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Green Mountain Power
FY 2025 Sales Forecast Report

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TABLE OF CONTENTS

List of Figures

List of Tables

1 2025 FISCAL YEAR BUDGET FORECAST SUMMARY

This report presents the FY2025 Forecast. The report summarizes forecast results, discusses methodology and assumptions, and examines the technologies that are reshaping load and sales growth projections.

Separate forecasts are derived for four customer classes – Residential, Small Commercial and Industrial, Large Commercial and Industrial, and Other sales; Other is primarily street lighting. Forecasts are derived from a set of linear regression models estimated for average use and customers in the residential class, and total sales in the Small C&I, Large C&I, and other loads. Monthly models are estimated with billed sales and customer data over the period January 2011 to December 2023. While the focus is on FY 2025 (October 2024 to September 2025), the forecast includes expected sales, customers, and revenues through 2034. Revenues are generated at the tariff level using a set of rate class and billing determinant models that translate the revenue class sales and customer forecast to billing determinants that are then priced out at current rates.

Where sales have been flat to declining historically, we now expect relatively strong sales growth driven primarily by state electrification efforts (primarily through heat pump adoption), and electric vehicle market growth. Continued solar adoption mitigates some of the impact from increasing heat pump and EV adoption. There is a significant drop in 2027 industrial sales as a large industrial customer is scheduled to procure their own power requirements beginning in that year. Table 1 shows the fiscal-year sales forecast.

TABLE 1: FISCAL YEAR SALES FORECAST (MWH)

	Residential	Chg	Small C&I	Chg	Large C&I	Chg	Other	Chg	Total	Chg
2024	1,593,779		1,453,041		1,044,723		3,681		4,095,223	
2025	1,617,317	1.5%	1,458,525	0.4%	1,050,578	0.6%	3,673	-0.2%	4,130,093	0.9%
2026	1,642,563	1.6%	1,466,172	0.5%	1,053,396	0.3%	3,673	0.0%	4,165,804	0.9%
2027	1,676,667	2.1%	1,476,951	0.7%	721,724	-31.5%	3,673	0.0%	3,879,015	-6.9%
2028	1,718,117	2.5%	1,489,548	0.9%	722,999	0.2%	3,673	0.0%	3,934,337	1.4%
2029	1,766,452	2.8%	1,503,244	0.9%	723,757	0.1%	3,673	0.0%	3,997,127	1.6%
2030	1,811,792	2.6%	1,513,071	0.7%	723,897	0.0%	3,673	0.0%	4,052,433	1.4%
2031	1,866,195	3.0%	1,522,599	0.6%	722,717	-0.2%	3,673	0.0%	4,115,184	1.5%
2032	1,924,814	3.1%	1,534,772	0.8%	721,148	-0.2%	3,673	0.0%	4,184,407	1.7%
2033	1,986,621	3.2%	1,549,047	0.9%	719,810	-0.2%	3,673	0.0%	4,259,152	1.8%
2034	2,060,087	3.7%	1,566,376	1.1%	718,555	-0.2%	3,673	0.0%	4,348,692	2.1%
24-29		2.1%		0.7%		-6.1%		0.0%		-0.4%
29-34		3.1%		0.8%		-0.1%		0.0%		1.7%

Revenues are derived by "pricing out" sales at the rate schedule level. Revenue class sales and customer forecasts are allocated to rate schedules and further into billing determinants (e.g., on and off-peak sales, billing demand, demand blocks) based on a set of rate class share and determinant models generated from historical billing data. Revenues are then calculated by pricing the billing determinants at the current tariff rates (*Revenues = Billing Determinants * Rates*). Table 2 shows the revenue forecast rolled back up to revenue classes.

TABLE 2: FISCAL YEAR REVENUE FORECAST ($)

	Residential	Chg	Small C&I	Chg	Large C&I	Chg	Other	Chg	Total	Chg
2024	346,589,160		272,306,327		111,487,726		2,894,699		733,277,912	
2025	350,574,437	1.1%	273,585,184	0.5%	113,139,417	1.5%	2,886,737	-0.3%	740,185,775	0.9%
2026	354,902,579	1.2%	275,109,882	0.6%	114,170,404	0.9%	2,886,737	0.0%	747,069,602	0.9%
2027	360,719,661	1.6%	277,208,148	0.8%	96,887,099	-15.1%	2,886,737	0.0%	737,701,645	-1.3%
2028	367,853,524	2.0%	279,516,325	0.8%	96,970,280	0.1%	2,886,737	0.0%	747,226,866	1.3%
2029	375,869,593	2.2%	282,287,053	1.0%	97,159,592	0.2%	2,886,737	0.0%	758,202,975	1.5%
2030	383,205,593	2.0%	284,243,894	0.7%	97,178,192	0.0%	2,886,737	0.0%	767,514,416	1.2%
2031	391,969,375	2.3%	286,136,020	0.7%	97,019,991	-0.2%	2,886,737	0.0%	778,012,124	1.4%
2032	401,393,648	2.4%	288,353,778	0.8%	96,722,137	-0.3%	2,886,737	0.0%	789,356,300	1.5%
2033	410,918,335	2.4%	291,209,710	1.0%	96,630,157	-0.1%	2,886,737	0.0%	801,644,939	1.6%
2034	422,590,808	2.8%	294,473,350	1.1%	96,461,868	-0.2%	2,886,737	0.0%	816,412,763	1.8%
24-29		1.6%		0.7%		-2.5%		-0.1%		0.7%
29-34		2.4%		0.8%		-0.1%		0.0%		1.5%

1.1 FORECAST APPROACH

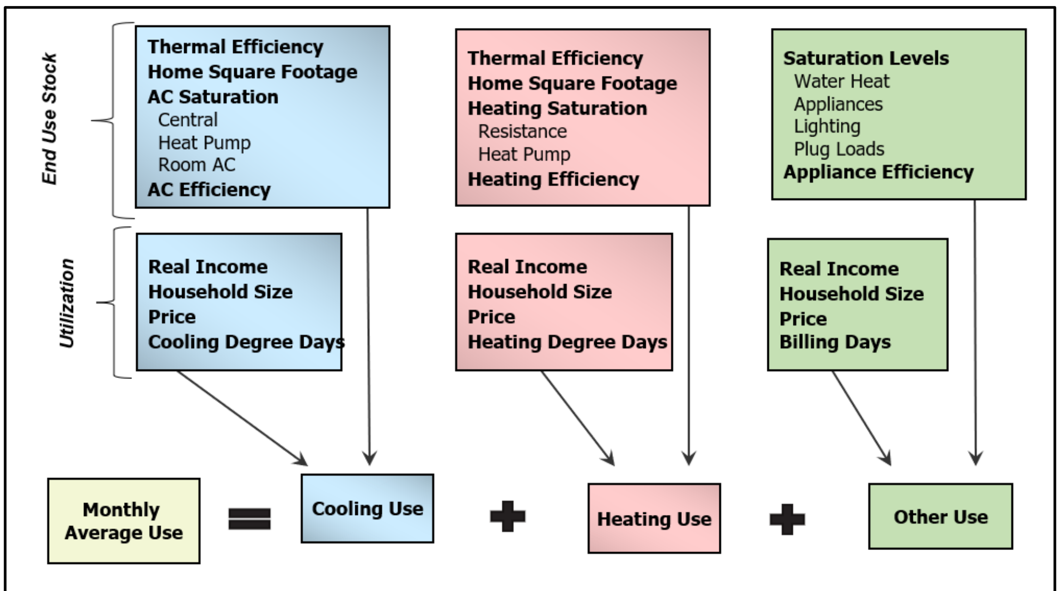
Baseline Sale Forecast. The process starts with estimating *baseline* sales and customers for each of the primary customer classes. The baseline forecast represents expected sales before adjustments for additional solar, heat pumps, and electric vehicles. Baseline models are estimated using linear regression models based on historical billed sales and customer data. The forecast is derived from a set of monthly customer class regression models that relate customer average use (residential), customers (residential) and sales (Small and Large C&I) to the economic, weather, and end-use energy intensities driving demand. Baseline forecast drivers include the number of households, employment, real income, GDP, weather, and end-use intensity trends (kWh per households in the residential sector and kWh per sqft in the commercial sector) that capture end-use ownership and efficiency trends. The end-use intensity trends also incorporate the impact of state energy efficiency programs. Models are estimated over the period January 2011 to December 2023.

Adjusted Forecast. The baseline forecast is adjusted for projected behind-the-meter (BTM) solar, heat pumps, and C&I electrification projects and in the longer-term electric vehicles. Most of the adjustments impact residential customer class. Solar has little impact on commercial billed sales and revenues as most of the commercial solar generation is treated as a power purchase cost. Heat pump and EV charging sales primarily impact the residential sector and are expected to have a significant impact on future residential sales and revenues.

1.2 RESIDENTIAL BASELINE FORECAST

Residential average use and commercial sales are modeled using a Statistically Adjusted End-Use (SAE) modeling framework. This modeling framework integrates end-use saturation and efficiency trends that capture long-term end-use energy trends with monthly weather, number of days, and economic drivers that capture expected utilization of the end-use stock. End-uses are mapped to heating (XHeat), cooling (XCool), and other uses (XOther). Figure 1 shows the residential average use model.

FIGURE 1: RESIDENTIAL AVERAGE USE MODEL



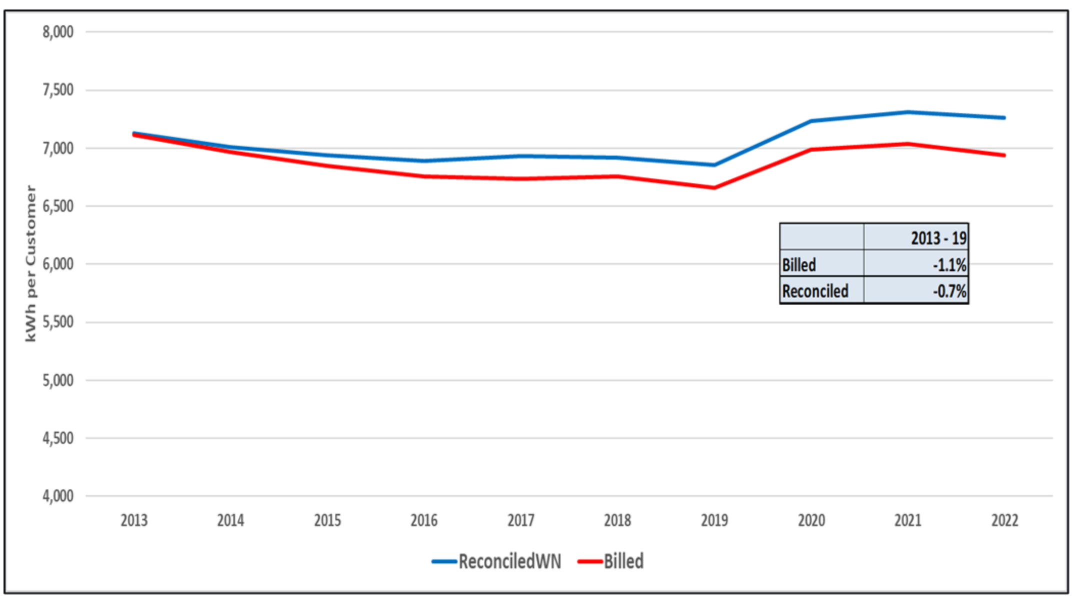
$$AvgUse_m = a + b_c \times XCool_m + b_h \times XHeat_m + b_o \times XOther_m + b_e \times EE_m$$

Linear regression is used to estimate the model coefficients – b_c, b_h, and b_0. Forecasts of cooling, heating, and base usage then drive the monthly average use forecast. The model is estimated with monthly billed average use data that is reconstituted (added back in) for BTM solar data from January 2011 to December 2023.

The initial model includes an energy efficiency variable (EE) that when combined with the estimated coefficient (b_e) measures the EE not captured in the structured model variables. The final model drops the EE variable as the end-use intensities are adjusted to account for the *missing* EE program savings.

Sales and Customer Trends. Figure 2 shows weather-normalized average use for both billed and reconstituted sales. Reconstituted sales include customer solar generation for their own use. Residential solar systems are meeting part of their own energy requirements with what is not used directly pushed back into the power grid. Own-use generation is added back to billed sales to generate a historical data series that reflects what the average household uses and not just what it purchases from GMP. Ultimately, revenues are based on billed sales which are calculated by subtracting out historical and forecasted own-use solar generation. Figure 2 shows historical billed and reconstituted average use (weather normalized).

FIGURE 2: RESIDENTIAL WEATHER NORMAL AVERAGE USE



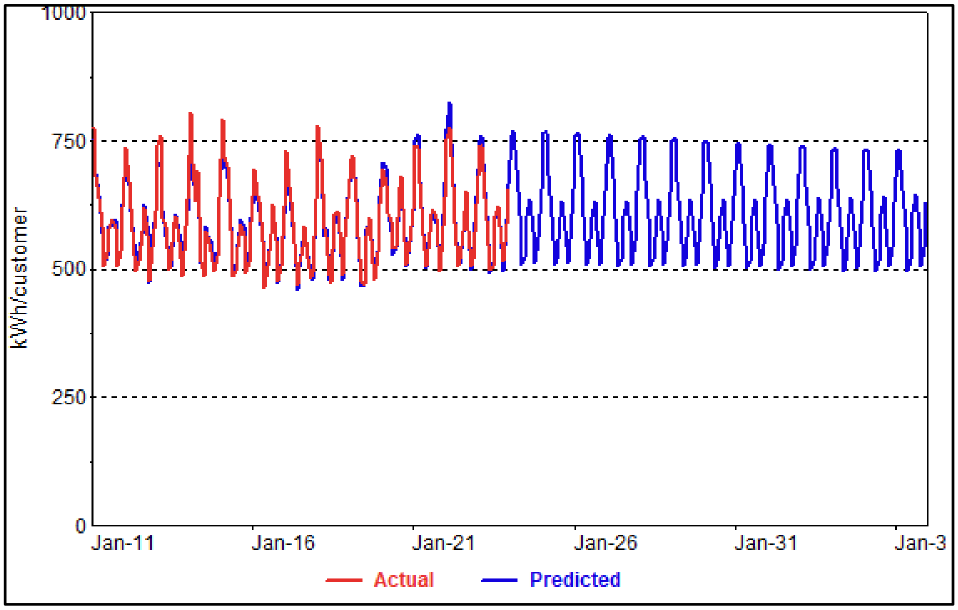
The gap between billed average use and reconstituted average use is the estimated amount of customer own generation on a per customer basis. On average residential customers are generating over five percent of their electricity use.

Between 2013 and 2019, billed average use declined 1.1% per year while reconstituted average use has declined 0.7% per year. Solar has accounted for 0.4% of the average annual decline in billed customer use. The long-term trend was upended with COVID-19 as work and school moved to the home. In 2020, average billed use jumped 5% to nearly 7,000 kWh, and reconstituted use to 7,300 kWh; reconstituted average use is higher than it was in 2013. Sales are still elevated largely as a result of people continuing to work from home. Another contributing factor is the large number of heat pumps that have been recently installed as part of the state's electrification effort.

Customer growth has been relatively consistent over the last ten years with GMP adding on average 600 new customers per year for 0.3% average annual growth. There was a jump of 1,800 in customers in 2021, but this followed a year (2020) in which GMP recorded just 7 new customers. Given state household projections, we are forecasting 0.2% average annual customer growth.

Baseline Average Use Forecast. The baseline model expresses reconstituted average use as function of cooling use (XCool), heating use (XHeat), and other non-weather sensitive use (XOther). The model is estimated using historical billed sales, customers, and own-use solar generation from January 2011 through December 2023. The same model specification has been used for nearly ten years and has proven to be extremely stable as measured by model fit statistics and out of sample performance. The model Adjusted R-Squared is 0.96 with a mean absolute error of 2.0%. Model coefficients and statistics are included in Appendix A. Figure 3 shows actual and predicted baseline average use.

FIGURE 3: RESIDENTIAL BASELINE AVERAGE USE MODEL (KWH)

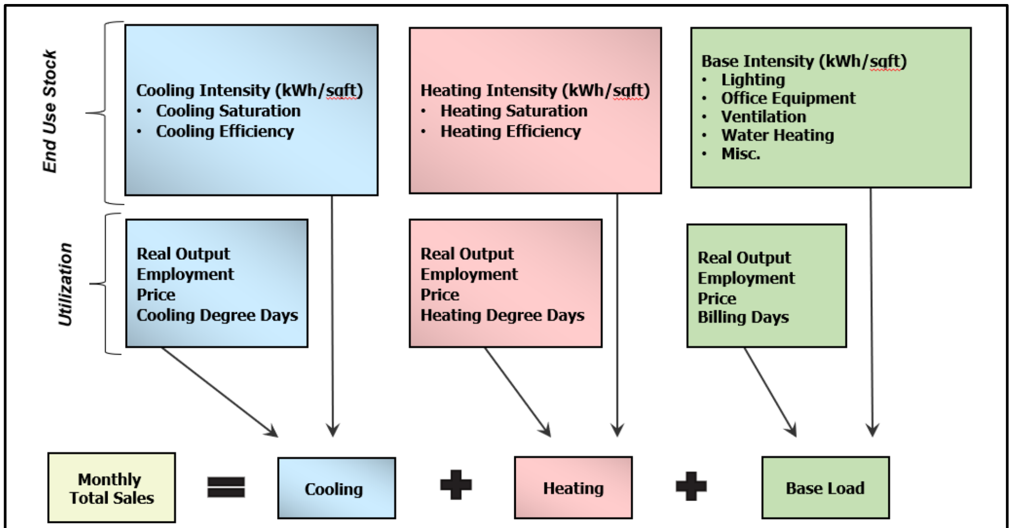


Average use jumps up in 2020 and stays elevated through 2023. We expect baseline loads to stay at this level given the new "work at home" normal and underlying sales gains due to recent heat pump adoption.

1.3 COMMERCIAL BASELINE FORECAST

Separate sales forecast models are estimated for the Small and Large commercial customer classes. Small commercial sales are also estimated using an SAE model where sales are specified as a function of commercial heating (XHeat), cooling (XCool), and base-use energy requirements (XOther). Figure 4 shows the commercial SAE model.

FIGURE 4: COMMERCIAL SALES MODEL



$$MWh_m = \quad a + b_c \times XCool_m + b_h \times XHeat_m + b_o \times XOther_m + b_e \times EE_m$$

Linear regression is used to estimate the model coefficients – b_c, b_h, and b_0. Forecasts of cooling, heating, and base load requirements then drive the monthly sales forecast. The model is estimated with monthly billed sales data from January 2011 to December 2023. The initial model also includes an energy efficiency variable (EE) that when combined with the estimated coefficient (b_e) measures the EE not captured in the structured model variables. The final model drops the EE variable as the end-use intensities are adjusted to account for the additional EE program savings.

Large C&I includes GMP's largest commercial and industrial customers; there are 75 Large C&I customers. The Large C&I sales forecast is based on a generalized econometric model that relates monthly consumption to economic activity, weather, and seasonal use captured by monthly binary variables. The model is estimated over the period January 2015 through December 2023.

The SAE commercial model, like the residential model, works well to explain historical sales and results in a reasonable forecast consistent with these trends. The small C&I model adjusted r-squared is 0.90 with a mean absolute error of 1.9%. The large C&I model fit is much weaker with an adjusted r-squared of 0.68 with a mean absolute error of 4.8%. The large C&I model fit is not as strong as there is significant more month to month variation reflecting the large mix of very different types of business activity. The adjusted r-squared and estimated model coefficient and statistics are included in Appendix A. Figure 5 and Figure 6 show the actual and predicted sales.

FIGURE 5: ACTUAL AND PREDICTED SMALL COMMERCIAL SALES (MWH)

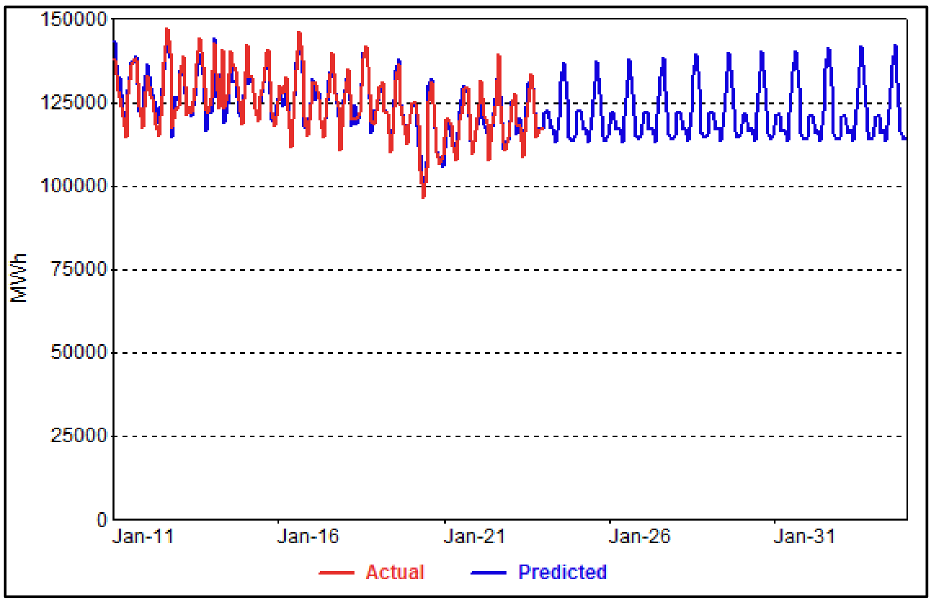
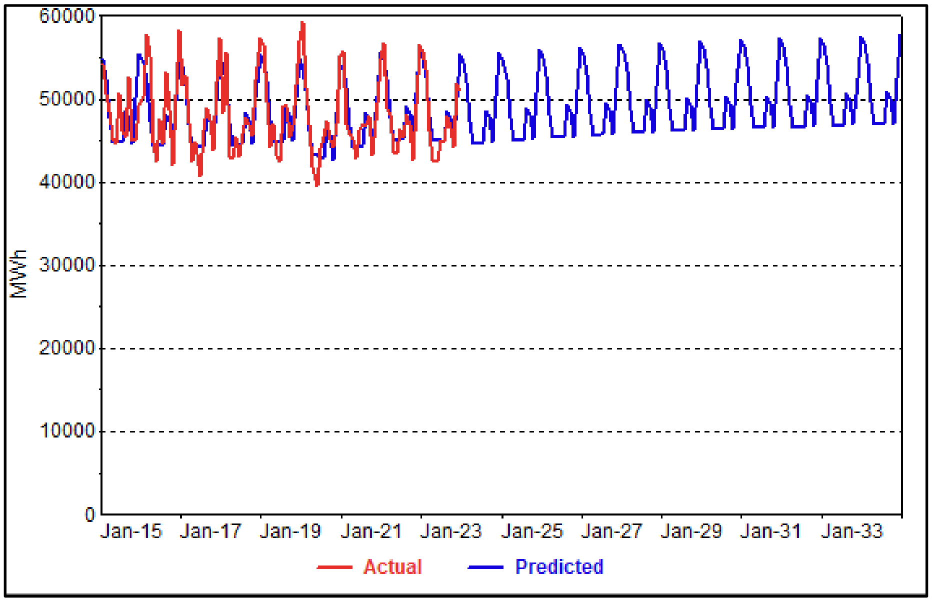


FIGURE 6: LARGE C&I ACTUAL AND PREDICTED SALES (MWH)



Large C&I forecast is adjusted for large customer load additions and losses that are not captured in the model based on historical sales. As part of the forecast process, we review customer-specific activity with GMP customer account representatives. Some customers are expected to add load through onsite expansion activity while others are closing or reducing operations. In the 2025 forecast, the net impact is a loss of 7,000 MWh per year. Also, in 2027 GMP loses a major customer, who is becoming a self-managed utility.

1.4 FORECAST DRIVERS

Several factors drive the sales and customer forecast through the estimated sales and customer models. These drivers include:

- Moody's Analytics January 2024 Vermont economic forecast.
- End-use saturation, efficiency and resulting energy intensities (kWh per end-use)
- VEIC current energy efficiency savings projections
- GMP's heat pump and EV forecast filed in their recent IRP.
- GMP's updated solar capacity forecast.

- GMP adjustments for C&I Tier 3 electrification efforts and large load adjustments that would not be reflected in the historical billing data.
- Expected HDD and CDD based on historical trends.

1.4.1 Economic Forecast

The FY25 forecast is based on Moody's January 2024 state economic projections. The primary economic drivers include the number of state households, state real personal income, employment, and real state economic output (GDP). Table 3 shows historical and projected economic outlook.

TABLE 3: STATE ECONOMIC PROJECTIONS

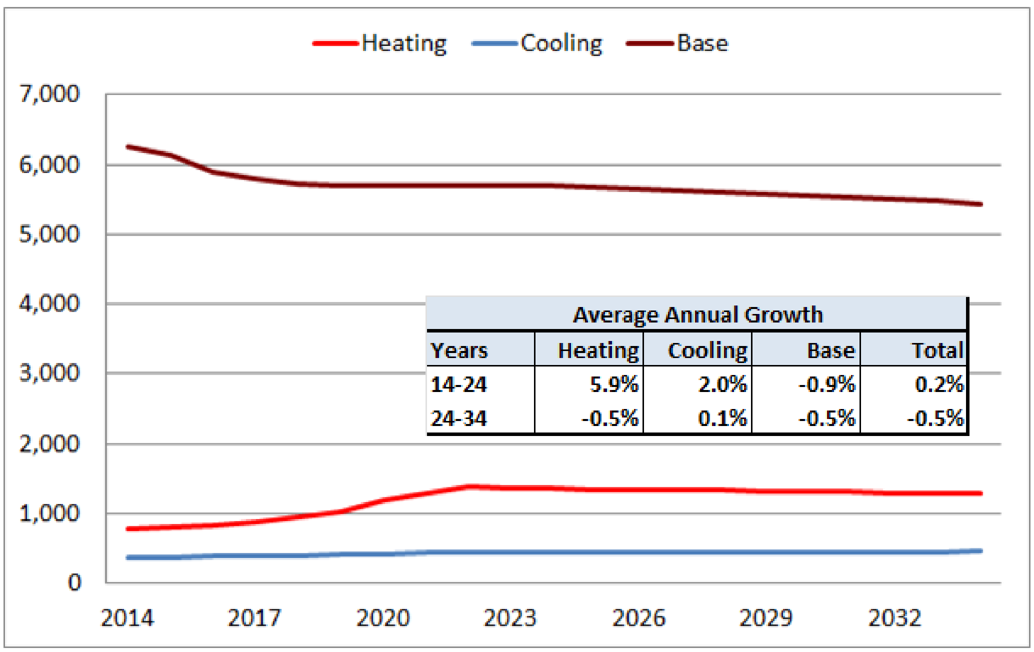
Year	Households (Thou)	Chg	RPI (Mil $)	Chg	GDP (Mil $)	Chg	Emp (Thou)	Chg
2014	270.6		30,558		31,754		309.6	
2015	272.9	0.8%	31,425	2.8%	32,117	1.1%	312.1	0.8%
2016	275.1	0.8%	31,632	0.7%	32,353	0.7%	313.3	0.4%
2017	276.6	0.5%	31,921	0.9%	32,594	0.7%	315.0	0.5%
2018	277.4	0.3%	32,513	1.9%	32,838	0.7%	316.1	0.3%
2019	276.0	-0.5%	33,619	3.4%	33,081	0.7%	315.4	-0.2%
2020	271.2	-1.8%	35,795	6.5%	32,422	-2.0%	289.2	-8.3%
2021	270.1	-0.4%	36,011	0.6%	33,821	4.3%	294.4	1.8%
2022	271.2	0.4%	35,194	-2.3%	34,568	2.2%	303.4	3.1%
2023	271.3	0.0%	35,860	1.9%	34,984	1.2%	307.0	1.2%
2024	272.1	0.3%	36,539	1.9%	35,414	1.2%	308.8	0.6%
2025	273.2	0.4%	37,144	1.7%	35,844	1.2%	309.7	0.3%
2026	274.1	0.3%	37,830	1.8%	36,413	1.6%	310.0	0.1%
2027	274.8	0.2%	38,572	2.0%	37,053	1.8%	309.9	0.0%
2028	275.4	0.2%	39,353	2.0%	37,742	1.9%	309.8	0.0%
2029	276.0	0.2%	40,102	1.9%	38,411	1.8%	309.9	0.0%
2030	276.5	0.2%	40,804	1.8%	39,030	1.6%	309.8	0.0%
2031	276.9	0.2%	41,466	1.6%	39,617	1.5%	309.7	0.0%
2032	277.3	0.1%	42,127	1.6%	40,220	1.5%	309.6	0.0%
2033	277.5	0.1%	42,801	1.6%	40,857	1.6%	309.7	0.0%
2034	277.5	0.0%	43,461	1.5%	41,507	1.6%	309.7	0.0%
14-24		0.1%		1.8%		1.1%		0.0%
24-34		0.2%		1.8%		1.6%		0.0%

The long-term outlook is for slow household and employment growth, but reasonable household income and real state output. Employment saw a steep drop in 2020 and while recovering through 2023, it never gets back to pre-COVID levels.

1.4.2 Energy Efficiency Impact

While slowing, energy efficiency improvements still have a significant impact. Efficiency gains are captured through the model heating, cooling, and other use end-use intensity projection. End-use intensities are derived for ten residential and nine small C&I end-uses. End-use intensities reflect both increase in appliance ownership (saturation) and change in stock efficiency. In the residential sector, intensities are measured on a kWh per household basis and in the small C&I sector on a kWh per square-foot basis. End-use intensities are based on EIA 2022 Annual Energy Outlook for New England. Residential end-use saturations are calibrated to Vermont-specific end-use saturations where this data is available. This year the starting saturation and end-use energy was calibrated using the recent statewide residential saturation study and housing and building simulation output from the National Energy Renewable Laboratory (NREL). This is shown in Figure 7.

FIGURE 7: RESIDENTIAL END-USE INDICES (KWH PER HOUSEHOLD)



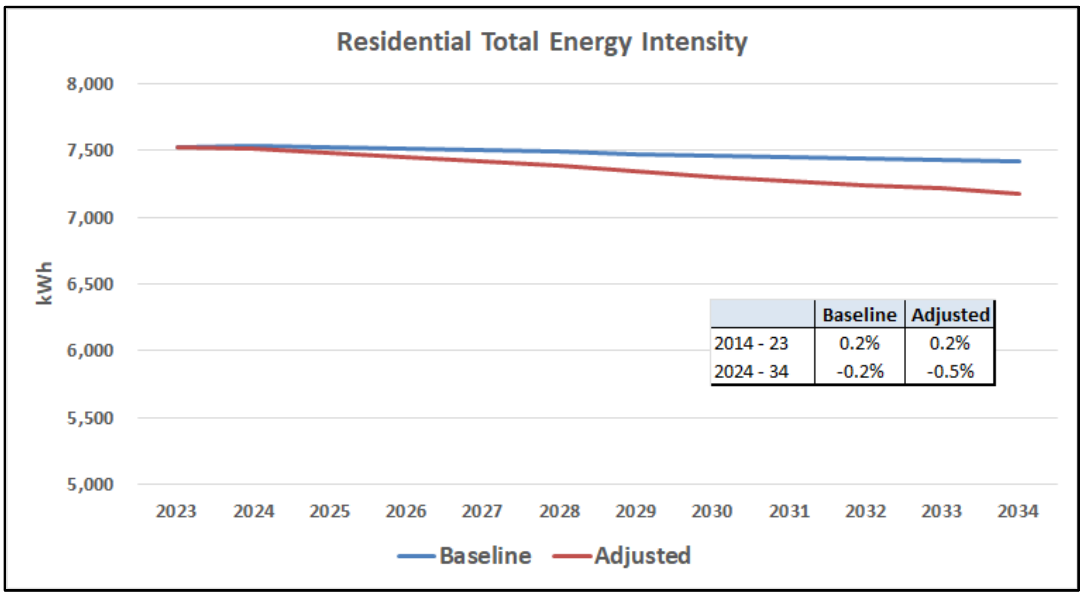
Average Annual Growth				
Years	Heating	Cooling	Base	Total
14-24	5.9%	2.0%	-0.9%	0.2%
24-34	-0.5%	0.1%	-0.5%	-0.5%

Heating intensity ramps up significantly between 2019 and 2023. For the forecast the heating intensity declines as heat pump saturation is held constant. Heat pumps are held constant as we assume that all heat pump purchases will be through the incentive program. Future heat pump saturation and associated load growth are treated separately and then added to the baseline forecast. Heating decline reflecting continued decline in resistant heat saturation and improvements in furnace fan efficiency.

Cooling intensity increases through the forecast period at 0.1% per year. Cooling intensity change is significantly slower than the prior ten years as cooling end-use saturation slows and unit efficiency continues to improve. Average intensity across the other use declines on average 0.5% per year reflecting continued end-use and housing shell efficiency improvements.

End-use intensities are also adjusted for state energy efficiency programs. Most of the savings are captured in the starting EIA end-use intensity projections as EIA builds regional (New England) efficiency savings estimates into the estimated end-use sales and resulting end-use intensities. A simple model is used to isolate the EE savings that are not captured in the initial SAE model. The model indicates that GMP is doing 30% more in efficiency savings than New England. The end-use intensity drivers are adjusted by 30% to account for state EE impacts. Figure 8 compares total intensity against the EE savings adjusted intensities.

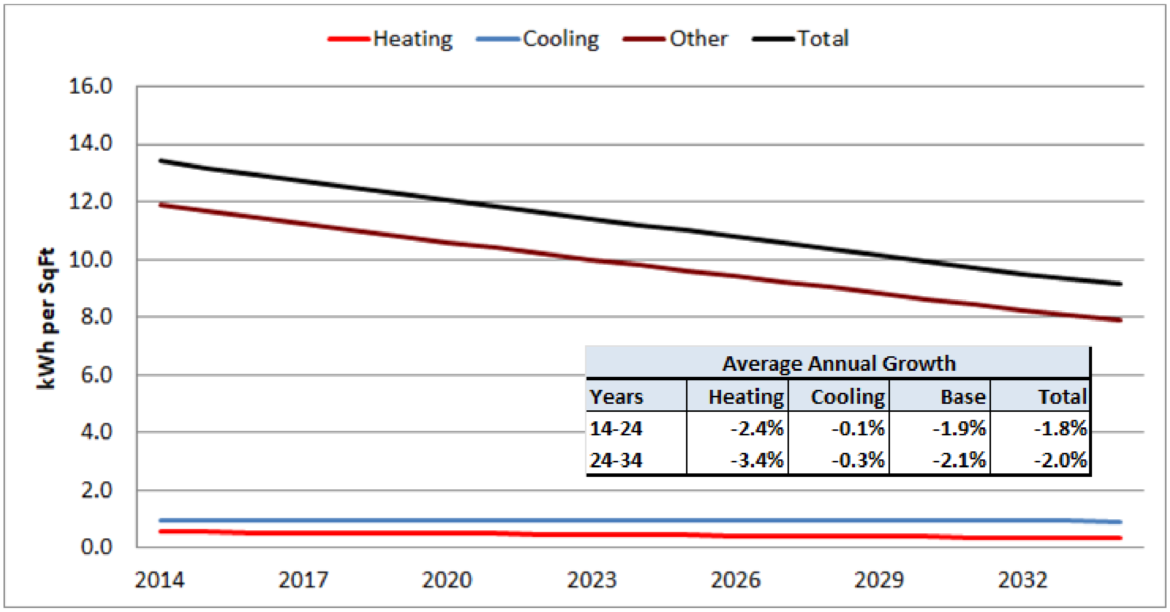
FIGURE 8: RESIDENTIAL BASELINE AND EE ADJUSTED INTENSITY COMPARISON



The EE program adjusted total intensity declines 0.5% per year compared with the initial EIA projection of 0.2% annual decline. The adjusted intensity is in line with the intensity trend before the recent jump in heat pump sales.

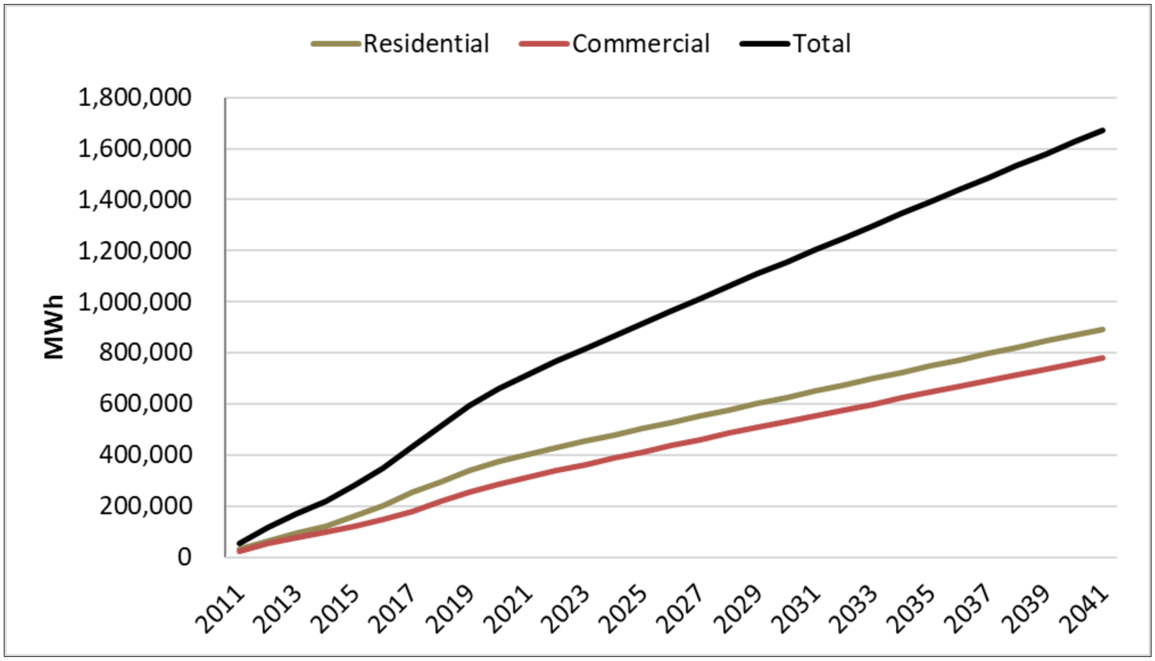
Figure 9 shows commercial heating, cooling, and other use intensity trends. Intensities are expressed on a kWh per square foot basis. Heating and cooling are relatively small in New England; most of the heating and cooling related loads show up in the ventilation end-use which is part of the base intensity. Ventilation and lighting are two of the largest commercial end-uses; EIA expects significant efficiency gains in these end-uses. Figure 9 shows historical and forecasted primary end-use intensity trends.

FIGURE 9: SMALL C&I END-USE INTENSITIES (KWH/SQFT)



The long-term decline in commercial intensity is the primary reason there has been little to no growth in commercial sales. The intensity projection also reflects the expected impact of future EE savings which contribute roughly 0.7% of the annual intensity decline. EE savings projections are based on the current Demand Resource Plan (DRP). Figure 10 shows cumulative historical savings and projected savings.

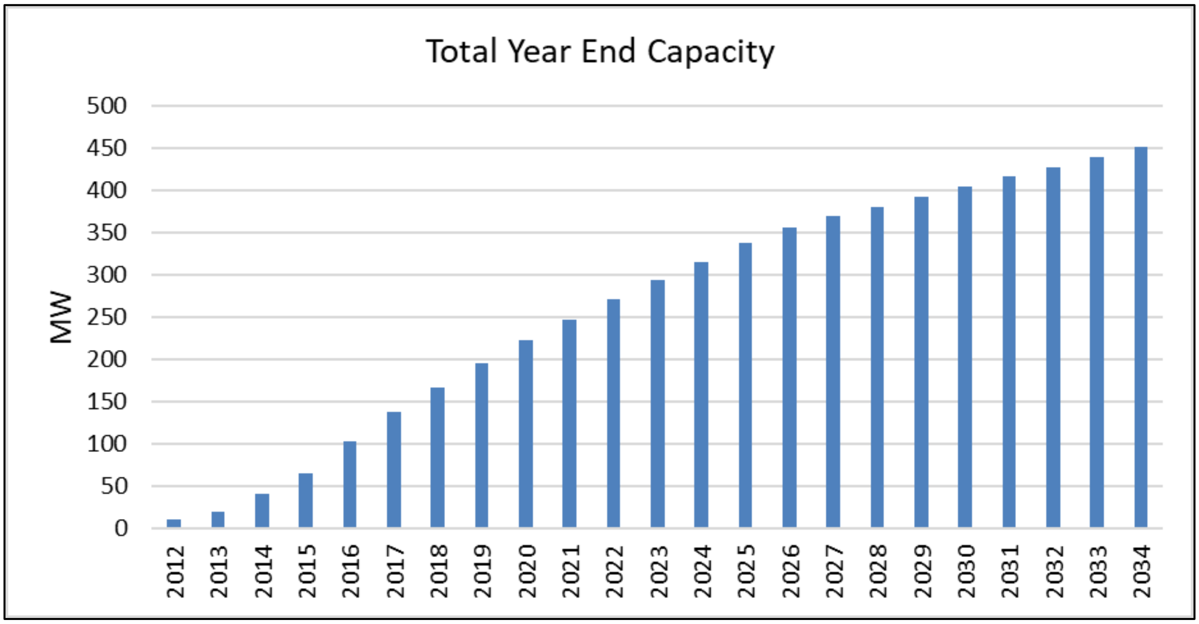
FIGURE 10: CUMULATIVE STATE EE SAVINGS



1.4.3 Behind the Meter Solar

Solar Capacity Forecast. Behind the meter (BTM) solar capacity forecast is developed by GMP based on historical trends and the interconnection application queue. As of December 2024, an estimated 294 MW of BTM solar has been installed; this includes traditional, customer owned or leased roof-top systems, and larger community/group-based systems. GMP expects BTM solar to continue to increase, adding 21 MW of capacity in 2024 and approximately 23 MW in 2025. Adoption slows to 19 MW of new capacity in 2026, followed by 13 MW of new capacity for the years 2027 through 2034. Figure 11 shows the year end capacity forecast.

FIGURE 11: YEAR-YEAR SOLAR CAPACITY FORECAST



Capacity Class Allocation. The capacity forecast is allocated to the residential, small C&I, and large C&I classes based on the previous 12 months of billed solar generation data. Table 4 shows the allocation factors.

TABLE 4: CAPACITY ALLOCATION FACTORS

Class	Previous 12 Mnth Generation (MWh)	Share of Total
Residential	122,921	34.6%
Commerical	195,911	55.1%
Industrial	36,524	10.3%
Total	355,356	

Solar Generation. Solar output is derived by applying monthly solar load factors to the capacity forecast; load factors are based on typical solar generation patterns developed by GMP. Table 5 shows the solar generation load factors.

TABLE 5: SOLAR LOAD FACTORS

Month	Load Factor
Jan	7.7%
Feb	10.8%
Mar	14.1%
Apr	18.8%
May	19.5%
Jun	20.6%
Jul	20.3%
Aug	19.5%
Sep	15.7%
Oct	12.5%
Nov	8.4%
Dec	5.7%

Solar Own-Use. Solar generation is either consumed onsite (*own-use*) or returned to the connected power-grid (*excess*); own-use reduces billed revenues, while excess is treated as power purchase cost. Solar billing data are used to determine the own-use and excess allocations. The split between own-use and excess varies by revenue class and month; own-use share is typically smaller in the summer months with a larger percentage of the generation sent to the grid. Figure 12 shows total, own use, and excess solar generation. Excess is significantly higher than own use. One reason is that most of small C&I solar generation are purchases from large offsite solar installations that do not directly impact the customer's usage.

FIGURE 12: BTM SOLAR GENERATION

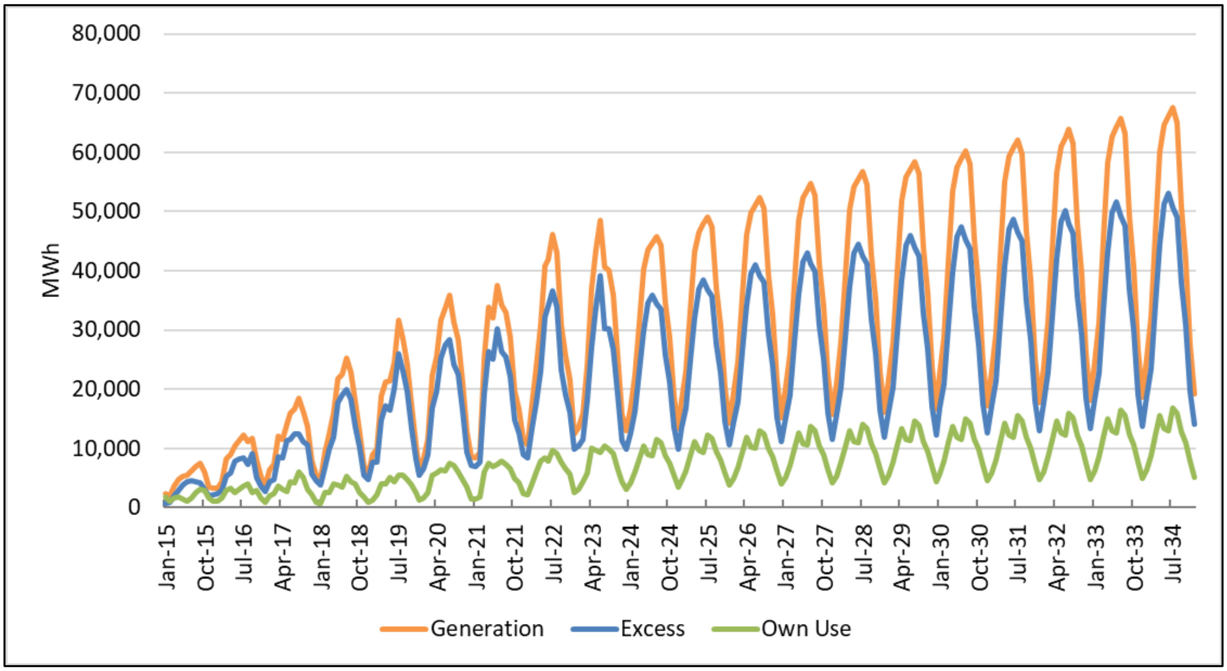


Table 6 shows the forecasted capacity and solar generation by rate case.

TABLE 6: SOLAR GENERATION (HISTORICAL & NEW CAPACITY)

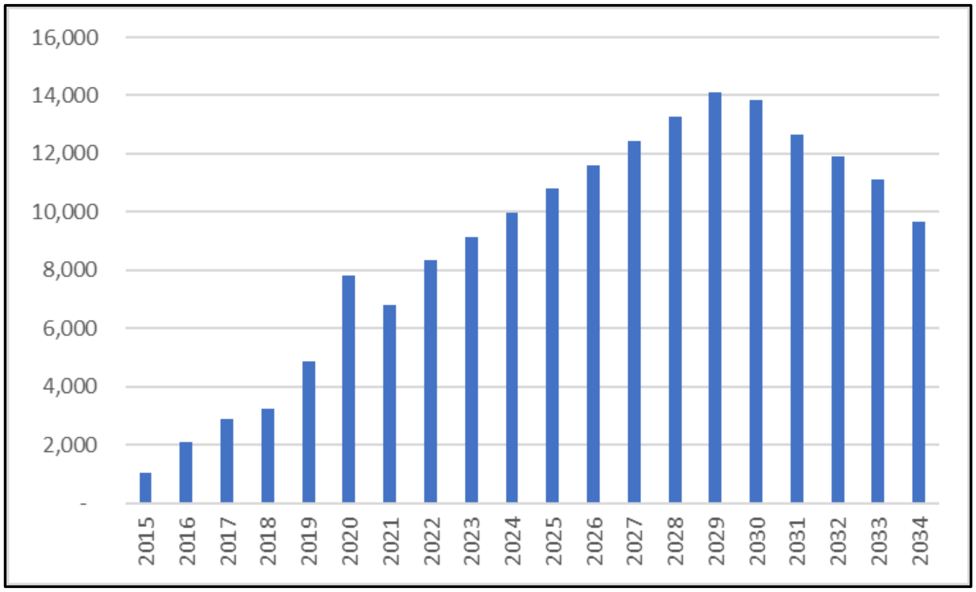
Year	Year End Capacity (MW)	Total MWh Generation	Total MWh Excess	Total MWh Own Use	Residential MWh Generation	Residential MWh Excess	Residential MWh Own Use	Commercial & Industrial MWh Generation	Commercial & Industrial MWh Excess	Commercial & Industrial MWh Own Use
2024	314.6	384,731	290,319	94,413	133,082	45,928	87,154	251,649	244,391	7,258
2025	337.7	411,184	310,303	100,882	142,232	49,121	93,112	268,952	261,182	7,770
2026	356.5	438,463	330,899	107,564	151,668	52,382	99,286	286,794	278,517	8,278
2027	369.2	459,482	346,775	112,708	158,939	54,897	104,042	300,543	291,878	8,666
2028	381.0	476,233	359,393	116,840	164,733	56,857	107,876	311,500	302,536	8,964
2029	392.9	490,261	370,007	120,254	169,586	58,575	111,011	320,675	311,432	9,244
2030	404.7	505,253	381,322	123,931	174,771	60,366	114,405	330,481	320,955	9,526
2031	416.5	520,244	392,637	127,607	179,957	62,158	117,800	340,287	330,479	9,808
2032	428.3	536,322	404,742	131,580	185,519	64,031	121,488	350,803	340,711	10,092
2033	440.1	550,227	415,267	134,960	190,329	65,740	124,589	359,899	349,527	10,372
2034	451.9	566,449	427,519	138,930	195,940	67,689	128,251	370,509	359,830	10,679

The sales forecast is adjusted for solar load impacts by subtracting cumulative new solar own-use generation from the appropriate class sales forecasts. In 2024, solar generation reduces residential sales by 94,413 MWh, which represents a reduction of 385 kWh per customer, by 2034 this increases to 555 kWh per customer. C&I solar impacts are relatively small as most of the C&I solar generation is treated as excess generation that shows up as a reduction in system energy requirements.

1.4.4 Heat Pumps

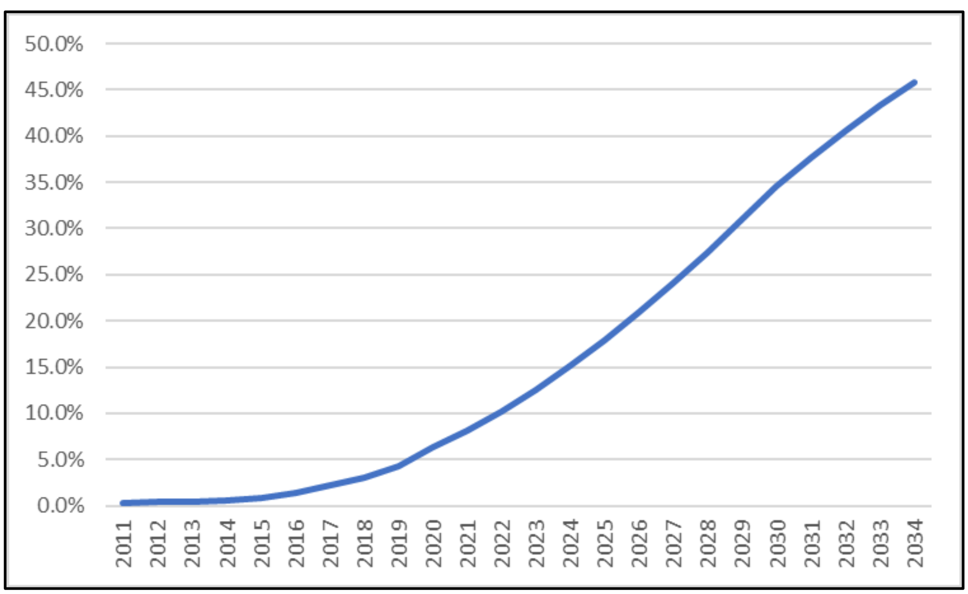
Heat pump sales drive most of the near-term residential sales growth. Heat pumps are being promoted through state heat pump incentives and are part of the state's building electrification strategy designed to reduce CO2 emissions. The recently adopted federal Inflation Reduction Act (IRA) will further contribute to heat pump adoption through federal tax credits and rebates that will flow through to VEIC. To date, the state heat pump program has been highly successful with roughly 60,000 heat pumps installed across the state over the last five years. With each home installing approximately 1.7 units, (much of the market are auxiliary mini-split units) estimated heat pump saturation has increased from approximately 1.0% in 2015 to 15% in 2023. Heat pump adoption has had a measurable impact on residential sales and partially explains (along with COVID's impact on at home work activity) why there has been no significant decline in residential usage even with increasing efficiency. The heat pump forecast was developed as part of the VELCO state IRP forecast completed last summer. It is based on VEIC and DPS expected case scenario. The forecast is relatively aggressive assuming that the number of annual heat pump units increases from roughly 10,000 units per year today to 18,000 annual units by 2029 before beginning to decline. Given GMP's share of the state customer base, we expect to see roughly 70% of heat pump sales in the GMP service area. This translates into peak heat pump sales of 14,000 units by 2029. Figure 13 shows the GMP heat pump unit forecast.

FIGURE 13: HEAT PUMP UNIT FORECAST



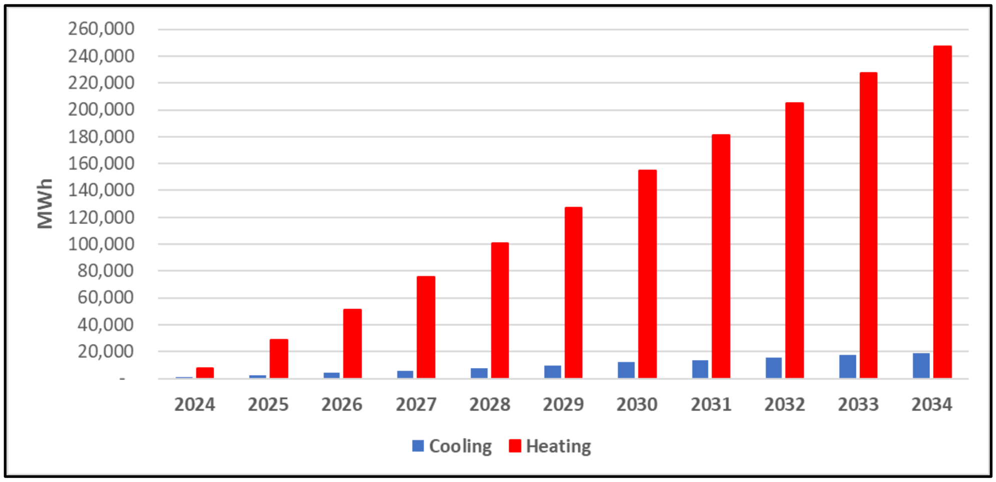
The unit forecast implies that in five years over, 25% of residential customers will have heat pumps increasing to 45% of residential customers by 2034. Figure 14 shows forecasted heat pump saturation.

FIGURE 14: HEAT PUMP SATURATION



Translation to Sales. Heat pump sales are estimated for both heating and cooling. Sales are derived by multiplying the unit forecast by annual heating and cooling average use (UEC). The starting UEC is based on a Cadmus study that metered heat pump electricity input. Average heat pump use declines over time with projected heat pump efficiency improvements. Annual heating and cooling are allocated to months based on heating and cooling estimated load profiles. Ninety percent of heat pump sales are residential, and ten percent are commercial. Projected sales starting in 2024 are shown in Figure 15.

FIGURE 15: HEAT PUMP SALES FORECAST

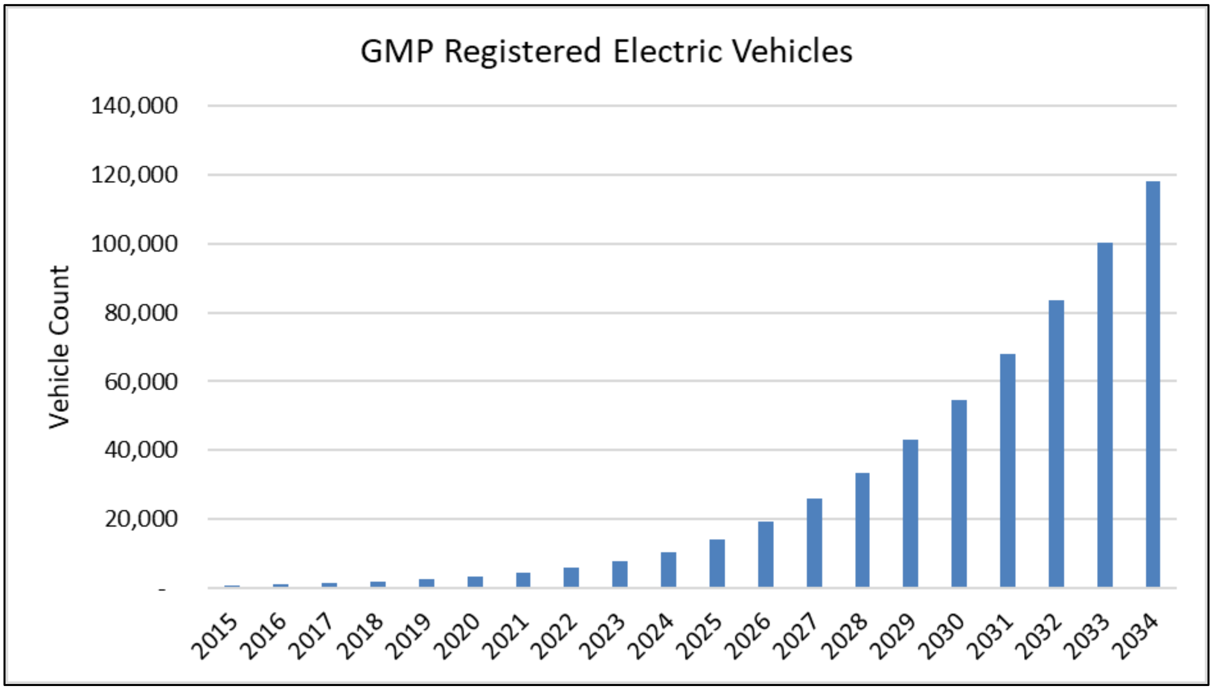


1.4.5 Electric Vehicles

As of January 2024, Vermont had approximately 12,754 registered plug-in hybrid (PHEV) and all battery electric (BEV) vehicles, this is up 44% over the past year. Electric vehicles constituted 10% of all new light duty vehicle sales in 2023, up from 6.9% in 2022. Vermont has joined 16 other states in adopting California's Advanced Clean Cars II goals. By 2035 all new passenger cars, trucks and SUVs sold in Vermont must qualify as zero or low emission vehicles, which includes battery electric, plug-in hybrid electric, and hydrogen vehicles. There are interim goals of 35% by 2026 and 68% by 2030.

The EV sales forecast is based on VELCO's 2023 high-case projections. While the mandate addresses new vehicle sales, given the current and future combustion engine vehicle stock, the increase in total EV market share will be much slower. Figure 16 shows the projected number of GMP electric vehicles.

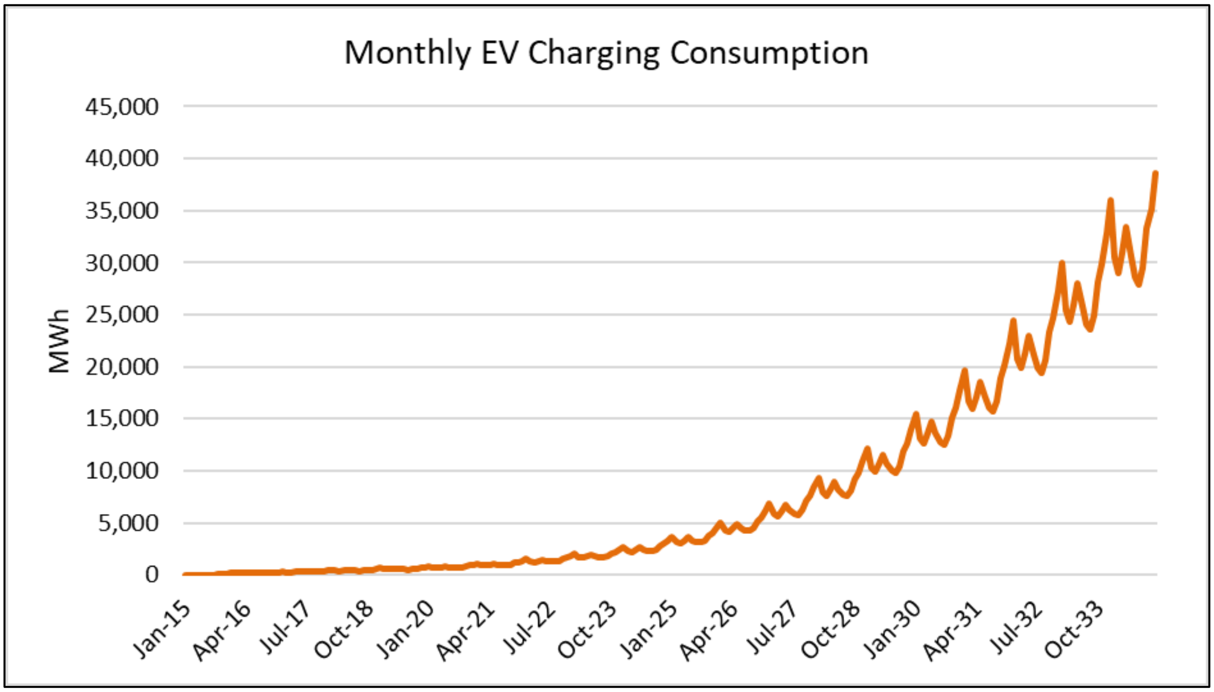
FIGURE 16: REGISTERED ELECTRIC VEHICLES



Based on studies by NREL, we assume 80% of the charging energy will be at home impacting residential sales and 20% will be away adding to commercial sales.

Figure 17Figure 17 shows the GMP electric vehicle sales forecast. Inputs include number of EVs, average annual miles driven, and miles per kWh. The monthly charging consumption is based on AMI vehicle charging data and reflects the impact of increased charging needs in colder months. Based on studies by NREL, we assume 80% of the charging energy will be at home impacting residential sales and 20% will be away adding to commercial sales.

FIGURE 17: ELECTRIC VEHICLE SALES



1.4.6 Customer Specific Load Adjustments

Forecasts are adjusted for specific customer business activity that result in large changes in load; this load change would not be captured in historical data series, and as a result not captured in the forecast models. The expected downward spot load adjustment is relatively small at 7,000 MWh.

The largest load adjustment is for the removal of GlobalFoundries from GMP's service territory as they commence operations as their own electric utility, consistent with the Vermont Public Utility Commission's Order in Case Nos. 21-1107-PET and 21-1109-PET. GMP is currently serving GlobalFoundries' load under a transitional power purchase agreement (PPA), which represents a third of the Large C&I class sales. This PPA expires in October 2026, at which time GlobalFoundries load is removed from the sales forecast.

Itron

1.4.7 Load Adjustments Summary

Table 7 summarizes load adjustments applied to the baseline forecast. Electrification programs and increasing penetration of electric vehicles outweigh efficiency and solar impacts after 2026. The large drop in 2027 sales reflects the loss of a large customer to transmission only service.

TABLE 7: ADJUSTMENTS SUMMARY

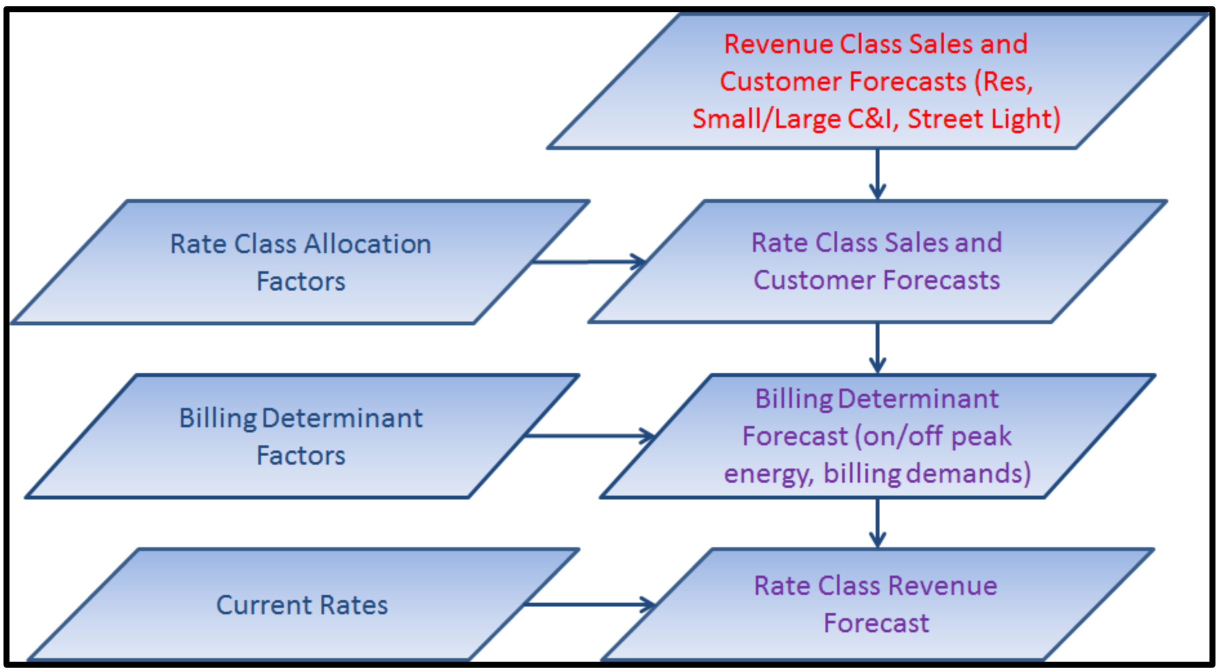
ear	NoEE(1)	EE(2)	Solar(3)	Tier3(4)	EV(5)	SpotLds(6)	TtlAdj	Forecast
2025	4,142,318	-39,226	-8,111	29,439	12,673	-7,000	-12,224	4,130,093
2026	4,171,285	-66,152	-14,812	55,772	26,712	-7,000	-5,480	4,165,804
2027	3,869,307	-92,420	-20,173	83,444	45,858	-7,000	9,709	3,879,015
2028	3,902,937	-120,307	-24,157	112,436	70,428	-7,000	31,400	3,934,337
2029	3,932,519	-148,289	-27,736	148,841	98,792	-7,000	64,608	3,997,127
2030	3,958,937	-178,217	-31,357	176,358	133,712	-7,000	93,496	4,052,433
2031	3,982,515	-206,541	-34,980	205,387	175,803	-7,000	132,668	4,115,184
2032	4,006,893	-232,687	-38,694	230,838	225,056	-7,000	177,513	4,184,407
2033	4,029,742	-256,550	-42,225	254,531	280,654	-7,000	229,410	4,259,152
2034	4,053,487	-280,811	-46,116	288,349	340,783	-7,000	295,205	4,348,692

1. No EE forecast assumes no efficiency improvements after 2023.
2. Efficiency includes impacts of new standards, naturally occurring, and EE program-based efficiency improvements.
3. Solar is derived from GMP solar capacity forecast and is allocated to classes.
4. Tier 3 heat pump forecast is derived by scaling VEIC state projections to the GMP service area and also includes sales for commercial building electrification.
5. VEIC EV forecast adjusted for GMP state share of electricity sales.
6. Customer specific spot load adjustments.

1.5 REVENUE FORECAST

The revenue forecast is derived at the rate schedule level. Class sales forecasts are allocated to rate schedules and within rate schedules to billing determinants (i.e., customer, on and off-peak use, and billing demands). Revenues are then generated by multiplying rate schedule billing determinants by the current tariff rates. Figure 18 provides an overview of the revenue model.

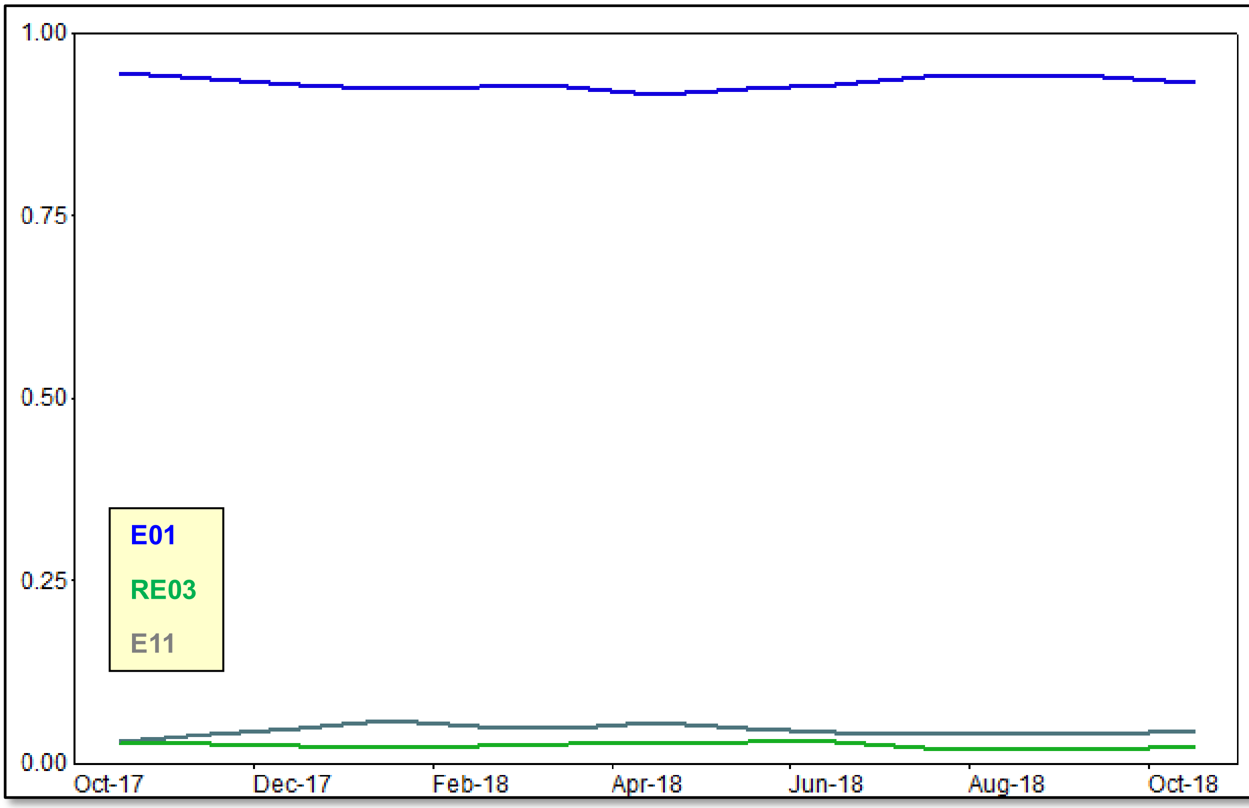
FIGURE 18: REVENUE MODEL



1.5.1 Derive Rate Class Monthly Sales Forecast

Revenue class sales and customer forecasts are allocated to the underlying rate schedules based on projected monthly allocation factors. The allocation factors are derived from historical billing data and simple regression models that capture any share trends and seasonal variation. Residential class sales, for example, are allocated to rate schedules - E01, RE03, and E11 rate classes. Figure 19 shows historical and forecasted residential rate class sales shares.

FIGURE 19: RESIDENTIAL RATE CLASS SHARE FORECAST



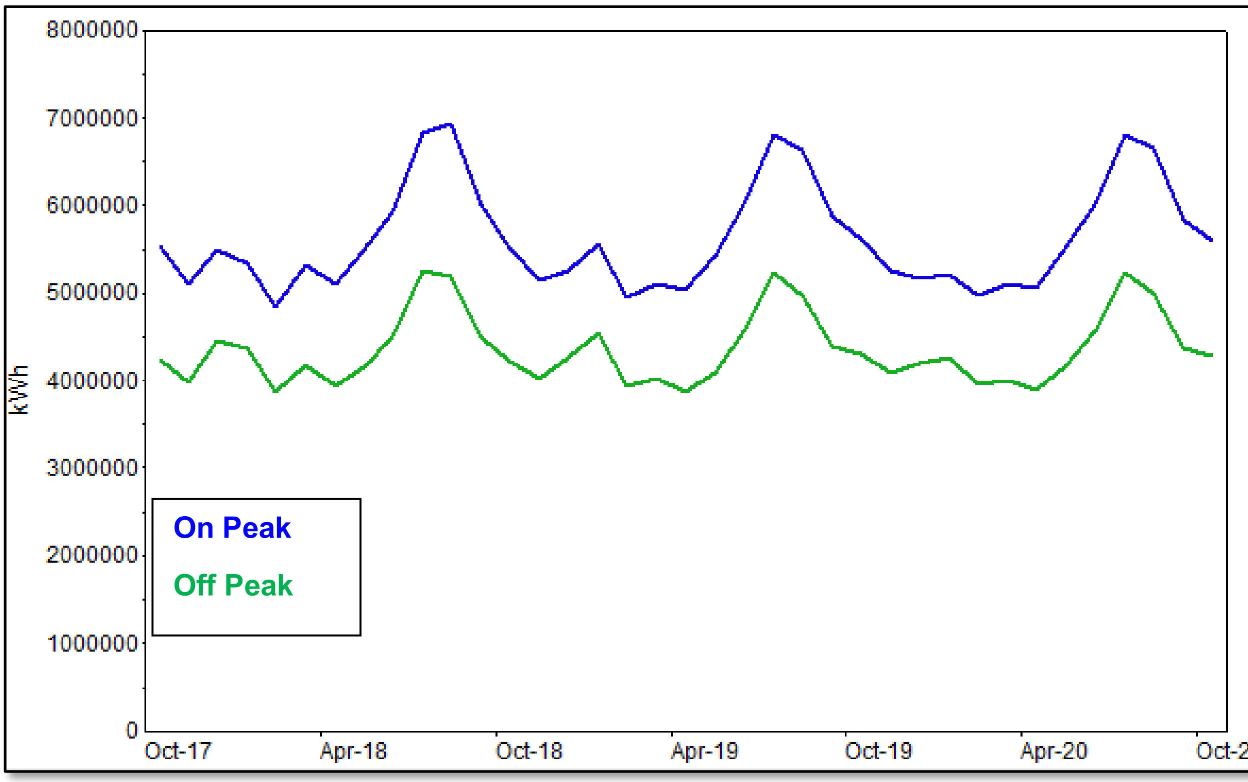
Approximately 95% of residential sales are billed under rate E01. The percentage is slightly lower in the winter months as the electric time-of-use rate (E11) is higher in these months.

1.5.2 Estimate Monthly Billing Determinants

In the next step, rate class sales (and customers counts for some rates) are allocated to billing blocks, time-of-use billing periods, and on and off-peak billing demand blocks. Billing block and demand factors are derived from historical billing data. For example, residential rate E11 has on peak and off-peak energy billing periods that are priced differently. Rate E11 monthly sales are allocated to TOU periods based on historical on-peak and off-peak sales data.

Some of the rates are complex. The small C&I rate E65, for example, includes non-demand and demand billed sales and customers, load factor kWh blocks (for demand customers), and different demand charges for demand for on/off peak, which are scheduled to replace block rates within the next two years. Figure 20 shows the resulting sales block forecasts for rate E65 Demand Customers.

FIGURE 20: RATE E65 DEMAND CUSTOMER - SALES BILLING BLOCK FORECAST



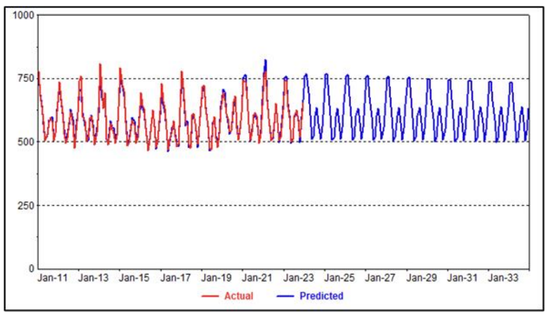
1.5.3 Calculate Rate Schedule and Revenue Class Revenues

Once the billing determinants are derived, revenues are generated by multiplying the forecasted billing determinants by the current customer, energy, and demand charges. Revenues are aggregated by rate schedule and month. Rate schedule revenues are then mapped back to the customer classes residential, small C&I, large C&I, and street lighting as reported in the Summary Table 2.

APPENDIX A: MODEL STATISTICS AND COEFFICIENTS

FIGURE 21: RESIDENTIAL AVERAGE USE MODEL (KWH PER CUSTOMER)

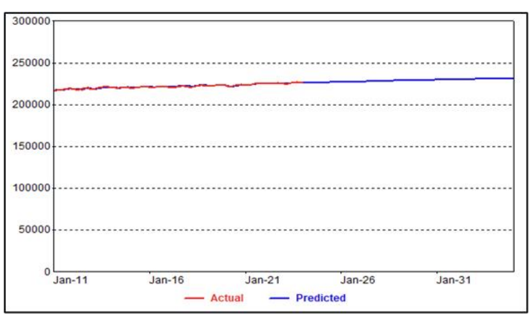
Variable	Coefficient	StdErr	T-Stat	P-Value
mStructRevRes.XHeat	1.143	0.046	24.896	0.00%
mStructRevRes.XCool	1.110	0.064	17.422	0.00%
mStructRevRes.XOther	0.966	0.013	74.363	0.00%
mBin.Feb	-22.707	5.908	-3.843	0.02%
mBin.Mar	-25.933	6.948	-3.732	0.03%
mBin.Apr	-29.021	6.765	-4.290	0.00%
mBin.May	-30.150	7.191	-4.193	0.01%
mBin.Jun	-27.161	5.476	-4.960	0.00%
mBin.Oct	-10.442	5.724	-1.824	7.02%
mBin.Nov	-13.314	5.612	-2.373	1.90%
mBin.Apr14	118.737	13.726	8.650	0.00%
MA(1)	0.663	0.072	9.188	0.00%



Model Statistics	
Iterations	31
Adjusted Observations	156
Deg. of Freedom for Error	144
R-Squared	0.963
Adjusted R-Squared	0.960
AIC	5.677
BIC	5.911
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-652.15
Model Sum of Squares	1,005,651.37
Sum of Squared Errors	39,059.48
Mean Squared Error	271.25
Std. Error of Regression	16.47
Mean Abs. Dev. (MAD)	12.03
Mean Abs. % Err. (MAPE)	1.98%
Durbin-Watson Statistic	1.683

FIGURE 22: RESIDENTIAL CUSTOMER MODEL

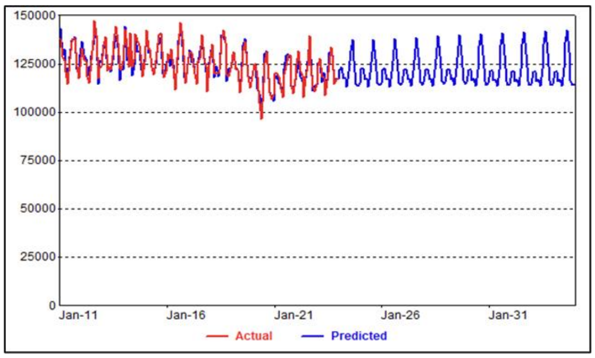
Variable	Coefficient	StdErr	T-Stat	P-Value
CONST	44870.376	14179.484	3.164	0.19%
mEcon.GDP	0.992	0.154	6.438	0.00%
mEcon.Pop	225.573	28.262	7.981	0.00%
MA(1)	0.547	0.070	7.856	0.00%
MA(2)	0.517	0.070	7.406	0.00%



Model Statistics	
Iterations	32
Adjusted Observations	156
Deg. of Freedom for Error	151
R-Squared	0.945
Adjusted R-Squared	0.943
AIC	12.742
BIC	12.840
F-Statistic	647.470
Prob (F-Statistic)	0.0000
Log-Likelihood	-1,210.25
Model Sum of Squares	858,011,704.75
Sum of Squared Errors	50,025,356.86
Mean Squared Error	331,293.75
Std. Error of Regression	575.58
Mean Abs. Dev. (MAD)	438.51
Mean Abs. % Err. (MAPE)	0.20%
Durbin-Watson Statistic	1.500

FIGURE 23: SMALL C&I SALES MODEL (MWH)

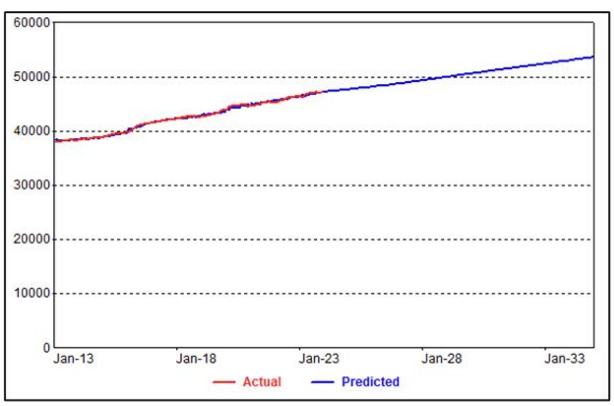
Variable	Coefficient	StdErr	T-Stat	P-Value
mBin.TrendVar	921.097	111.116	8.290	0.00%
mStructRevCom.XHeat	161484.777	10574.558	15.271	0.00%
mStructRevCom.XCool	77495.980	3706.426	20.909	0.00%
mStructRevCom.XOther	9409.659	81.939	114.837	0.00%
mBin.Apr14	17406.057	2734.574	6.365	0.00%
mBin.May20	-7288.794	3080.622	-2.366	1.93%
mBin.Jun20	-10109.954	2994.350	-3.376	0.09%
Covid.NResIndex	-5704.240	1082.588	-5.269	0.00%
MA(1)	0.450	0.078	5.737	0.00%



Model Statistics	
Iterations	21
Adjusted Observations	156
Deg. of Freedom for Error	147
R-Squared	0.910
Adjusted R-Squared	0.905
AIC	16.036
BIC	16.212
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-1,463.14
Model Sum of Squares	12,878,399,972.43
Sum of Squared Errors	1,280,073,955.76
Mean Squared Error	8,707,986.09
Std. Error of Regression	2,950.93
Mean Abs. Dev. (MAD)	2,309.63
Mean Abs. % Err. (MAPE)	1.85%
Durbin-Watson Statistic	1.734

FIGURE 24: SMALL C&I CUSTOMER MODEL

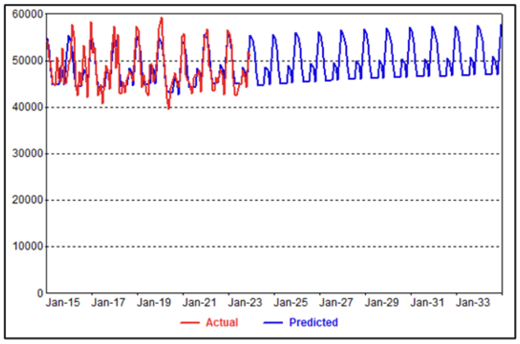
Variable	Coefficient	StdErr	T-Stat	P-Value
mEcon.ComVar	13768.471	2107.745	6.532	0.00%
mBin.Yr16Plus	862.041	128.072	6.731	0.00%
mBin.Yr19Plus	340.228	124.115	2.741	0.70%
mBin.Yr20Plus	541.702	142.630	3.798	0.02%
ComCust.LagDep(6)	0.653	0.054	12.040	0.00%
MA(1)	0.514	0.077	6.701	0.00%



Model Statistics	
Iterations	14
Adjusted Observations	132
Deg. of Freedom for Error	126
R-Squared	0.994
Adjusted R-Squared	0.993
AIC	10.953
BIC	11.084
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-904.20
Model Sum of Squares	1,067,928,115.58
Sum of Squared Errors	6,885,554.94
Mean Squared Error	54,647.26
Std. Error of Regression	233.77
Mean Abs. Dev. (MAD)	182.99
Mean Abs. % Err. (MAPE)	0.43%
Durbin-Watson Statistic	1.645

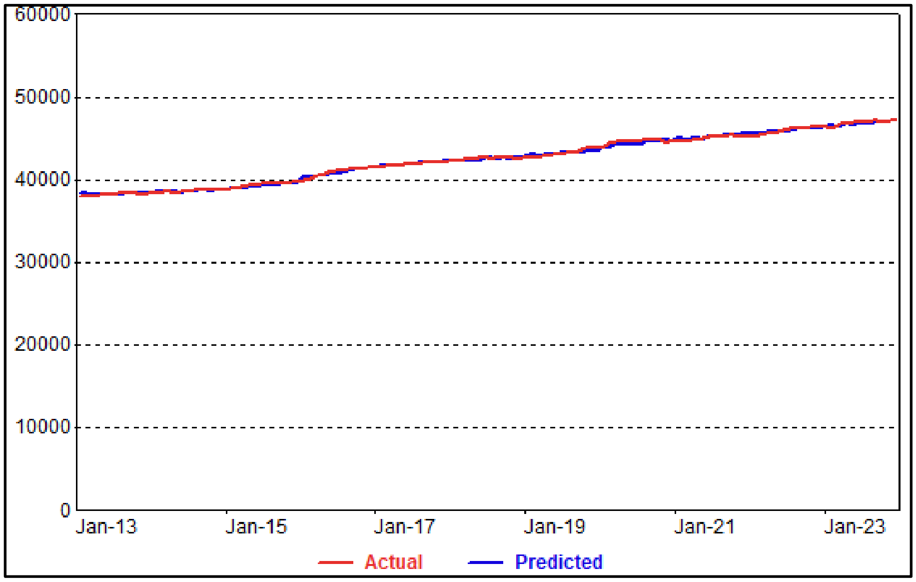
FIGURE 25: LARGE C&I SALES MODEL (MWH)

Variable	Coefficient	StdErr	T-Stat	P-Value
mEcon.IndVar	250.831	2.186	114.765	0.00%
mBin.Jan	9803.702	949.795	10.322	0.00%
mBin.Feb	7464.724	949.788	7.859	0.00%
mBin.Aug	3799.059	949.700	4.000	0.01%
mBin.Sep	3035.597	949.697	3.196	0.19%
mBin.Nov	5448.821	949.693	5.737	0.00%
mBin.Dec	10670.095	949.688	11.235	0.00%
mBin.Mar	2771.523	949.780	2.918	0.44%



Model Statistics	
Iterations	1
Adjusted Observations	108
Deg. of Freedom for Error	100
R-Squared	0.697
Adjusted R-Squared	0.676
AIC	15.799
BIC	15.997
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-998.36
Model Sum of Squares	1,556,285,476.89
Sum of Squared Errors	676,534,368.66
Mean Squared Error	6,765,343.69
Std. Error of Regression	2,601.03
Mean Abs. Dev. (MAD)	1,939.43
Mean Abs. % Err. (MAPE)	4.00%
Durbin-Watson Statistic	1.941

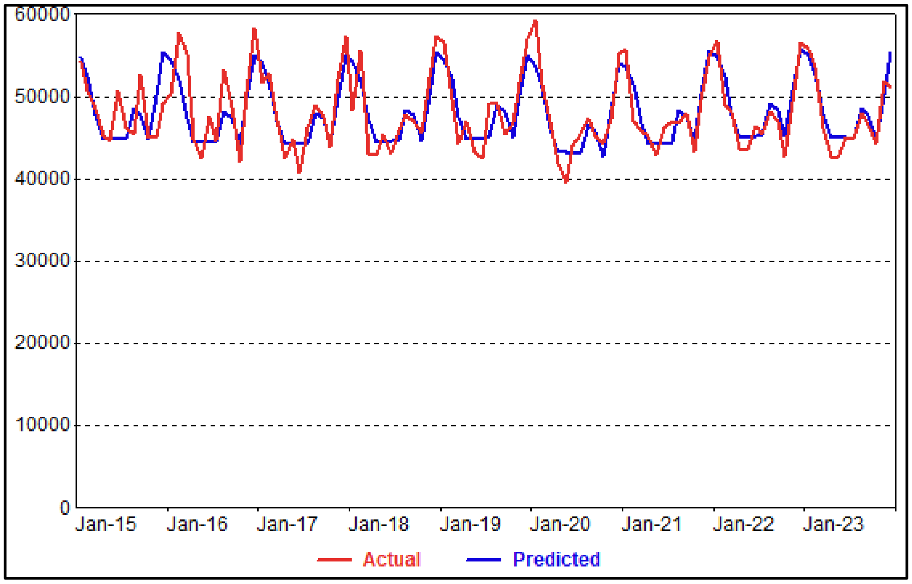
FIGURE 26: SMALL C&I CUSTOMER MODEL



Variable	Coefficient	StdErr	T-Stat	P-Value
mEcon.ComVar	13768.471	2107.75	6.532	0.00%
mBin.Yr16Plus	862.041	128.072	6.731	0.00%
mBin.Yr19Plus	340.228	124.115	2.741	0.70%
mBin.Yr20Plus	541.702	142.63	3.798	0.02%
ComCust.LagDep(6)	0.653	0.054	12.04	0.00%
MA(1)	0.514	0.077	6.701	0.00%

Model Statistics	
Iterations	14
Adjusted Observations	132
Deg. of Freedom for Error	126
R-Squared	0.994
Adjusted R-Squared	0.993
AIC	10.953
BIC	11.084
Log-Likelihood	-904.2
Model Sum of Squares	1,067,928,115.58
Sum of Squared Errors	6,885,554.94
Mean Squared Error	54,647.26
Std. Error of Regression	233.77
Mean Abs. Dev. (MAD)	182.99
Mean Abs. % Err. (MAPE)	0.43%
Durbin-Watson Statistic	1.645

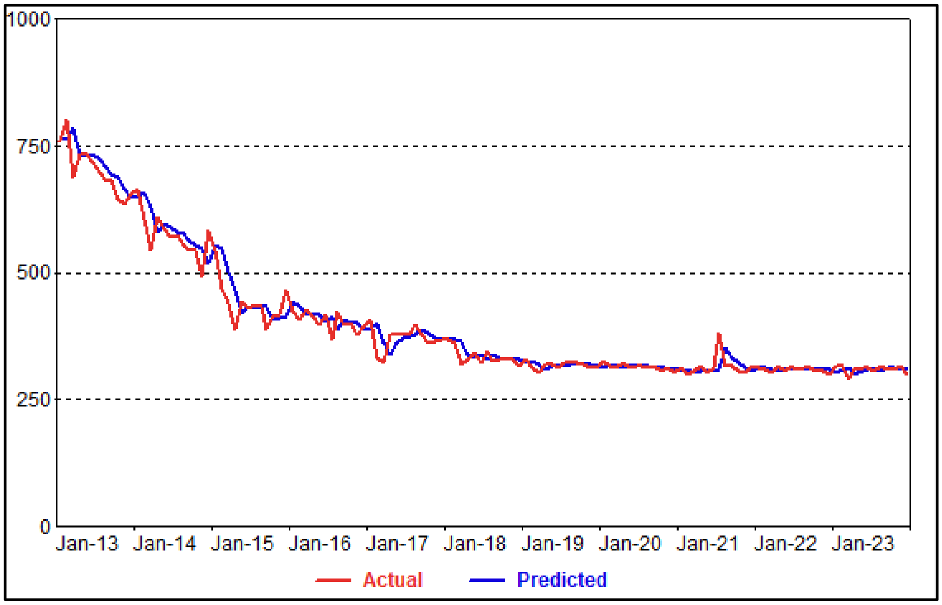
FIGURE 27: LARGE C&I SALES MODEL



Variable	Coefficient	StdErr	T-Stat	P-Value
mEcon.IndVar	250.831	2.186	114.765	0.00%
mBin.Jan	9803.702	949.795	10.322	0.00%
mBin.Feb	7464.724	949.788	7.859	0.00%
mBin.Aug	3799.059	949.7	4	0.01%
mBin.Sep	3035.597	949.697	3.196	0.19%
mBin.Nov	5448.821	949.693	5.737	0.00%
mBin.Dec	10670.095	949.688	11.235	0.00%
mBin.Mar	2771.523	949.78	2.918	0.44%

Model Statistics	
Iterations	1
Adjusted Observations	108
Deg. of Freedom for Error	100
R-Squared	0.697
Adjusted R-Squared	0.676
AIC	15.799
BIC	15.997
Log-Likelihood	-998.36
Model Sum of Squares	1,556,285,476.89
Sum of Squared Errors	676,534,368.66
Mean Squared Error	6,765,343.69
Std. Error of Regression	2,601.03
Mean Abs. Dev. (MAD)	1,939.43
Mean Abs. % Err. (MAPE)	4.00%
Durbin-Watson Statistic	1.941

FIGURE 28: OTHER SALES MODEL



Variable	Coefficient	StdErr	T-Stat	P-Value
Simple	0.583	0.079	7.332	0

Model Statistics	
Iterations	11
Adjusted Observations	132
Deg. of Freedom for Error	131
R-Squared	0.959
Adjusted R-Squared	0.959
AIC	6.496
BIC	6.518
Log-Likelihood	-615.02
Model Sum of Squares	1,996,336
Sum of Squared Errors	86,115
Mean Squared Error	657.37
Std. Error of Regression	25.64
Mean Abs. Dev. (MAD)	16.36
Mean Abs. % Err. (MAPE)	3.94%
Durbin-Watson Statistic	1.997