, which may capture a trend, and focus on the external factors. A weather normalized forecast is produced first based on no CDM delivery, and then persisting CDM savings of historic programs are subtracted off to reflect the actual normal forecast.

CDM data beyond 2018 is based on limited data in the IESO Participant and Cost Report and additional data provided by Kingston Hydro. As per the updated CDM Guidelines, forecast CDM is based on a forecast of Kingston Hydro's share of provincial energy savings.

While statistical regression is appropriate for estimating a relationship between explanatory variables and energy use, in the case of CDM, an independent measurement is available providing a greater level of accuracy than could be obtained through regression.

Overall economic activity also impacts energy consumption. There is no known agency that publishes monthly economic accounts on a regional basis for Ontario. However, regional employment levels are available. Specifically, the monthly full-time equivalent (FTE) employment levels for Kingston and Ontario, as reported in Statistics Canada's

Monthly Labour Force Survey[1]. Overall GDP in Ontario is also considered but is available only on an annual basis.[2]

In order to isolate demand determinants at the class specific level, equations to weather normalize and forecast kWh consumption for the Residential, GS < 50 kW, GS > 50 kW, and Large Use classes have been estimated.

In addition to the weather and economic variables, a time trend variable, number of days and number of working days in each month, number of customers, and month of year variables have been examined for all weather-sensitive rate classes. More details on the individual class specifications are provided in the next section.

A range of COVID variables were considered to account for the impacts of the ongoing COVID-19 pandemic. The extent to which consumption since March 2020 differed from typical consumption was found to be related to the weather variables in those months. A set of COVID/weather interaction variables were considered to capture the incremental consumption caused by people working from home and generally staying at home due to lockdowns. These variables, "HDD COVID" and "CDD COVID" are equal to the relevant HDD and CDD variables since March 2020, and 0 in all earlier months. The coefficients reflect incremental heating and cooling load consumed as people stayed home during the pandemic. These variables continue to December 2021 but are reduced to 75% of HDD and CDD in all months in 2022 and 50% in 2023.

COVID flag variables were tested and found to be statistically significant for the General Service < 50 kW and General Service > 50 kW, and Large Use classes. A "COVID" variable equal to 0 in all months prior to March 2020 and 1 in all months since March 2020 and a "COVID_AM" variable equal to 0 in all months prior to March 2020, equal to 1 in April and May 2020, and 0.5 in each month from June 2020 to December 2021 were tested. The "COVID_AM" variable considers the incremental impact in the first few months of the pandemic, with lower impacts after May 2020. The "COVID_AM" variable is used for each of the General Service < 50 kW and General Service > 50 kW, and Large Use classes.

Various calendar variables such as the number of days in the month, binary month variables (equal to 1 in the respective month and 0 in all other months), and seasonal binary variables were considered. Queen's University is located in Kingston and has a significant impact on Kingston Hydro's loads. A Summer variable, equal to 1 in the summer term months from May to August and 0 in all other months, is used to account for lower consumption during this term.

---

[1] Statistics Canada Table 14-10-0380-01

[2] Statistics Canada Table 36-10-0402-01

Finally, for classes with demand charges, an annual kW to kWh ratio is calculated using actual observations for each historical year and applied to the normalized kWh to derive a weather normal kW observation.

1.1 SUMMARIZED RESULTS

The following table summarizes the historic and forecast kWh for 2016 to 2023.

Normal Forecast

kWh	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Forecast	2023 Forecast
Residential	189,823,390	183,638,161	177,822,512	178,197,736	187,265,579	189,687,330	188,986,251	187,884,918
GS < 50	88,067,774	88,412,648	88,593,071	89,044,415	81,113,608	82,806,781	86,188,191	89,137,180
GS > 50	270,092,448	266,794,800	263,361,502	262,343,738	240,769,619	240,509,820	246,557,792	252,522,937
Large Use	155,470,980	158,601,363	157,579,638	157,429,383	147,832,724	149,693,761	155,595,872	158,773,806
Street Light	1,855,541	1,981,443	1,968,388	2,005,899	2,029,919	2,005,960	2,014,809	2,023,697
USL	1,214,411	1,252,378	1,210,653	1,206,871	1,219,174	1,214,646	1,229,039	1,243,602
Total	706,524,544	700,680,793	690,535,763	690,228,042	660,230,624	665,918,298	680,571,953	691,586,139

Table 1 kWh Forecast by Class

The following table summarizes the 2023 CDM Adjusted kWh Load Forecast. Details for this calculation can be found in Schedule 6 of this report.

CDM Adjusted

kWh	2023 Weather Normal	CDM Adjustment	2023 CDM Adjusted Forecast
Residential	187,884,918	1,043,585	186,841,333
GS < 50	89,137,180	905,846	88,231,334
GS > 50	252,522,937	2,380,247	250,142,689
Large Use	158,773,806	1,188,822	157,584,984
Street Light	2,023,697		2,023,697
USL	1,243,602		1,243,602
Total	691,586,139	5,518,500	686,067,639

Table 2 CDM Adjusted kWh Forecast

The following table summarizes the historic and forecast kW for 2016 to 2023:

Normal Forecast

kW	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Forecast	2023 Forecast
GS > 50	663,979	649,755	656,918	632,692	601,464	587,992	602,778	617,361
Large Use	304,048	292,964	302,276	300,750	271,760	281,022	292,103	298,069
Street Light	5,184	5,508	5,508	5,612	5,664	5,494	5,518	5,543
Total	973,211	948,226	964,702	939,054	878,889	874,509	900,399	920,973

Table 3 kW Forecast by Class

The following table summarizes the 2023 CDM Adjusted kW Load Forecast. Details for this calculation can be found at the end of in Schedule 6 of this report.

CDM Adjusted

kW	2023 Weather Normal	CDM Adjustment	2023 CDM Adjusted Forecast
GS > 50	617,361	5,819	611,542
Large Use	298,069	2,232	295,837
Street Light	5,543		5,543
Total	920,973	8,051	912,922

Table 4 CDM Adjusted kW Forecast

The following table summarizes the historic and forecast customer/connections for 2016 to 2023:

Customers / Devices

Customers	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Forecast	2023 Forecast
Residential	24,122	24,232	24,304	24,412	24,461	24,606	24,768	24,932
GS < 50	2,956	2,946	2,933	2,931	2,923	2,946	2,919	2,893
GS > 50	325	320	324	316	318	310	305	300
Large Use	3	3	3	3	3	3	3	3
Street Light	5,561	5,514	5,514	5,649	5,717	5,685	5,710	5,735
USL	144	153	163	165	168	169	171	173
Total	33,112	33,168	33,240	33,476	33,590	33,719	33,877	34,036

Table 5 Customer / Connection Forecast for 2016-2023

Finally, a summary of billing determinants to be used in rate design is provided in Table 6.

Summary

Rate Class	kWh	kW	Customers / Devices
Residential	186,841,333		24,932
GS < 50	88,231,334		2,893
GS > 50		611,542	300
Large Use		295,837	3
Street Light		5,543	5,735
USL	1,243,602		173
Total	276,316,269	912,922	34,036

Table 6 Billing Determinant Summary

2 CLASS SPECIFIC KWH REGRESSION

Consumption for the Residential, GS < 50, GS > 50, and Large Use rate classes were forecast with multivariate regressions. Regressions were not used for the Street Light and USL rate classes as these classes do not exhibit sensitivity to the explanatory variables available for a statistical regression approach.

2.1 RESIDENTIAL

For Residential kWh consumption the equation was estimated using 120 observations from 2012:01-2021:12. Multiple heating degree day and cooling degree day thresholds were considered in the Residential regression. Consumption is relatively stable when the average monthly temperature is between 14°C and 18°C and increases as average temperatures deviate from that range. HDD relative to 14°C and CDD relative to 18°C were found to provide the strongest results. HDD and CDD measures between 12°C and 18°C were also considered but found to be less predictive of monthly consumption.

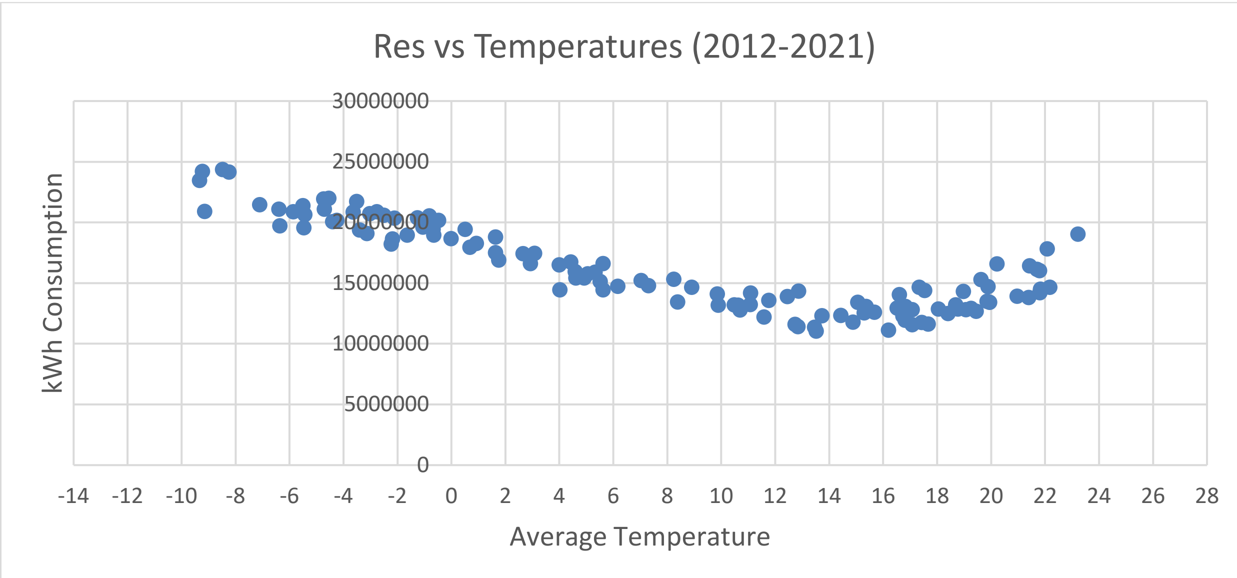

Figure 1 Residential kWh and Average Temperature

In addition to the HDD18 and CDD14 variables, the corresponding COVIDHDD18 and COVIDCDD14 variables were used and found to be statistically significant.

Due to the lower residential population in Kingston when Queen's University is in its summer semester, the Summer variable is used. This variable is equal to 1 from May to August of each month and 0 in all other months.

The number of Residential customers was found to be statistically significant and is used as an independent variable. A count of the number of calendar days in the month was also used.

Several other variables were examined and found to not show a statistically significant relationship to energy usage, or a weaker relationship than similar variables that are included. Those included GDP, employment, a time trend variable, and other calendar variables. .

A time-series autoregressive model using the Prais-Winsten estimation was used for the Residential class to account for autocorrelation.

The following table outlines the resulting regression model:

Model 13: Prais-Winsten, using observations 2012:01-2021:12 (T = 120) Dependent variable: Res_NoCDM rho = 0.431727				
	coefficient	std. error	t-ratio	p-value
const	(14,098,113.1)	5,652,852.2	-2.494	0.0141
HDD18	16,505.3	381.0	43.318	0.0000
CDD14	26,893.3	1,341.0	20.055	0.0000
COVIDHDD18	1,032.6	562.9	1.835	0.0692
COVIDCDD14	8,556.6	1,834.4	4.664	0.0000
Summer	(860,484.3)	188,043.7	-4.576	0.0000
ResCust	627.5	224.9	2.790	0.0062
MonthDays	275,609.3	52,484.5	5.251	0.0000
Statistics based on the rho-differenced data				
Mean dependent var	16,261,109	S.D. dependent var	3,490,374	
Sum squared resid	3.49E+13	S.E. of regression	558,598	
R-squared	0.9759	Adjusted R-squared	0.9744	
F(7, 112)	387.0977	P-value(F)	0.0000	
rho	(0.0508)	Durbin-Watson	2.0870	

Table 7 Residential Regression Model

Using the above model coefficients, we derive the following:

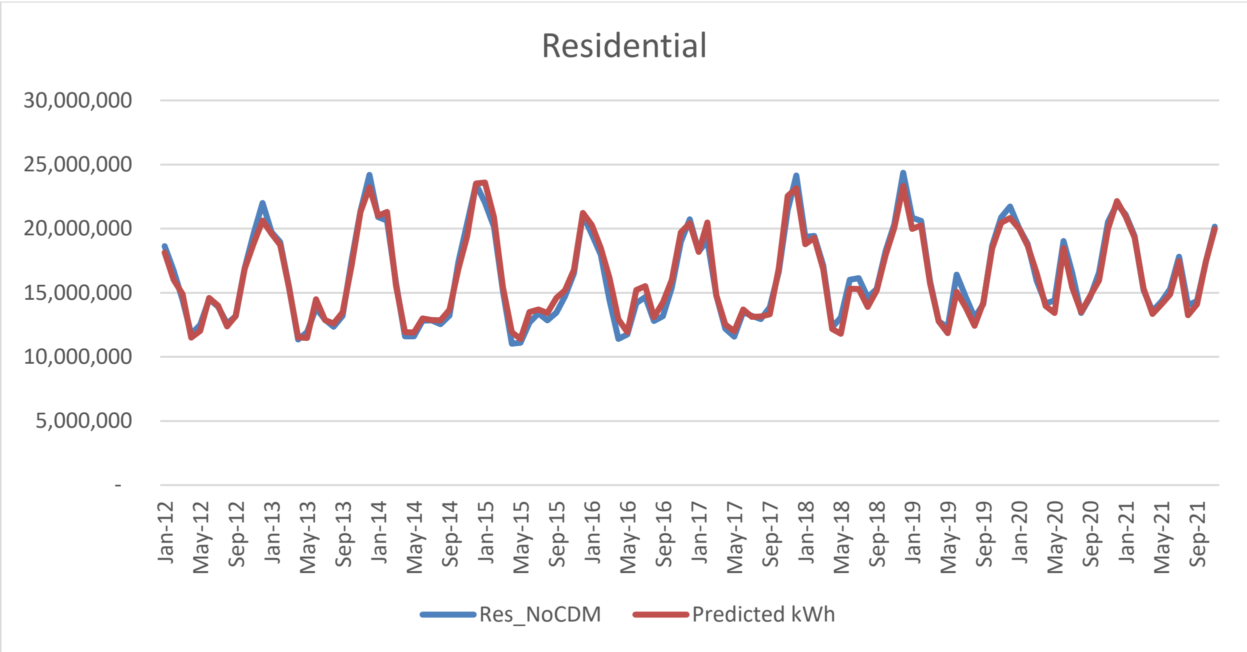

Figure 2 Residential Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 2.3%. The MAPE calculated monthly over the period is 3.0%.

Year	Residential kWh CDM Added Back	Predicted	Absolute Error (%)
2012	185,639,241	182,511,705	1.7%
2013	190,460,490	189,176,804	0.7%
2014	193,943,212	193,483,920	0.2%
2015	186,529,138	193,962,366	4.0%
2016	185,410,364	194,790,298	5.1%
2017	188,103,245	191,156,752	1.6%
2018	206,179,931	199,677,886	3.2%
2019	204,589,319	198,382,711	3.0%
2020	205,852,012	201,533,535	2.1%
2021	204,626,189	202,231,844	1.2%

Mean Absolute Percentage Error (Annual)	2.3%
Mean Absolute Percentage Error (Monthly)	3.0%

Table 8 Residential model error

2.2 GS < 50

For the GS < 50 class, the regression equation was estimated using 120 observations from 2012:01-2021:12. Consumption for this class is relatively stable when the average monthly temperature is between 12°C and 16°C and increases as average temperatures deviate from that range. HDD relative to 12°C and CDD relative to 16°C were found to provide the strongest results. HDD and CDD measures between 10°C and 18°C were also considered but found to be less predictive of monthly consumption.

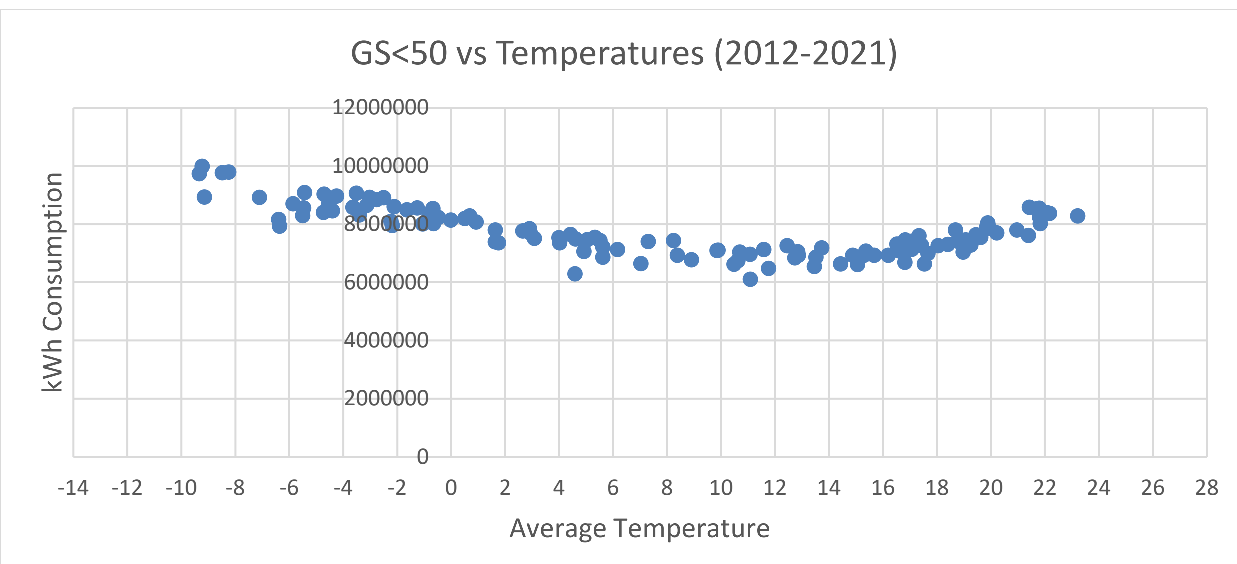

Figure 3 GS<50 kWh and Average Temperature

Ontario GDP has been included as an indicator of economic activity. Measures for Kingston and Ontario employment were also tested but found to be statistically less significant than Ontario GDP. A count of the number of calendar days in the month has been included.

The COVID_AM variable has been included for this class. This variable is equal to 0 in each month prior to March 2020, 0.5 in March 2020, 1 in April 2020 and May 2020, and 0.5 in each month from June 2020 to December 2021. This variable accounts for the impacts of COVID, while recognizing the impacts in April and May 2020 were more significant than any month thereafter. The value in March 2020 reflects that the impacts of the pandemic on energy consumption began about halfway though the month.

The customer count and various calendar variables were tested but found to not have statistically significant relationships to energy usage.

The following table outlines the resulting regression model:

Model 15: Prais-Winsten, using observations 2012:01-2021:12 (T = 120) Dependent variable: GSlt50kW_NoCDM rho = 0.198885				
	coefficient	std. error	t-ratio	p-value
const	(1,901,109.7)	672,518.4	-2.827	0.0056
HDD16	4,640.0	113.2	40.986	0.0000
CDD12	7,700.1	275.8	27.916	0.0000
MonthDays	145,945.2	18,167.0	8.034	0.0000
COVID_AM	(1,000,737.1)	95,650.4	-10.462	0.0000
OntarioGDP	4.8	0.5	8.963	0.0000
Statistics based on the rho-differenced data				
Mean dependent var	7,750,826	S.D. dependent var	817,574	
Sum squared resid	3.48E+12	S.E. of regression	174,641	
R-squared	0.9564	Adjusted R-squared	0.9545	
F(7, 112)	427.3153	P-value(F)	0.0000	
rho	0.0064	Durbin-Watson	1.9828	

Table 9 GS < 50 Regression Model

Using the above model coefficients we derive the following:

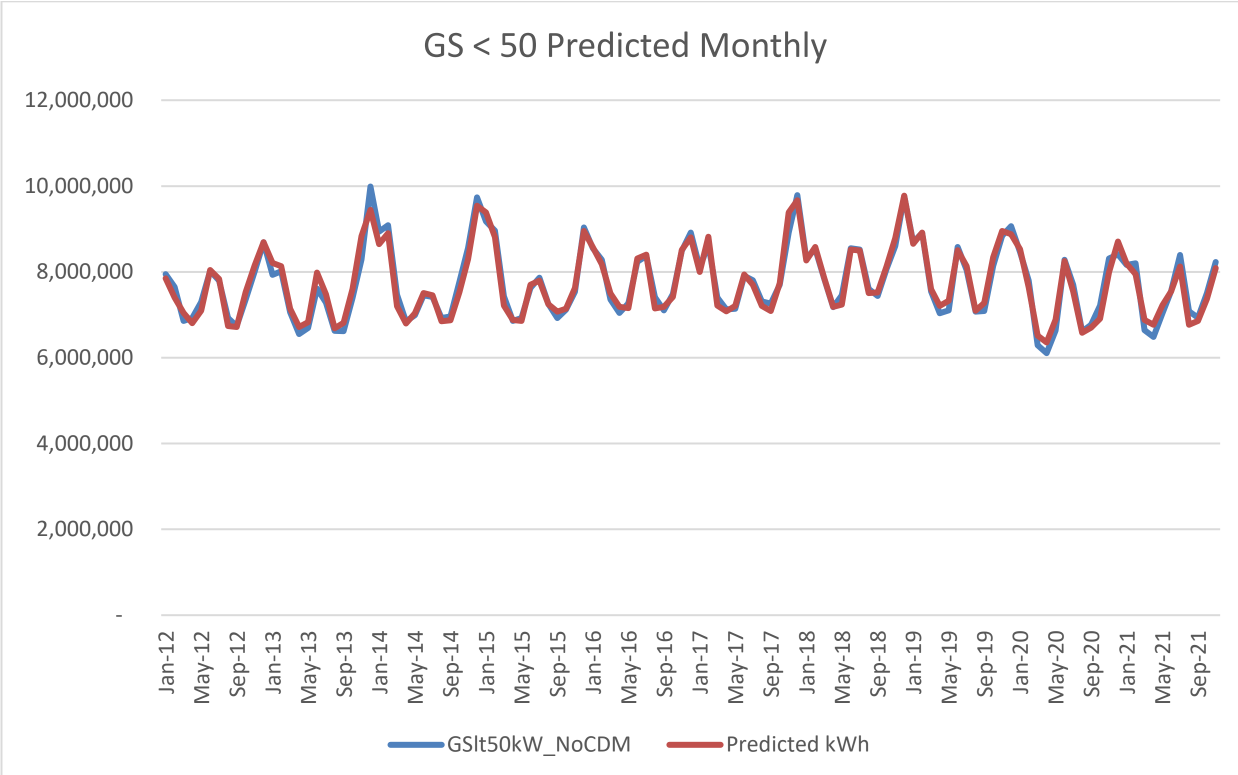

Figure 4 GS < 50 Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 0.7%. The MAPE calculated monthly over the period is 1.8%.

Year	GS<50 kWh CDM Added Back	Predicted	Absolute Error (%)
2012	90,107,617	89,719,306	0.4%
2013	88,753,315	91,112,224	2.7%
2014	94,398,573	92,521,961	2.0%
2015	93,406,890	93,277,794	0.1%
2016	94,636,447	94,519,407	0.1%
2017	94,224,270	94,191,455	0.0%
2018	97,898,478	97,776,915	0.1%
2019	96,822,702	97,775,638	1.0%
2020	89,245,084	88,788,658	0.5%
2021	90,605,726	90,464,955	0.2%
Mean Absolute Percentage Error (Annual)			0.7%
Mean Absolute Percentage Error (Monthly)			1.8%

Table 10 GS < 50 model error

2.3 GS > 50

For the GS > 50 class, the regression equation was estimated using 120 observations from 2012:01-2021:12. GS > 50 consumption is relatively flat when the average monthly temperature is between 12°C and 16°C and increases as average temperatures deviate from that range. HDD relative to 12°C and CDD relative to 16°C were found to provide the strongest results. HDD and CDD measures between 8°C and 18°C were also considered but found to be less predictive of monthly consumption.

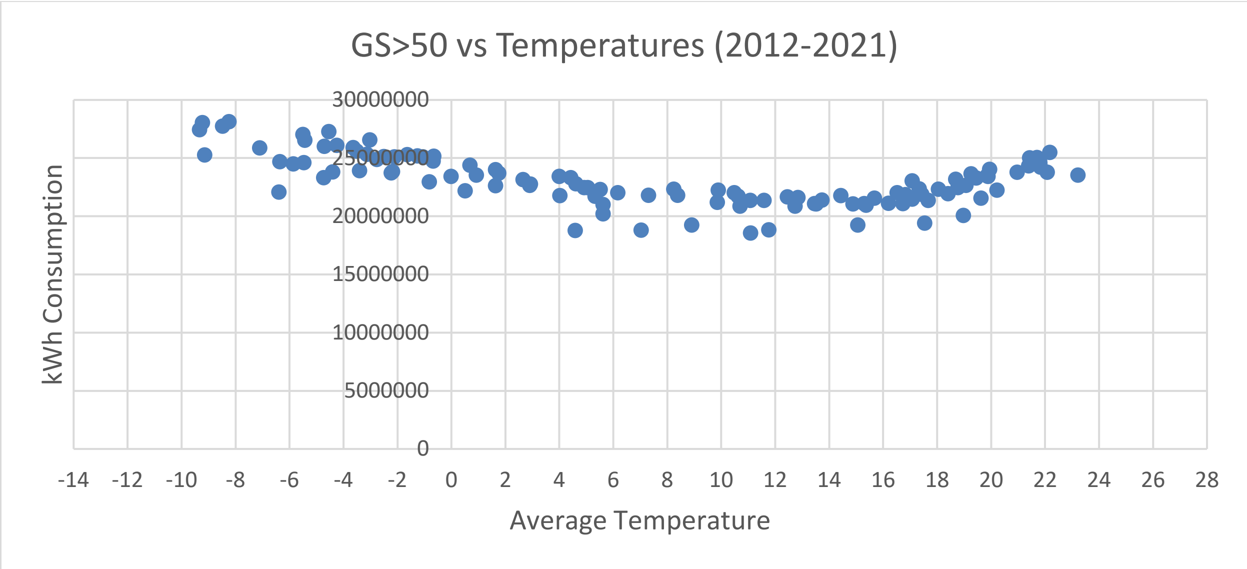

Figure 5 GS>50 kWh and Average Temperature

Economic variables were tested but found not to have a statistically significant relationship with class consumption. This includes employment data for Kingston and Ontario (both seasonally adjusted and unadjusted) and GDP data for Ontario as a whole.

The number of days in the month and COVID_AM variables were found to be statistically significant. The Summer variable is also statistically significant.

The customer count, a time trend, and binary calendar variables representing other seasons and months were tested but found to not have a statistically significant relationship to energy use.

The following table outlines the resulting regression model:

Model 26: Prais-Winsten, using observations 2012:01-2021:12 (T = 120) Dependent variable: GSgt50kWh_NoCDM rho = 0.347976				
	coefficient	std. error	t-ratio	p-value
const	2,178,842.5	1,198,625.6	1.818	0.0717
HDD16	10,988.1	284.3	38.643	0.0000
CDD12	20,090.6	750.7	26.763	0.0000
MonthDays	546,221.9	39,666.3	13.770	0.0000
COVID_AM	(3,748,972.7)	244,710.2	-15.320	0.0000
Summer	(422,014.2)	138,039.1	-3.057	0.0028
Statistics based on the rho-differenced data				
Mean dependent var	23,030,619	S.D. dependent var	2,109,469	
Sum squared resid	1.87E+13	S.E. of regression	405,030	
R-squared	0.9648	Adjusted R-squared	0.9633	
F(7, 112)	531.5438	P-value(F)	0.0000	
rho	(0.0306)	Durbin-Watson	2.0584	

Table 11 GS > 50 Regression Model

Using the above model coefficients we derive the following:

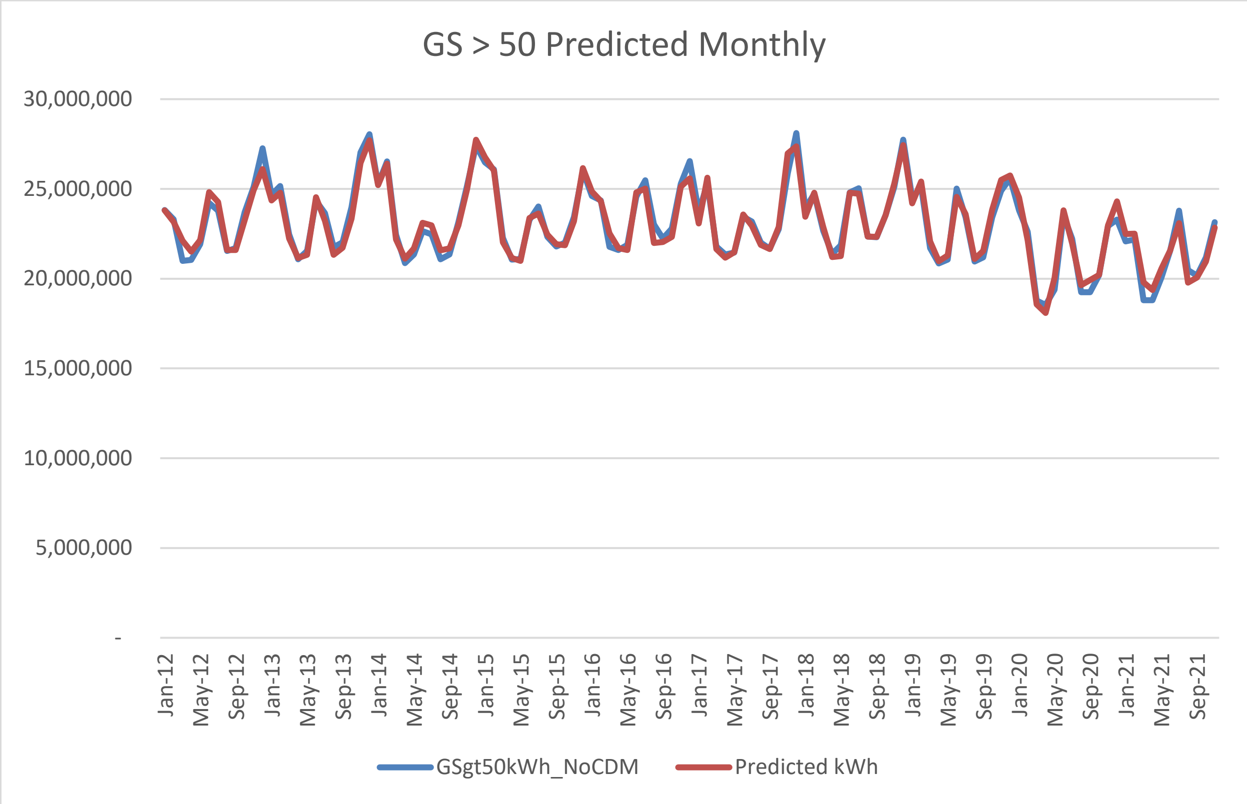

Figure 6 GS > 50 Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 0.6%. The MAPE calculated monthly over the period is 1.4%.

Year	GS>50 kWh CDM Added Back	Predicted	Absolute Error (%)
2012	277,037,206	279,025,540	0.7%
2013	284,957,996	280,561,760	1.5%
2014	280,397,475	281,627,321	0.4%
2015	281,272,521	281,111,710	0.1%
2016	283,604,033	282,502,014	0.4%
2017	279,110,154	278,539,069	0.2%
2018	285,819,730	283,975,375	0.6%
2019	279,834,626	281,572,848	0.6%
2020	256,083,149	257,620,773	0.6%
2021	255,557,409	257,342,971	0.7%
Mean Absolute Percentage Error (Annual)			0.6%
Mean Absolute Percentage Error (Monthly)			1.4%

Table 12 GS > 50 model error

2.4 LARGE USE

For the GS > 50 class, the regression equation was estimated using 120 observations from 2012:01-2021:12. Large Use consumption is generally not very weather-sensitive. It is relatively flat when the average monthly temperature is between 8°C and 10°C and increases as average temperatures deviate from that range. HDD relative to 8°C and CDD relative to 10°C were found to provide the strongest results. The weather variables do not have a significant impact but are statistically significant. HDD and CDD measures between 8°C and 18°C were also considered but found to be less predictive of monthly consumption.

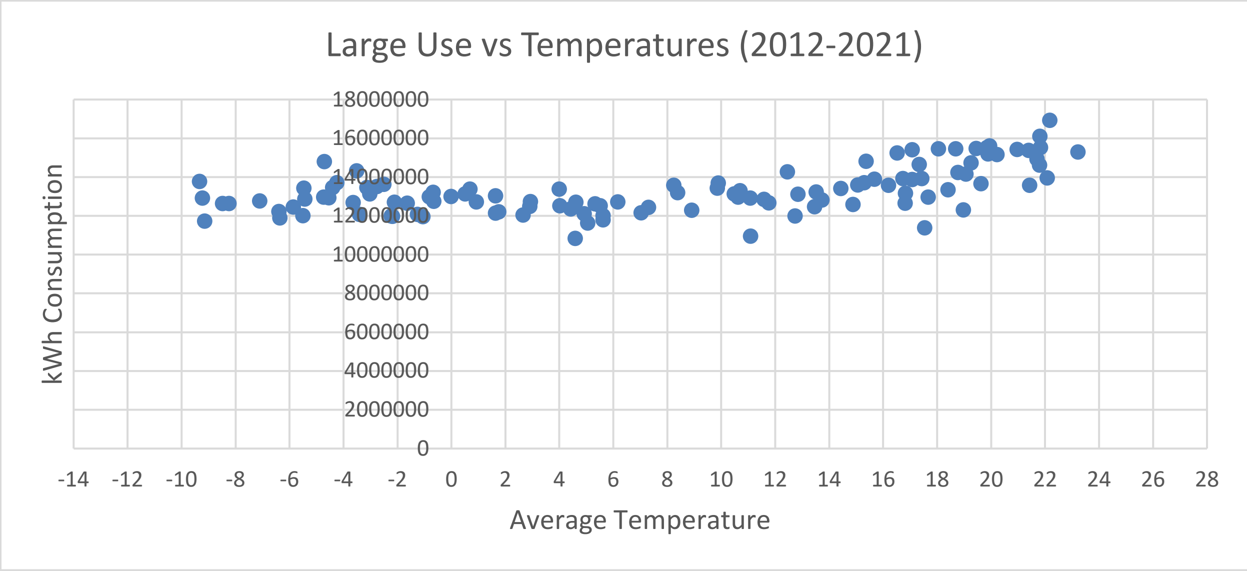

Figure 7 Large Use and Average Temperature

Economic variables were tested and multiple were found to have a statistically significant relationship with class consumption. Seasonally adjusted Kingston employment was found to be the most statistically significant so it is used.

The number of days in the month and COVID_AM variables were found to be statistically significant. The Summer variable is also statistically significant as Queen's University is one of the Large Use customers.

The customer count, a time trend, and binary calendar variables representing seasons and months were tested but found to not have a statistically significant relationship to energy use.

The following table outlines the resulting regression model:

Model 29: Prais-Winsten, using observations 2012:01-2021:12 (T = 120) Dependent variable: LUkWh_NoCDM rho = 0.511244				
	coefficient	std. error	t-ratio	p-value
const	(6,967,478.3)	3,237,472.31	-2.152	0.0335
HDD10	1,922.5	462.50	4.157	0.0001
CDD8	9,278.7	721.01	12.869	0.0000
MonthDays	355,738.4	46,586.93	7.636	0.0000
COVID_AM	(930,116.2)	398,958.66	-2.331	0.0215
KingstonFTEAdj	102,401.9	36,260.39	2.824	0.0056
Summer	(927,389.5)	179,638.79	-5.163	0.0000
Statistics based on the rho-differenced data				
Mean dependent var	13,315,884	S.D. dependent var	1,161,822	
Sum squared resid	3.07E+13	S.E. of regression	520,915	
R-squared	0.8115	Adjusted R-squared	0.8015	
F(7, 112)	56.6190	P-value(F)	0.0000	
rho	(0.0034)	Durbin-Watson	2.0028	

Table 13 Large Use Regression Model

Using the above model coefficients we derive the following:

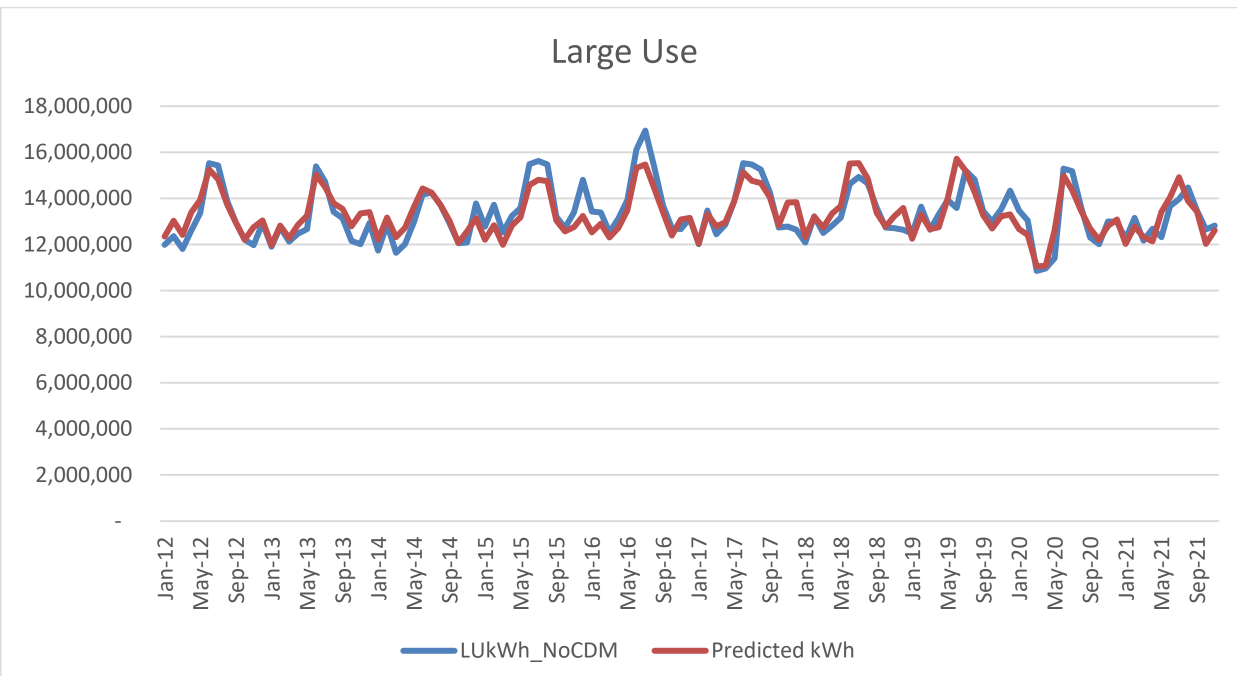

Figure 8 Large Use Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 2.0%. The MAPE calculated monthly over the period is 3.4%.

Year	GS>50 kWh CDM Added Back	Predicted	Absolute Error (%)
2012	156,822,137	159,943,236	2.0%
2013	155,701,782	159,217,951	2.3%
2014	153,330,491	157,505,772	2.7%
2015	165,534,415	158,662,683	4.2%
2016	168,740,156	161,339,524	4.4%
2017	163,850,505	163,419,086	0.3%
2018	159,697,241	164,388,971	2.9%
2019	162,199,564	162,931,949	0.5%
2020	155,445,218	153,606,425	1.2%
2021	156,584,560	156,705,824	0.1%
Mean Absolute Percentage Error (Annual)			2.0%
Mean Absolute Percentage Error (Monthly)			3.4%

Table 14 Large Use model error

3 WEATHER NORMALIZATION AND ECONOMIC FORECAST

It is not possible to accurately forecast weather for months or years in advance. Therefore, future weather expectations can be based only on what has happened in the past. Individual years may experience unusual spells of weather (unusually cold winter, unusually warm summer, etc.). However, over time, these unusual spells “average” out. While there may be trends over several years (e.g., warmer winters for example), using several years of data rather than one particular year filters out the extremes of any particular year. While there are several different approaches to determining an appropriate weather normal, Kingston Hydro has adopted the most recent 10-year monthly degree day average as the definition of weather normal, consistent with many LDCs load forecast filings for cost-of-service rebasing applications.

It is Elenchus’ opinion that the 10-year average HDD and CDD are more appropriate weather figures for the purposes of short-term load forecasts. The 20-year trend figures tend to be over reliant on the first and last year values, which can sometimes lead to negative values for HDD and CDD, and are typically more volatile from year to year than 10-year average values.

Additionally, no weather station in Kingston has a full set of 20 years of data. Weather trends would therefore reflect both a trend in weather and difference between two weather stations. The Kingston Climate weather station has been in operation since 2008 so there is sufficient data for 10-year average variables.

3.1 10-Year Average

The table below displays the most recent 10-year average of heating degree days and cooling degree days for a number of temperature thresholds based on temperatures reported by Environment Canada for Kingston Climate, which is used as the weather station for Kingston Hydro.

In a few instances in the 2012 to 2021 period, daily Kingston Climate data was not available. If data was not available from the Kingston Climate weather station, data from the Kingston A weather station (at the Kingston Airport) or Hartington IHD weather station was used.

	8°C		10°C		12°C		14°C		16°C		18°C		20°C	
	HDD	CDD	HDD	CDD	HDD	CDD	HDD	CDD	HDD	CDD	HDD	CDD	HDD	CDD
January	432	0	494	0	556	0	618	0	680	0	742	0	804	0
February	395	0	451	0	508	0	564	0	621	0	678	0	734	0
March	281	4	341	2	402	1	463	0	525	0	587	0	649	0
April	100	17	150	7	206	3	264	1	323	0	383	0	443	0
May	9	153	23	104	45	64	77	35	121	17	173	6	230	1
June	0	281	0	221	1	162	6	107	20	61	48	29	91	12
July	0	401	0	339	0	277	0	215	1	154	5	97	22	51
August	0	383	0	321	0	259	0	198	2	137	9	83	29	40
September	0	244	2	187	9	133	23	87	46	51	81	25	126	10
October	28	98	52	61	88	35	132	17	184	6	241	1	302	0
November	163	12	217	5	273	1	332	0	392	0	452	0	512	0
December	307	1	368	0	430	0	492	0	554	0	616	0	678	0

Table 15 - 10 Year Average HDD and CDD

3.2 Economic Forecast

GDP and employment forecasts are based on the mean forecasts of five major Canadian banks, RBC, TD, Scotiabank, BMO, and CIBC as of March 2022. Average forecast rates are applied to the most recent GDP and Labour Force Survey monthly data available.

Report Date	TD 17-Mar-22	BMO 25-Mar-22	Scotia 11-Mar-22	RBC 10-Mar-22	Average
FTE (Employment growth % YoY)					
2021	4.9%	4.9%	4.9%	4.9%	4.90%
2022	4.5%	5.1%	4.5%	3.4%	4.38%
2023	1.0%	2.2%	1.4%	1.6%	1.55%
GDP (Real % YoY)					
2021	4.3%	4.4%	4.1%	4.2%	4.18%
2022	4.2%	3.4%	4.1%	4.2%	4.00%
2023	3.0%	3.0%	3.2%	2.8%	3.08%

Table 16 Economic Forecasts

For example, the 2022 forecast FTE growth rate, 4.38%, is applied to the number of January 2021 FTEs to forecast the number of incremental FTEs in January 2022. The January 2023 FTE forecast is then determined by applying 1.55%, the 2023 FTE forecast growth rate, to the January 2022 forecast.

4 Class Specific Normalized Forecasts

4.1 Residential

Incorporating the forecast economic variables, 10-yr weather normal heating and cooling degree days, and calendar variables, the following weather corrected consumption and forecast values are calculated:

Residential kWh

Year	Actual	Cumulative Persisting CDM	Actual No CDM	Normalized No CDM	Cumulative Persisting CDM	Normalized
	A	B	C = A + B	D	E = B	F = D - E
2012	184,953,209	686,032	185,639,241	186,895,987	686,032	186,209,955
2013	189,348,696	1,111,794	190,460,490	188,691,273	1,111,794	187,579,479
2014	192,061,408	1,881,803	193,943,212	191,591,154	1,881,803	189,709,351
2015	183,596,950	2,932,188	186,529,138	193,124,244	2,932,188	190,192,056
2016	181,338,768	4,071,596	185,410,364	193,894,986	4,071,596	189,823,390
2017	177,290,533	10,812,712	188,103,245	194,450,873	10,812,712	183,638,161
2018	189,011,882	17,168,048	206,179,931	194,990,560	17,168,048	177,822,512
2019	186,981,942	17,607,377	204,589,319	195,805,113	17,607,377	178,197,736
2020	188,355,001	17,497,011	205,852,012	204,762,590	17,497,011	187,265,579
2021	187,264,602	17,361,587	204,626,189	207,048,917	17,361,587	189,687,330
2022				205,825,652	16,839,402	188,986,251
2023				204,609,667	16,724,750	187,884,918

Table 17 Actual vs Normalized Residential kWh

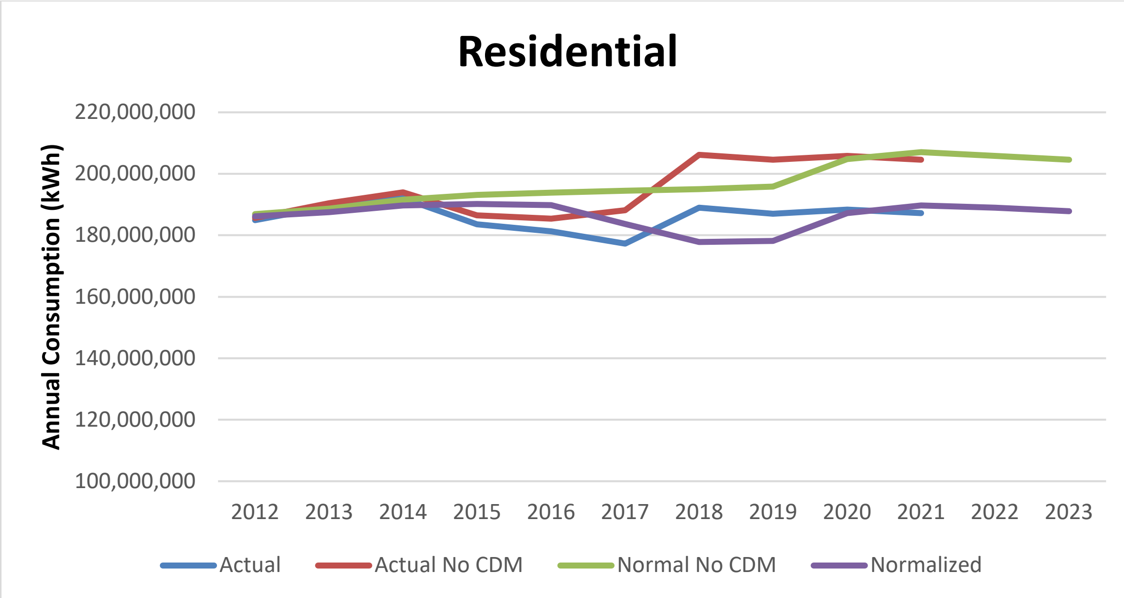

Figure 9 Actual vs Normalized Residential kWh

Note that the vertical intercept does not begin at 0 in any figure in this section. While Residential customer counts are not a component of the regression model, they are forecasted for the purpose of rate setting. The Geometric mean of the annual growth from 2012 to 2021 was used to forecast the growth rate from 2021 to 2023.

Year	Residential Customers	Percent of Prior Year
2012	23,193	
2013	23,468	101.2%
2014	23,853	101.6%
2015	24,056	100.9%
2016	24,122	100.3%
2017	24,232	100.5%
2018	24,304	100.3%
2019	24,412	100.4%
2020	24,461	100.2%
2021	24,606	100.6%
2022	24,768	100.66%
2023	24,932	100.66%

Table 18 Forecasted Residential Customer Count

4.2 GS < 50

Incorporating the forecast economic variables, 10-yr weather normal heating and cooling degree days, and calendar variables, the following weather corrected consumption and forecast values are calculated:

			GS < 50 kWh			
Year	Actual	Cumulative Persisting CDM	Actual No CDM	Normalized No CDM	Cumulative Persisting CDM	Normalized
	A	B	C = A + B	D	E = B	F = D - E
2012	88,608,641	1,498,976	90,107,617	90,748,654	1,498,976	89,249,677
2013	86,375,577	2,377,738	88,753,315	91,124,663	2,377,738	88,746,925
2014	91,470,555	2,928,018	94,398,573	92,048,936	2,928,018	89,120,918
2015	89,065,306	4,341,584	93,406,890	93,065,995	4,341,584	88,724,411
2016	88,607,906	6,028,541	94,636,447	94,096,316	6,028,541	88,067,774
2017	87,579,437	6,644,833	94,224,270	95,057,482	6,644,833	88,412,648
2018	90,027,071	7,871,407	97,898,478	96,464,479	7,871,407	88,593,071
2019	88,540,325	8,282,377	96,822,702	97,326,792	8,282,377	89,044,415
2020	81,058,179	8,186,905	89,245,084	89,300,514	8,186,905	81,113,608
2021	82,498,024	8,107,702	90,605,726	90,914,483	8,107,702	82,806,781
2,022				94,131,582	7,943,391	86,188,191
2,023				96,979,258	7,842,078	89,137,180

Table 19 Actual vs Normalized GS < 50 kWh

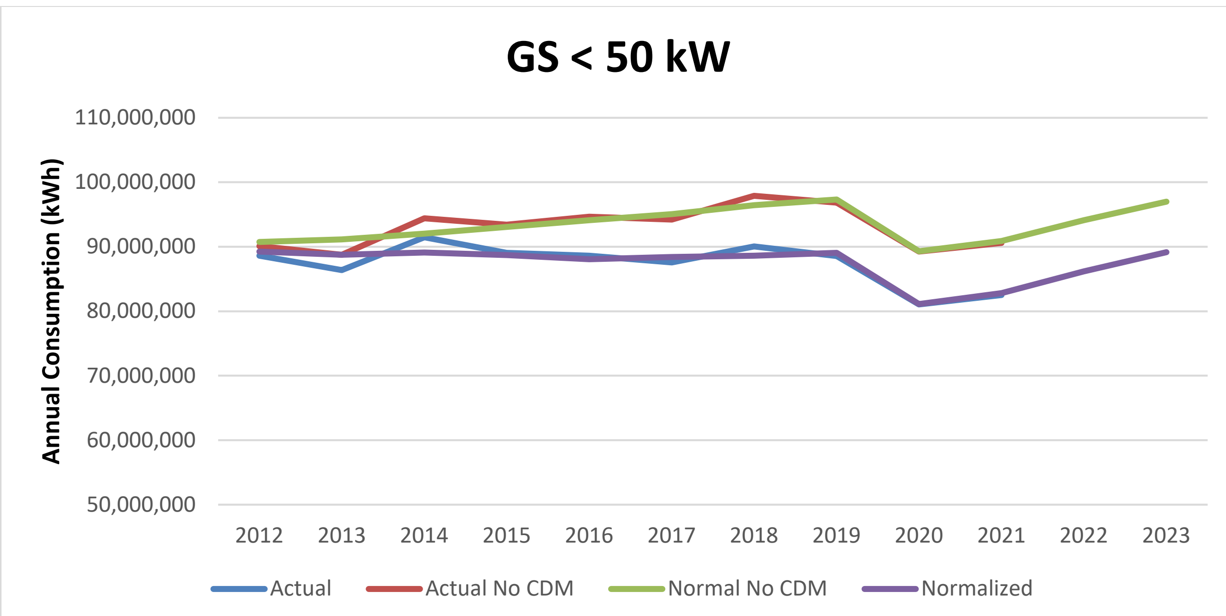

Figure 10 Actual vs Normalized GS < 50 kWh

While GS < 50 customer counts are not a component of the regression model, they are forecasted for the purpose of rate setting. The Geometric mean of the annual growth from 2012 to 2021 was used to forecast the growth rate from 2021 to 2023. GS < 50 kW customer counts have been declining and are forecast to continue to decrease in the 2023 Test Year.

The following table includes the customer Actual / Forecast customer count on this basis:

Year	GS < 50 Customers	Percent of Prior Year

2012	3,197	
2013	3,160	98.8%
2014	3,051	96.6%
2015	2,984	97.8%
2016	2,956	99.1%
2017	2,946	99.6%
2018	2,933	99.6%
2019	2,931	99.9%
2020	2,923	99.7%
2021	2,946	100.8%
2022	2,919	99.10%
2023	2,893	99.10%

Table 20 Forecasted GS < 50 Customer Count

4.3 GS > 50

Incorporating the forecast economic variables, 10-yr weather normal heating and cooling degree days, and calendar variables, the following weather corrected consumption and forecast values are calculated:

GS < 50 kWh						
Year	Actual	Cumulative Persisting CDM	Actual No CDM	Normalized No CDM	Cumulative Persisting CDM	Normalized
	A	B	C = A + B	D	E = B	F = D - E
2012	274,473,668	2,563,538	277,037,206	281,269,061	2,563,538	278,705,523
2013	279,458,000	5,499,996	284,957,996	280,722,839	5,499,996	275,222,843
2014	272,498,127	7,899,348	280,397,475	280,722,839	7,899,348	272,823,491
2015	271,522,294	9,750,227	281,272,521	280,722,839	9,750,227	270,972,612
2016	272,427,420	11,176,613	283,604,033	281,269,061	11,176,613	270,092,448
2017	265,182,115	13,928,039	279,110,154	280,722,839	13,928,039	266,794,800
2018	268,458,393	17,361,337	285,819,730	280,722,839	17,361,337	263,361,502
2019	261,455,526	18,379,101	279,834,626	280,722,839	18,379,101	262,343,738
2020	238,077,544	18,005,605	256,083,149	258,775,225	18,005,605	240,769,619
2021	237,838,227	17,719,182	255,557,409	258,229,003	17,719,182	240,509,820
2,022				263,852,462	17,294,670	246,557,792
2,023				269,475,921	16,952,984	252,522,937

Table 21 Actual vs Normalized GS > 50 kWh

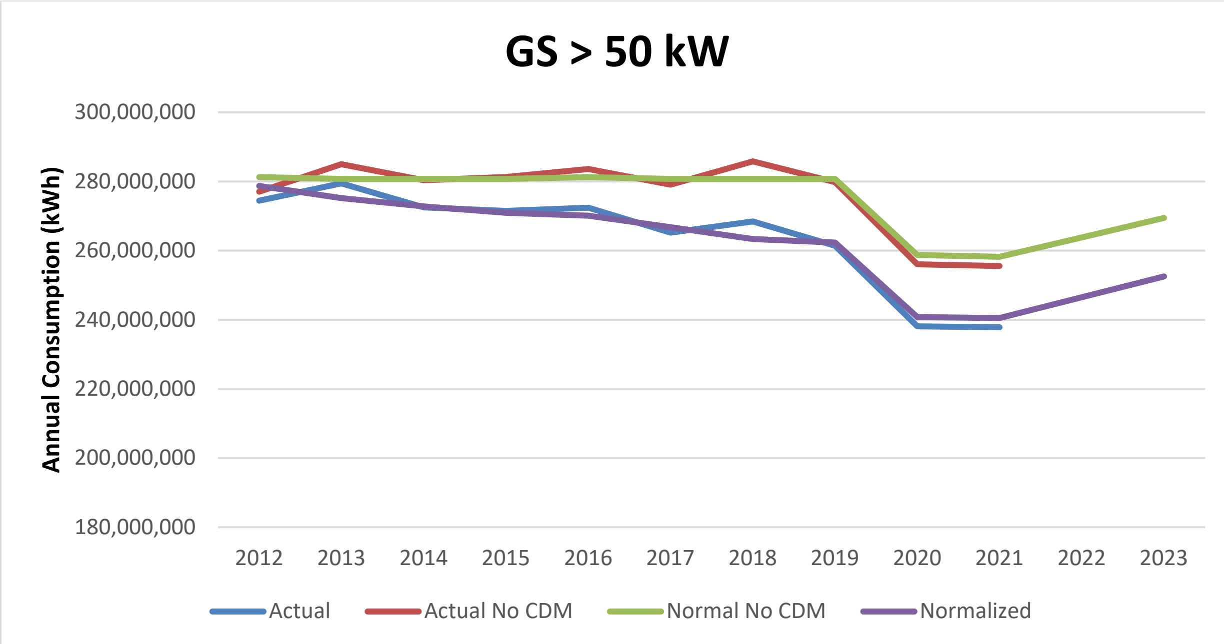

Figure 11 Actual vs Normalized GS > 50 kWh

While GS > 50 customer counts are not a component of the regression model, they are forecasted for the purpose of rate setting. The Geometric mean of the annual growth from 2012 to 2021 was used to forecast the growth rate from 2021 to 2023.

The following table includes the customer Actual / Forecast customer count on this basis:

Year	GS > 50 Customers	Percent of Prior Year
2012	360	
2013	371	103.1%
2014	325	87.5%
2015	327	100.6%
2016	325	99.6%
2017	320	98.3%
2018	324	101.2%
2019	316	97.5%
2020	318	100.9%
2021	310	97.4%
2022	305	98.36%
2023	300	98.36%

Table 22 Forecasted GS > 50 Customer Count

In order to normalize and forecast class kW for those classes that bill based on kW (demand) billing determinants, the relationship between billed kW and kWh is used. The 5-year average kW/kWh ratio from 2017-2021 was used because the ratio has changed over 10 years so a shorter time frame was used. The ratio decreased from 0.00284 in 2012 to 0.00238 in 2021 and the 5-year average is more aligned with recent ratios.

	kWh A	GS > 50 kW B	Ratio C = B / A
2012	274,473,668	781,260	0.002846
2013	279,458,000	767,156	0.002745
2014	272,498,127	743,905	0.002730
2015	271,522,294	651,920	0.002401
2016	272,427,420	663,979	0.002437
2017	265,182,115	649,755	0.002450
2018	268,458,393	656,918	0.002447
2019	261,455,526	632,692	0.002420
2020	238,077,544	601,464	0.002526
2021	237,838,227	566,156	0.002380
	kWh Normalized E	kW Normalized F = E * G	Average Trend G
2021	240,509,820	587,992	0.002445
2022	246,557,792	602,778	0.002445
2023	252,522,937	617,361	0.002445

Table 23 Forecasted GS > 50 kW

Kingston Hydro has a standby demand charge equal to variable demand charges. For the purposes of deriving a billed kW forecast, standby demands are included with actual demand volumes. As a result, the kW forecast is a forecast of actual and standby demand volumes.

4.4 LARGE USE

Incorporating the forecast economic variables, 10-yr weather normal heating and cooling degree days, and calendar variables, the following weather corrected consumption and forecast values are calculated:

Large Use						
Year	Actual	Cumulative Persisting CDM	Actual No CDM	Normalized No CDM	Cumulative Persisting CDM	Normalized
	A	B	C = A + B	D	E = B	F = D - E
2012	155,448,435	1,373,703	156,822,137	159,293,040	1,373,703	157,919,337
2013	153,943,746	1,758,036	155,701,782	159,561,953	1,758,036	157,803,917
2014	151,518,193	1,812,298	153,330,491	158,097,605	1,812,298	156,285,308
2015	162,219,637	3,314,778	165,534,415	158,742,738	3,314,778	155,427,960
2016	163,719,994	5,020,162	168,740,156	160,491,142	5,020,162	155,470,980
2017	158,476,392	5,374,113	163,850,505	163,975,476	5,374,113	158,601,363
2018	153,680,290	6,016,951	159,697,241	163,596,589	6,016,951	157,579,638
2019	155,694,432	6,505,132	162,199,564	163,934,515	6,505,132	157,429,383
2020	149,135,513	6,309,706	155,445,218	154,142,430	6,309,706	147,832,724
2021	150,392,390	6,192,171	156,584,560	155,885,931	6,192,171	149,693,761
2,022				161,661,284	6,065,413	155,595,872
2,023				164,676,186	5,902,380	158,773,806

Table 24 Actual vs Normalized Large Use

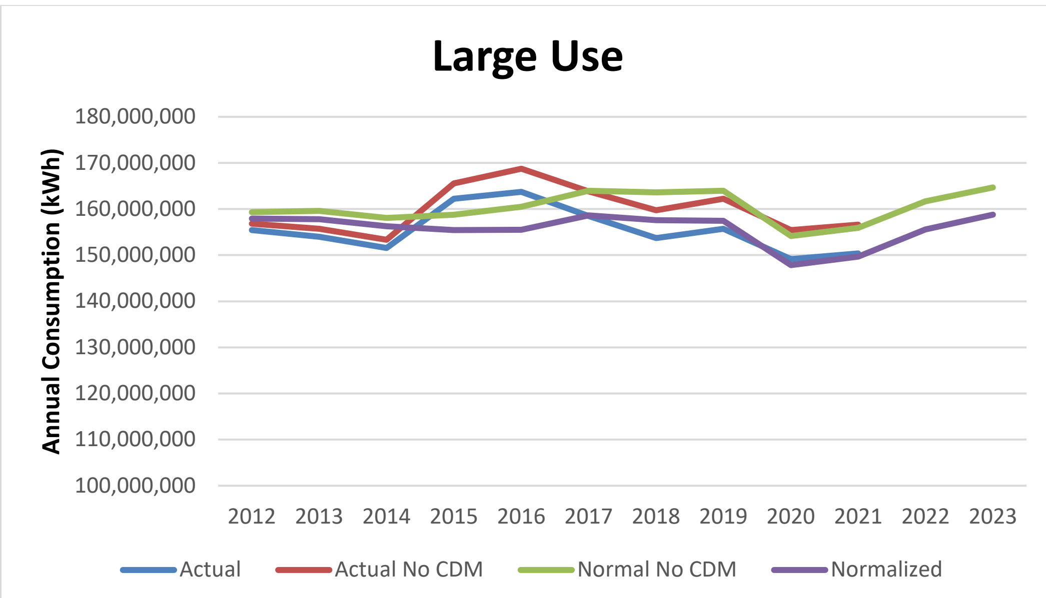

Figure 12 Actual vs Normalized Large Use

The Large Use class has had 3 customers since 2012 and is forecast to have 3 customers in the test year.

Year	Large Use Customers	Percent of Prior Year
2012	3	
2013	3	100.0%
2014	3	100.0%
2015	3	100.0%
2016	3	100.0%
2017	3	100.0%
2018	3	100.0%
2019	3	100.0%
2020	3	100.0%
2021	3	100.0%
2022	3	100.0%
2023	3	100.0%

Table 25 Forecasted Large Use Customer Count

In order to normalize and forecast class kW for those classes that bill based on kW (demand) billing determinants, the relationship between billed kW and kWh is used. The 5-year average kW/kWh ratio from 2017-2021 was used because the ratio has changed over 10 years, so a shorter time frame was used. The ratio decreased from 0.002079 in 2012 to 0.001817 in 2021 and the 5-year average is more aligned with recent ratios.

	kWh A	GS > 50 kW B	Ratio C = B / A
2012	155,448,435	323,212	0.002079
2013	153,943,746	291,732	0.001895
2014	151,518,193	286,452	0.001891
2015	162,219,637	299,944	0.001849
2016	163,719,994	304,048	0.001857
2017	158,476,392	292,964	0.001849
2018	153,680,290	302,276	0.001967
2019	155,694,432	300,750	0.001932
2020	149,135,513	271,760	0.001822
2021	150,392,390	273,283	0.001817
	kWh Normalized E	kW Normalized F = E * G	Average Trend G
2021	149,693,761	281,022	0.001877
2022	155,595,872	292,103	0.001877
2023	158,773,806	298,069	0.001877

Table 26 Forecasted Large Use

Kingston Hydro has a standby demand charge equal to variable demand charges. For the purposes of deriving a billed kW forecast, standby demands are included with actual demand volumes. As a result, the kW forecast is a forecast of actual and standby demand volumes.

5 STREET LIGHT AND USL FORECAST

The Street Lighting and Unmetered Scattered Load classes are non-weather sensitive classes. Device counts are forecasted on the geometric mean growth rate from 2012 to 2021. Energy volumes for these classes are forecasted on the basis of average energy per connection or the trend of average energy per device.

5.1 STREET LIGHT

The table below summarizes the historic and forecast annual energy consumption for the Street Light class. Kingston Hydro underwent an LED conversion from 2012 to 2014, which saw a 61% reduction in consumption per device. Since then, Street Light consumption per device has been steady. The 2021 average consumption per device is used as the average consumption per device in 2022 and 2023.

Streetlight kWh				
Year	Actual	Devices	Average / Device	Normalized
	A	B	C = A / B	D = C * B
2012	4,555,371	5,126	889	4,555,371
2013	3,336,835	5,385	620	3,336,835
2014	1,817,917	5,228	348	1,817,917
2015	1,626,160	5,356	304	1,626,160
2016	1,855,541	5,561	334	1,855,541
2017	1,981,443	5,514	359	1,981,443
2018	1,968,388	5,514	357	1,968,388
2019	2,005,899	5,649	355	2,005,899
2020	2,029,919	5,717	355	2,029,919
2021	2,005,960	5,685	353	2,005,960
2022		5,710	353	2,014,809
2023		5,735	353	2,023,697

Table 27 Street Light Consumption Forecast

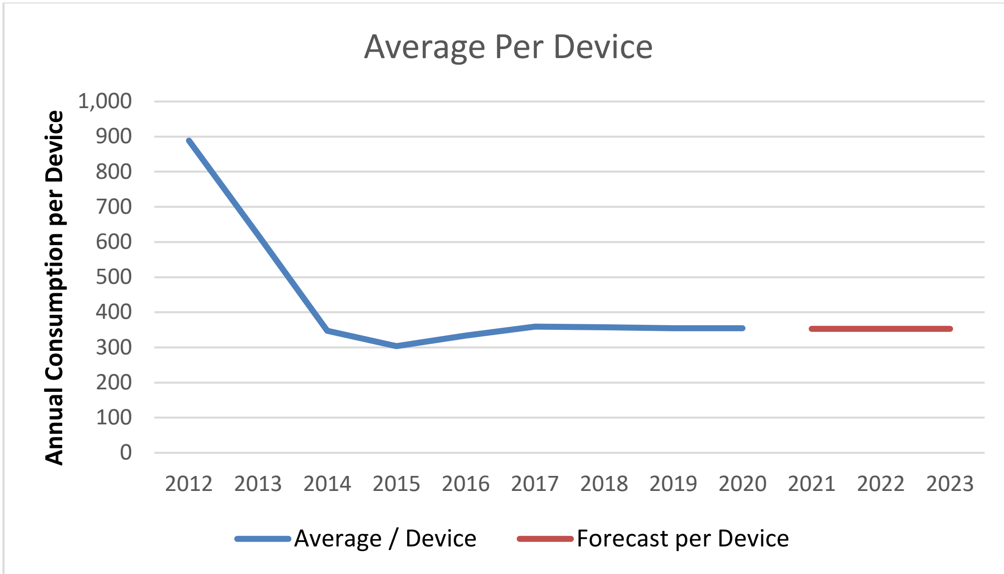

Figure 13 Street Light kWh per Device

This declining consumption is somewhat offset by an increasing device count, as reflected in column D of Table 27 and detailed in the following table. Device count growth has decreased in recent years so a 5-year average of the geometric mean growth rate is used instead of the 10-year average used for each other class.

Street Light Year	Devices	Percent of Prior Year
2012	5,126	
2013	5,385	105.1%
2014	5,228	97.1%
2015	5,356	102.5%
2016	5,561	103.8%
2017	5,514	99.2%
2018	5,514	100.0%
2019	5,649	102.5%
2020	5,717	101.2%
2021	5,685	99.4%
2022	5,710	100.44%
2023	5,735	100.44%

Table 28 Forecasted Street Light Device Count

The 10-year average of the ratio from 2012 to 2021 is applied to normalized consumption to forecast kW demand.

	Street Lights kWh	kW	Ratio
	A	B	C = B / A
2012	4,555,371	10,984	0.002411
2013	3,336,835	8,304	0.002489
2014	1,817,917	5,045	0.002775
2015	1,626,160	4,804	0.002954
2016	1,855,541	5,184	0.002794
2017	1,981,443	5,508	0.002780
2018	1,968,388	5,508	0.002798
2019	2,005,899	5,612	0.002798
2020	2,029,919	5,664	0.002790
2021	2,005,960	5,616	0.002800
	kWh Normalized	kW Normalized	Average Trend
	E	F = E * G	G
2021	2,005,960	5,494	0.002739
2022	2,014,809	5,518	0.002739
2023	2,023,697	5,543	0.002739

Table 29 Forecasted Street Light kW

5.2 USL

The following table summarizes historic and forecast annual energy consumption for Kingston Hydro's USL class.

Year	Actual	USL Connections	Average / Connection	Normal Forecast
	A	B	C = A / B	D = C * B
2012	1,484,560	152	9,767	1,484,560
2013	1,499,820	151	9,944	1,499,820
2014	1,247,036	147	8,512	1,247,036
2015	1,185,727	145	8,182	1,185,727
2016	1,214,411	144	8,424	1,214,411
2017	1,252,378	153	8,194	1,252,378
2018	1,210,653	163	7,446	1,210,653
2019	1,206,871	165	7,303	1,206,871
2020	1,219,174	168	7,250	1,219,174
2021	1,214,646	169	7,187	1,214,646
2022		171	7,187	1,229,039
2023		173	7,187	1,243,602

Table 30 USL Consumption Forecast

Total consumption and consumption per connection have decreased significantly since 2012. Most of this decrease occurred between 2012 and 2018 and the rate of decline has since been decelerating. The average use per connection forecast for 2022 and 223 is based on a 2021 average consumption per connection.

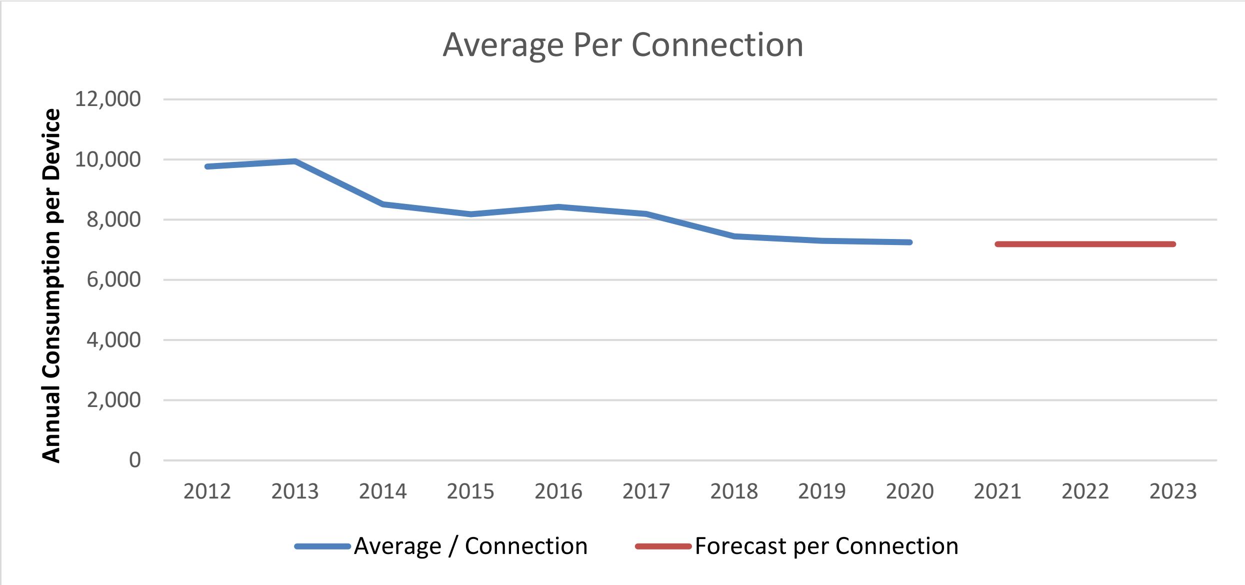

Figure 14 USL kWh per Device

The number of USL connections has increased slightly over that past 10 years and this trend is forecast to continue to 2023.

USL Year	Connections	Percent of Prior Year
2012	152	
2013	151	99.2%
2014	147	97.1%
2015	145	98.9%
2016	144	99.5%
2017	153	106.0%
2018	163	106.4%
2019	165	101.6%
2020	168	101.8%
2021	169	100.5%
2022	171	101.18%
2023	173	101.18%

Table 31 Forecasted USL Connections

6 CDM Adjustment to Load Forecast

On December 20, 2021, the OEB issued a report Conservation and Demand Management Guidelines for Electricity Distributors which provided updated guidance on the role of CDM for rate-regulated LDCs. Based on these guidelines, Elenchus has derived a manual adjustment to the load forecast. CDM programs undertaken as part of the 2021-2024 Conservation and Demand Management framework will put downward pressure on its billing determinants for the General Service < 50 kW, General Service > 50 kW, and Large Use classes.

This CDM adjustment has been made to reflect the impact of CDM activities that are expected to be implemented through from 2021 to 2023. CDM activities have been forecast based on Kingston Hydro's share of consumption within the province and the IESO's 2021-2024 Conservation and Demand Management Framework. The table below provides a summary of the 2021-2024 Framework and Kingston Hydro's allocation of savings.

Program	In year energy savings (GWh)				Kingston Share %	Basis for Kingston %
	2021	2022	2023	2024		
Retrofit	354.3	337.8	217.2	217.2	0.52%	% of provincial kWh
Small Business	40.2	28.5	14.3	15.3	0.52%	% of provincial kWh
Energy Performance Program	21.8	17.3	34.1	35.6	0.52%	% of provincial kWh
Energy Management	16.4	47.3	115.2	115.2	0.52%	% of provincial kWh
Customer Solutions	0	0	325.7	325.7	0.52%	% of provincial kWh
Local Initiatives	52.4	52.4	62.9	62.9	0.00%	
Energy Affordability Program	47.6	50.3	52.3	54	1.04%	% of prov. LIM
First Nations Program	10.3	7.3	7.3	7.3	0.00%	

Table 32 2021-2024 CDM Framework and Kingston Allocation

Kingston Hydro's share of kWh is calculated with OEB Yearbook data as a 5-year average of Kingston Hydro's Total kWh Supplied divided by the sum of Total kWh Supplied of all Ontario LDCs.

Year	Province kWh	Kingston Hydro kWh	Kingston Hydro % Share
2016	135,092,458,977	728,999,941	0.540%
2017	131,507,457,611	709,485,459	0.540%
2018	137,831,974,215	733,582,771	0.532%
2019	135,053,462,090	717,331,271	0.531%
2020	133,510,137,228	681,149,565	0.510%
5-Year Avg.	**135,465,191,178**	**710,687,869**	**0.525%**

Table 33 Kingston Hydro kWh

Kingston Hydro's Energy Affordability Program allocation is based on the number of households in Kingston within the Low-Income Measure (after tax) as a share of all Ontario households, as per Statistics Canada.

Kingston Hydro is not aware of any Local Initiatives programs so no share of that program is attributed to Kingston Hydro.

Total GWh savings figures are then adjusted by the share attributable to Kingston Hydro, yearly weighting factors, and converted to kWh savings. Total CDM savings attributable to Kingston Hydro is provided in the following table.

	In year energy savings (kWh)				Total CDM
	2021	2022	2023	2024	
Weighting Factor	*0.5*	*1.0*	*0.5*	*0.0*	
Retrofit	929,378	1,772,192	569,746	-	3,271,316
Small Business	105,450	149,519	37,511	-	292,480
Energy Performance Program	57,184	90,761	89,449	-	237,394
Energy Management	43,019	248,149	302,186	-	593,354
Customer Solutions	-	-	854,356	-	854,356
Local Initiatives	-	-	-	-	-
Energy Affordability Program	247,754	523,614	272,217	-	1,043,585
First Nations Program	-	-	-	-	-
Total CDM	**1,382,786**	**2,784,235**	**2,125,464**		**6,292,485**

Table 34 Kingston Hydro CDM

Total CDM savings by program are then allocated to Kingston Hydro's rate classes in proportion to historic allocations for those programs. The percentages below reflect the typical share by class used in the LRAMVA workform. The sum of allocations do not necessarily equal 100% because shares for Residential and GS < 50 kW reflect kWh savings and shares for GS > 50 kW and Large Use customers reflect kW savings. The kW share is used for demand-billed classes to better represent the impact of CDM activities on the class's billing determinants.

Program	Residential	GS < 50 kW	GS > 50 kW	Large Use
Allocation %				
Retrofit		10.5%	52.0%	18.7%
Small Business		90.5%	9.5%	
Energy Performance Program		25.0%	25.0%	50.0%
Energy Management		25.0%	25.0%	50.0%
Customer Solutions		10.5%	52.0%	18.7%
Local Initiatives				
Energy Affordability Program	100%			
CDM By Class				
Retrofit		343,721	1,700,608	613,280
Small Business		264,669	27,811	
Energy Performance Program		59,349	59,349	118,697
Energy Management		148,338	148,338	296,677
Customer Solutions		89,768	444,141	160,168
Local Initiatives				
Energy Affordability Program	1,043,585			
Adjustment by Class	**1,043,585**	**905,846**	**2,380,247**	**1,188,822**

Table 35 Proposed CDM Adjustments

Exhibit 3: Customer And Load Forecast

Tab 2 (of 2): Accuracy of Load Forecast and Variance Analysis

VARIANCE ANALYSIS OF LOAD FORECAST

Variance Analysis of Load Forecast

Kingston Hydro's year over year variance analysis for rate class customer/devices; consumption and demand are provided in this section for Kingston Hydro's 2016 OEB approved through to the 2023 Test Year.

The OEB Chapter 2 Appendices Tab "App.2-IB Load_Forecast_Analysis" has been completed and is provided along with this Application in live Excel format. App. 2-IB includes Kingston's 2016-2020 OEB approved, 2016-2021 historicals, and forecast 2020 Bridge and 2023 Test Year customer/devices, consumption, demand, and revenue for each of the rate classifications.

2016 Board Approved vs. 2016 Actual

	Customers/Devices			Volumetric			Volumetric Difference
Rate Class	**2016 Approved**	**2016 Actual**	**Diff.**	**2016 Approved**	**2016 Actual**	**kWh / kW**	
Residential	24,157	24,122	-35	189,260,683	181,338,768	kWh	-7,921,915
GS < 50 kW	2,950	2,956	6	90,006,478	88,607,906	kWh	-1,398,572
GS > 50 kW	337	325	-12	756,499	663,979	kW	-92,520
Large Use	3	3	0	296,770	304,048	kW	7,278
St. Lighting	5,349	5,561	212	4,752	5,184	kW	432
USL	141	144	3	1,221,326	1,214,411	kWh	-6,915
Total	**32,937**	**33,112**	**175**	**280,488,486**	**271,161,084**		

Actual 2016 consumption and demand of Kingston Hydro's most weather-sensitive classes were lower than forecast. Loads were lower despite higher cooling loads in 2016 relative to the 2004 to 2013 average used in the 2016 Load Forecast (249 CDD normal vs. 322 CDD in 2016), which was partially offset by lower heating loads (4,040 HDD normal vs. 3,882 CDD 2016). Variances are partially caused by CDM, which was materially higher than forecast in 2015 and 2016.

Within the Load Forecast used in Kingston Hydro's 2016-2020 Custom IR (EB-2015-0083), General Service 50 to 4,999 kW demand volumes were inflated because consumption and demands in certain months were double counted. The double counting issue related to how consumption and demand figures were summarized in load reports for months in which distribution rates changed. This has been corrected in the historic loads included in the Load Forecast. The inflation of historic loads had the corresponding impact of increasing forecast loads. The extent to which 2016 Approved GS 50 to 4,999 kW demand is higher than 2016 Actuals is largely caused by this overstatement of historic loads.

2016 Actual vs. 2017 Actual

	Customers/Devices			Volumes			Volumetric Difference
Rate Class	**2016 Actual**	**2017 Actual**	**Diff.**	**2016 Actual**	**2017 Actual**	**kWh / kW**	
Residential	24,122	24,232	110	181,338,768	177,290,533	kWh	-4,048,234
GS < 50 kW	2,956	2,946	-10	88,607,906	87,579,437	kWh	-1,028,469
GS > 50 kW	325	320	-5	663,979	649,755	kW	-14,224
Large Use	3	3	0	304,048	292,964	kW	-11,084
St. Lighting	5,561	5,514	-47	5,184	5,508	kW	324
USL	144	153	9	1,214,411	1,252,378	kWh	37,967
Total	**33,112**	**33,168**	**56**	**272,134,295**	**267,070,574**		

Residential and GS < 50 kW consumption declined in 2017 due to a mild summer which reduced cooling load. Cooling degree days in 2017 were less than half than cooling degree days in 2016 (322 CDD in 2016 vs. 160 CDD in 2017).

2017 Actual vs. 2018 Actual

	Customers/Devices			**Volumes**			**Volumetric Difference**
Rate Class	**2017 Actual**	**2018 Actual**	**Diff.**	**2017 Actual**	**2018 Actual**	**kWh / kW**	
Residential	24,232	24,304	72	177,290,533	189,011,882	kWh	11,721,349
GS < 50 kW	2,946	2,933	-13	87,579,437	90,027,071	kWh	2,447,634
GS > 50 kW	320	324	4	649,755	656,918	kW	7,163
Large Use	3	3	0	292,964	302,276	kW	9,313
St. Lighting	5,514	5,514	0	5,508	5,508	kW	0
USL	153	163	10	1,252,378	1,210,653	kWh	-41,725
Total	**33,168**	**33,240**	**72**	**267,070,574**	**281,214,307**		

Residential and GS < 50 kW consumption increased in 2018 due to significantly warmer Summer weather. Cooling degree days in 2018 were twice as high as cooling degree days in 2017 (160 CDD in 2017 vs. 321 CDD in 2018). The winter was also colder in 2018 than 2017 (3,949 HDD in 2017 vs. 4,160 HDD in 2018), which contributed to higher weather-sensitive consumption.

2018 Actual vs. 2019 Actual

	Customers/Devices			Volumes			Volumetric Difference
Rate Class	**2018 Actual**	**2019 Actual**	**Diff.**	**2018 Actual**	**2019 Actual**	**kWh / kW**	
Residential	24,304	24,412	108	189,011,882	186,981,942	kWh	-2,029,940
GS < 50 kW	2,933	2,931	-2	90,027,071	88,540,325	kWh	-1,486,746
GS > 50 kW	324	316	-8	656,918	632,692	kW	-24,226
Large Use	3	3	0	302,276	300,750	kW	-1,526
St. Lighting	5,514	5,649	135	5,508	5,612	kW	104
USL	163	165	3	1,210,653	1,206,871	kWh	-3,782
Total	**33,240**	**33,476**	**236**	**281,214,307**	**277,668,192**		

Following a particularly warm Summer in 2018, Kingston experienced a mild Summer in 2019 in which cooling degree days declined by 38% (321 CDD in 2018 vs. 199 CDD in 2019). This was partially offset by a colder winder (4,160 HDD in 2018 vs. 4,320 HDD in 2019).

2019 Actual vs. 2020 Actual

	Customers/Devices			Volumes			Volumetric Difference
Rate Class	**2019 Actual**	**2020 Actual**	**Diff.**	**2019 Actual**	**2020 Actual**	**kWh / kW**	
Residential	24,412	24,461	49	186,981,942	188,355,001	kWh	1,373,059
GS < 50 kW	2,931	2,923	-8	88,540,325	81,058,179	kWh	-7,482,146
GS > 50 kW	316	318	3	632,692	601,464	kW	-31,227
Large Use	3	3	0	300,750	271,760	kW	-28,990
St. Lighting	5,649	5,717	68	5,612	5,664	kW	52
USL	165	168	3	1,206,871	1,219,174	kWh	12,303
Total	**33,476**	**33,590**	**114**	**277,668,192**	**271,511,243**		

Loads in 2020 were materially impacted by the COVID-19 pandemic. Residential consumption increased as more people working from home and generally spending more time at home in accordance with public health recommendations and mandates. Additionally, cooling load increased from 2019 to 2020 (199 CDD in 2019 vs. 306 CDD in 2020). The increase in Residential consumption due to COVID and weather were offset by a temporary decline in Kingston's student population. The General Service < 50 kW, General Service > 50 kW, and Large Use rate classes reduced loads in 2020 as a result of COVID-19 and corresponding economic impacts.

2020 Actual vs. 2021 Actual

	Customers/Devices			Volumes			Volumetric Difference
Rate Class	**2020 Actual**	**2021 Actual**	**Diff.**	**2020 Actual**	**2021 Actual**	**kWh / kW**	
Residential	24,461	24,606	146	188,355,001	187,264,602	kWh	-1,090,399
GS < 50 kW	2,923	2,946	23	81,058,179	82,498,024	kWh	1,439,845
GS > 50 kW	318	310	-8	601,464	566,156	kW	-35,308
Large Use	3	3	0	271,760	273,283	kW	1,522
St. Lighting	5,717	5,685	-32	5,664	5,616	kW	-48
USL	168	169	1	1,219,174	1,214,646	kWh	-4,528
Total	**33,590**	**33,719**	**129**	**271,511,243**	**271,822,326**		

Variances in 2021 loads relative to 2020 generally reflect a partial reversal of 2020 COVID-related impacts.

2021 Actual vs. 2022 Bridge Year

	Customers/Devices			Volumes			Volumetric Difference
Rate Class	**2021 Actual**	**2022 Bridge**	**Diff.**	**2021 Actual**	**2022 Bridge**	**kWh / kW**	
Residential	24,606	24,768	162	187,264,602	188,476,690	kWh	1,212,088
GS < 50 kW	2,946	2,919	-27	82,498,024	85,766,948	kWh	3,268,924
GS > 50 kW	310	305	-5	566,156	600,264	kW	34,107
Large Use	3	3	0	273,283	291,211	kW	17,928
St. Lighting	5,685	5,710	25	5,616	5,518	kW	-98
USL	169	171	2	1,214,646	1,229,039	kWh	14,393
Total	**33,719**	**33,877**	**158**	**271,822,326**	**276,369,669**		

The 2022 Bridge Year forecast includes a continuation of the return to normal loads as he impacts of COVID-19 ease. Consumption variances of the weather-sensitive classes reflect changes from 2021 actual weather to “normal weather”, which is 2012-2021 average weather. This change results in a 7.4% increase in heating loads (3,740 HDD in 2021 vs. 4,015 HDD normal) and 11.2% decrease in cooling loads (272 CDD in 2021 vs. 241 CDD normal).

2022 Bridge Year vs. 2023 Test Year

	Customers/Devices			Volumes			Volumetric Difference
Rate Class	**2022 Bridge**	**2023 Test**	**Diff.**	**2022 Bridge**	**2023 Test**	**kWh / kW**	
Residential	24,768	24,932	163	188,476,690	186,841,333	kWh	-1,635,357
GS < 50 kW	2,919	2,893	-26	85,766,948	88,231,334	kWh	2,464,386
GS > 50 kW	305	300	-5	600,264	611,542	kW	11,278
Large Use	3	3	0	291,211	295,837	kW	4,626
St. Lighting	5,710	5,735	25	5,518	5,543	kW	24
USL	171	173	2	1,229,039	1,243,602	kWh	14,563
Total	**33,877**	**34,036**	**159**	**276,369,669**	**277,229,191**		

Changes from the 2022 Bridge Year to 2023 Test Year reflect the results of the Load Forecast model. The impacts of COVID are assumed to continue to subside and loads are forecast to increase as the economy rebounds. Additionally, some forecast load growth from 2022 to 2023 is caused by the end of persistence for certain CDM programs.