OUTLINE OF APPENDIX 1

Supplemental Materials for the Demand Forecast Section

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Summary of the Demand Forecasting Framework

	Customer Segment Forecast	**Daily Throughput Model**
Purpose	Forecast demand for gas on a monthly basis for the Split Years 2022/23 – 2026/27 based on projected economic and demographic conditions	Forecast demand for gas under design day conditions based on historical daily weather and demand patterns
Periodicity	Monthly	Daily
Units of Time	Billing cycle month	Gas day (10:00 am to 10:00 am)
Historical Time Period	November 2014 – December 2022	November 1, 2021 – October 31, 2022
Independent Variables Types	Economic, demographic, and weather data, indicator variables	Weather and date/seasonal-related data
Demand Data Detail	Six Customer Segments, Company Use, and Capacity Exempt as a percentage of total C&I Demand	Design Day Throughput and Planning Load
Demand Data Source	Company billing data	Gate station meter reads
Determination of Forecast Demand	Results from (1) number of customers model times (2) use per customer model equals demand	Initial Design Day Throughput Model, escalated at growth in Design Year Throughput
Forecast Period	2022/23 – 2026/27 Split Years	2022/23 – 2026/27 Design Days

Calculation of Billing Cycle EDD Variable

Because demand for natural gas is generally affected by weather, including both temperature and wind speed, use per customer models should include a weather variable that (a) reflects temperature and wind speed and (b) measures weather in a manner that reflects the way that the customer class gas usage data is measured and recorded.

It is common operating practice for gas distribution companies, including Northern, to measure and record gas usage data in "billing months". For that purpose, customers are divided into multiple groups, or billing cycles, and each group of billing cycle customers is processed through the Company's billing procedures in succeeding business days throughout the month. Distribution companies set the billing cycle schedules to accommodate weekends and holidays, so as a result meters of customers in a billing cycle are read at approximately the same time of the month, every month.

As a result of this billing process, most of the gas consumption between meter readings of customers in an early billing cycle (e.g., Cycles 1 or 2) occurs in the prior calendar month; in contrast, most of the gas consumption between meter readings of customers in a later billing cycle (e.g., Cycles 19 or 20) occurs in the current calendar month. "Billing Month deliveries" are the gas deliveries as measured by customer meter readings and recorded by billing month (which includes consumption in the prior and current calendar month), and "Calendar Month deliveries" are estimated gas deliveries by calendar month.

For Northern's 2023 IRP Customer Segment models, the Company converted monthly EDDs to a billing month basis to be consistent with the Customer Segment data. Billing month EDD data was derived from daily EDD data by (1) summing the days of consumption that impact metered deliveries in the billing month and (2) developing weighting factors, i.e., Billing Month Percent Factors ("Percent Factors"), based on those sums that relate billing cycle data to calendar consumption. The weighting distribution allocates calendar EDD over the course of the month. The Percent Factors for the first and last days in the billing month are relatively small; Percent Factors for days in the middle of the billing month are the largest. Below is an example of the

Percent Factors used to convert weather data from a calendar month basis to a billing month basis for the January billing month:

	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	DAYS	DEC	**JAN**	FEB
PRIOR MONTH (December)	1	•																															1	97%	**3%**	
	2	•	•																														2	94%	**6%**	
	3	•	•	•																													3	90%	**10%**	
	4	•	•	•	•																												4	87%	**13%**	
	5	•	•	•	•	•																											5	84%	**16%**	
	6	•	•	•	•	•	•																										6	81%	**19%**	
	7	•	•	•	•	•	•	•																									7	77%	**23%**	
	8	•	•	•	•	•	•	•	•																								8	74%	**26%**	
	9	•	•	•	•	•	•	•	•	•																							9	71%	**29%**	
	10	•	•	•	•	•	•	•	•	•	•																						10	68%	**32%**	
	11	•	•	•	•	•	•	•	•	•	•	•																					11	65%	**35%**	
	12	•	•	•	•	•	•	•	•	•	•	•	•																				12	61%	**39%**	
	13	•	•	•	•	•	•	•	•	•	•	•	•	•																			13	58%	**42%**	
	14	•	•	•	•	•	•	•	•	•	•	•	•	•	•																		14	55%	**45%**	
	15	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																	15	52%	**48%**	
	16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																16	48%	**52%**	
	17	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•															17	45%	**55%**	
	18	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•														18	42%	**58%**	
	19	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•													19	39%	**61%**	
	20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•												20	35%	**65%**	
	21	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•											21	32%	**68%**	
	22	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•										22	29%	**71%**	
	23	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•									23	26%	**74%**	
	24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								24	23%	**77%**	
	25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							25	19%	**81%**	
	26	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						26	16%	**84%**	
	27	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					27	13%	**87%**	
	28	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				28	10%	**90%**	
	29	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			29	6%	**94%**	
	30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		30	3%	**97%**	
	31	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	31	0%	**100%**	
BILLING MONTH (January)	1	R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	30		**97%**	3%
	2		R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	29		**94%**	6%
	3			R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	28		**90%**	10%
	4				R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	27		**87%**	13%
	5					R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	26		**84%**	16%
	6						R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	25		**81%**	19%
	7							R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	24		**77%**	23%
	8								R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	23		**74%**	26%
	9									R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	22		**71%**	29%
	10										R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	21		**68%**	32%
	11											R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	20		**65%**	35%
	12												R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	19		**61%**	39%
	13													R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	18		**58%**	42%
	14														R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	17		**55%**	45%
	15															R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	16		**52%**	48%
	16																R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	15		**48%**	52%
	17																	R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	14		**45%**	55%
	18																		R	•	•	•	•	•	•	•	•	•	•	•	•	•	13		**42%**	58%
	19																			R	•	•	•	•	•	•	•	•	•	•	•	•	12		**39%**	61%
	20																				R	•	•	•	•	•	•	•	•	•	•	•	11		**35%**	65%
	21																					R	•	•	•	•	•	•	•	•	•	•	10		**32%**	68%
	22																						R	•	•	•	•	•	•	•	•	•	9		**29%**	71%
	23																							R	•	•	•	•	•	•	•	•	8		**26%**	74%
	24																								R	•	•	•	•	•	•	•	7		**23%**	77%
	25																									R	•	•	•	•	•	•	6		**19%**	81%
	26																										R	•	•	•	•	•	5		**16%**	84%
	27																											R	•	•	•	•	4		**13%**	87%
	28																												R	•	•	•	3		**10%**	90%
	29																													R	•	•	2		**6%**	94%
	30																														R	•	1		**3%**	97%
	31																															R	0		**0%**	100%

R = Meter read dates. "•" symbol represents a day of consumption reflected in the meter read at time "R".

A string of Percent Factors was calculated for each of the 12 billing months in a year. For each day in the billing month, the actual daily EDD was multiplied by the corresponding Percent Factor for that day to determine the billing month EDDs.

Statistical Techniques and Glossary

Regression modeling techniques were used to generate the demand forecasts for both Divisions. The regression analyses were developed in the EViews software package. Regression modeling techniques were used to develop separate Maine and New Hampshire forecasts of (a) number of customers, (b) use per customer for each of six Customer Segment models, as well as demand forecasts for (1) Company Use, (2) Daily Throughput, and (3) Daily Planning Load.

Regression Analysis

Econometrics is the empirical determination of economic laws; it involves the application of statistical techniques and analyses to the study of economic data. A fundamental statistical method of econometrics is regression analysis, which is concerned with the study of the relationship between one variable, i.e., the dependent variable, and one or more other variables, i.e., the independent or explanatory variables. One of the primary uses of regression analysis is to forecast the values of the dependent variable, given forecast values of the independent variables.[1]

Northern forecast models of number of customers, use per customer, or demand, regression equations were developed with appropriate variables, such as weather, economic data, and dummy variables, etc. Each of the forecast models explains historical values of the dependent variable as a function of historical values of the independent variables; the models produce forecasted values of the dependent variable based on forecasted values of the independent variables.

The forecast models for this IRP were developed using the following process: (a) the appropriate economic theory that the model should be based on was considered (b) appropriate data was collected; (c) mathematical and statistical models were specified; (d) the model parameters were estimated; (e) the accuracy of the model was checked; (f) hypotheses about the model and its parameters were tested; and (g) the models were used to prepare the forecast.[2]

First, based on economic theory and standard utility forecasting practice, independent variables were identified that could have an effect on the dependent variable in each equation, and expectations about the appropriate sign of the coefficients for those variables was determined. For example, the EDD variable

[1] A glossary of statistical terms can be found at the end of this Appendix.
[2] This process was derived from Essentials of Econometrics, Damodar Gujarati, p. 3 (1999 Irwin McGraw-Hill).

is expected to affect use per customer, and the relationship would be expected to be positive (i.e., when EDDs increase, demand should increase, and vice versa).

For each of the models, after the possible explanatory variables were identified and the data sets were developed, potential regression equations were created to test various combinations of independent variables. Based on: (1) the theoretical relevance and signs of the independent variables; (2) the results of various statistical tests that assess the significance of the independent variables included in the equation; and (3) the explanatory power of the equation as a whole, a preliminary regression equation was identified for each model. If the sign of an independent variable was counter to expectations or if important variables were not significant, either, (a) that model not considered further or (b) modified forms of the model with different variables were considered. The statistical significance of each independent variable was determined by examining the variable t-test values; variables that were significant at the 0.1z0 level were included in a model.[3] Finally, equations were evaluated based on explanatory power, as determined by the R^2. Models that met all of these criteria were subjected to further testing, for example, for autocorrelation and heteroskedasticity.

Autocorrelation

Statistical theory requires that the residuals (the "error terms") associated with a regression equation be independent of one another (i.e., there should be no relationship or correlation in the residuals over time).[4] Correlation of residuals over time is known as "autocorrelation". One aspect of time series analysis is to identify and correct for autocorrelation.

Autocorrelation can be present between two consecutive periods (lag 1 or first-order), periods separated by one period (lag 2 or second-order), periods separated by two periods (lag 3 or third-order), etc. The Durbin-Watson statistic is a standard test for first-order autocorrelation; autocorrelation function ("ACF") and partial autocorrelation function ("PACF") values and graphs are used to test for higher orders of autocorrelation.[5] Advanced statistical packages such as EViews correct for higher order autocorrelation, based on user inputs.

The forecast models for this IRP were examined for orders of autocorrelation from lag(s) 1 through 12 using the ACF and PACF graphs. If autocorrelation was identified, the appropriate autoregressive terms

[3] Depending on specific circumstances, acceptable statistical practice allows for including variables that are not statistically significant in a regression model.

[4] In statistical theory, a regression equation with residuals that are independent of one another equation is efficient. The coefficients of an "efficient" regression equation have the smallest (i.e., minimum) variance.

[5] The presence of autocorrelation is indicated by ACF or PACF values that fall beyond two standard errors.

("AR") were added to the regression equation to correct for the autocorrelation (e.g., autocorrelation at lag 4 would be corrected by adding an AR4 term to the regression equation). The regression equations were re-evaluated after any necessary corrections for autocorrelation were made. If correcting for autocorrelation in residuals decreased an independent variable's t-statistic to the extent that the variable was no longer significant, the equation parameters were re-estimated with the statistically insignificant variables excluded.

Heteroskedasticity

Statistical theory also requires that the residuals associated with a regression equation have constant variance to ensure that the equation is efficient. Non-constant variance is known as "heteroskedasticity". The forecast models for this IRP were tested for heteroskedasticity using White's Test. The White's Test statistic is developed by regressing the squared residuals from the original regression against the original independent variables, the independent variables squared, and the cross products. The R^2 from this regression is multiplied by the number of observations compared against a χ^2 distribution to test for significance; models with White's Test results that were not significant at the 0.01 level were considered to not exhibit heteroskedasticity.

If the overall explanatory power of the model was significantly reduced after correcting for the various statistical issues described above, another preliminary model was examined. This process continued until a model was developed with appropriate statistical properties and explanatory power. Details associated with final model results, including all parameters, residuals, and the results of all the statistical tests described above can be found in the Appendix.

Glossary of Statistical Terms[6]

Term	**Definition**
Adjusted R^2	A measure of the overall goodness of fit for the regression model, taking into account the number of independent variables in the model. Adjusted R^2 ranges from 0 to 1; the closer the Adjusted R^2 value is to 1, the better the fit of the model. Adjusted R^2 can be interpreted as the amount of variability of the dependent variable that is explained by the regression equation, taking into consideration the number of independent variables in the model.
Autocorrelation	A measure of the correlation of the values of a series with the values lagged by 1 or more cases. (Other equivalent terms include: serial correlation)
Autocorrelation Function ("ACF")	A function defined as the autocorrelation of the residuals at various lags; can be shown as a graph.
Correlation	A measure of the degree of relationship between two variables. The value of a correlation can range from -1 to 1, with values close to +/-1 indicating a strong relationship between two variables and a correlation close to 0 indicating no relationship between the variables.
Dependent Variable	A dependent variable is one that is observed to change in response to the independent variables. (Other equivalent terms include: response variable, result variable, outcome variable, endogenous variable, output variable, Y-variable)
Estimate (of the Independent Variable)	A measure of the value of the model parameter (i.e., independent variable). (Other equivalent terms include: coefficient of the independent variable)
F statistic	A measure of whether a regression equation is significant (i.e., whether the set of independent variables in a model explains a significant portion of the variability of the dependent variable). Calculated as the mean-square regression divided by the mean square residuals. The value of the F statistic ranges from zero to positive infinity, with large positive values indicating that the model is significant.
Forecast	The values predicted by the model for the forecast period.
Independent Variable	A variable used to attempt to explain the behavior of another variable (see Dependent Variable) in a regression equation. (Other equivalent terms include: explanatory variable, exogenous variable, external variable, predictor variable, causal variable, input variable, X-variable, regressors)
Model	A specific set of independent variables and their parameters used to explain a dependent variable. (Other equivalent terms include: Equation)
Number of Observations ("N")	The amount of data used to develop the model (i.e., the number of data points that are included for each variable in the model).
Number of Predictors	The amount of independent variables included in the model. Note that Number of Predictors measures the total number of independent variables included in the model, not only the significant independent variables.

6 These terms are defined as they relate to the econometric/regression analysis used in this IRP.

Term	**Definition**
Partial Autocorrelation Function ("PACF")	A function defined as the partial autocorrelation of the residuals at various lags. Partial autocorrelation is a measure of the correlation of the values of a series with values lagged by one or more cases, after the effects of correlations at the intervening lags have been removed; can be shown as a graph.
R^2	A measure of the overall goodness of fit for the regression model. R^2 ranges from 0 to 1; the closer the R^2 value is to 1, the better the fit of the model. R^2 can be interpreted as the amount of variability of the dependent variable that is explained by the regression equation.
Residual	The difference between the actual historical values of the dependent variable and the values predicted by the model (i.e., the model fits). (Other equivalent terms include: error, error term)
Root Mean Square Error ("RMSE")	A measure of the variability of the residuals. (Other equivalent terms include: Standard Error of the Regression)
Significance of the t statistic	A measure of the strength (or significance level) of the t statistic. A low value of the significance level of the t statistic is desired, as it indicates the related independent variable is significant in the equation. In general, only independent variables that had t statistics that were significant at the 0.10 level (i.e. less than 0.10) were included in the final equation. (Other equivalent terms include: p-value) Although statistical significance is dependent on the number of observations and number of explanatory variables in the equation, generally, t statistics greater than 2.0 are statistically significant.
Standard Error (of the Estimate of the Independent Variable) ("SE")	A measure of how much the value of a test statistic varies (i.e., the standard deviation of the sampling distribution for a statistic), in this case the Estimate of the Independent Variable.
t statistic	A measure of whether the coefficient for an independent variable is statistically different than zero. Calculated as the Estimate of the Independent Variable divided by its Standard Error. The value of t statistic ranges from negative infinity to positive infinity, with values far from zero indicating that the independent variable is significant in the model. (Other equivalent terms include: t-Statistic, t-Test, Student's t)

Maine Division Statistical Model Results

Variable Nomenclature

Variable	Description	Type
HH(-3)	Total Households Lagged by 3	Actual/Forecast
HH_SIZE	Houshehold Size (i.e. Population/Households)	Actual/Forecast
GMP(-3)	Gross Metro Product Lagged by 3	Actual/Forecast
UNEMP_RT(-1)	Unemployment Rate Percentage Lagged by 1	Actual/Forecast
C	Constant	Intercept Value
TREND	Linear Trend	Linear Count (e.g. i=i+1)
JAN	January	Boolean
FEB	February	Boolean
MAR	March	Boolean
APR	April	Boolean
MAY	May	Boolean
JUN	June	Boolean
JUL	July	Boolean
AUG	August	Boolean
SEP	September	Boolean
OCT	October	Boolean
NOV	November	Boolean
DEC	December	Boolean
BC_EDD	Billing Cycle EDDs	Actual/Forecast
BC_JAN	January Bill Cycle EDD	Actual/Forecast
BC_FEB	February Bill Cycle EDD	Actual/Forecast
BC_MAR	March Bill Cycle EDD	Actual/Forecast
BC_APR	April Bill Cycle EDD	Actual/Forecast
BC_MAY	May Bill Cycle EDD	Actual/Forecast
BC_JUN	June Bill Cycle EDD	Actual/Forecast
BC_JUL	July Bill Cycle EDD	Actual/Forecast
BC_AUG	August Bill Cycle EDD	Actual/Forecast
BC_SEP	September Bill Cycle EDD	Actual/Forecast
BC_OCT	October Bill Cycle EDD	Actual/Forecast
BC_NOV	November Bill Cycle EDD	Actual/Forecast
BC_DEC	December Bill Cycle EDD	Actual/Forecast
ME_EDD	Maine Calendar EDD	Actual
ME_EDD(-1)	Maine Calendar EDD Lagged by 1	Actual
ME_EDD_50	Maine Calendar EDD Base 15	Actual
@WEEKDAY=X	Xth Day of Week (i.e. X=1 is Sunday)	Boolean
Q4_to_Q2	October to June	Boolean
AR(X)	Autoregressive Term at Lag X (where X is a real integer)	ARMA
MA(X)	Moving Average Term at Lag X (where X is a real integer)	ARMA
D_*YearMx*	Dummy Variable for *Year* and *Month x*	Boolean
D_*YearMx_f*	Dummy Variable for *Year* and *Month x* and all future months	Boolean
D_*Year1Mx_Year2My*	Dummy Variable for time between *Year 1-Month x and Year 2-Month y*	Boolean

1. Residential Customer Segment - Customer Model

Dependent Variable: RES_CUST
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/26/23 Time: 11:35
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Failure to improve likelihood (non-zero gradients) after 17 iterations
Coefficient covariance computed using outer product of gradients
MA Backcast: 2015M01 2015M12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HH(-3)*TREND	0.118592	0.030147	3.933744	0.0002
AUG	-762.7841	67.19731	-11.35141	0.0000
SEP	-641.8783	61.78035	-10.38968	0.0000
OCT	-251.1848	48.11117	-5.220926	0.0000
MAY	-424.2753	47.62273	-8.909093	0.0000
JUN	-596.0700	61.39381	-9.708960	0.0000
JUL	-690.2223	67.18205	-10.27391	0.0000
D_2021M11_F	195.5350	54.35576	3.597319	0.0006
C	21957.43	649.4600	33.80875	0.0000
AR(1)	0.928198	0.045037	20.60951	0.0000
MA(12)	0.924969	0.023194	39.88002	0.0000

R-squared	0.995453	Mean dependent var	23519.15
Adjusted R-squared	0.994830	S.D. dependent var	959.1573
S.E. of regression	68.96271	Akaike info criterion	11.42656
Sum squared resid	347177.4	Schwarz criterion	11.74488
Log likelihood	-468.9154	Hannan-Quinn criter.	11.55452
F-statistic	1598.270	Durbin-Watson stat	2.106341
Prob(F-statistic)	0.000000		

Inverted AR Roots	.93			
Inverted MA Roots	.96+.26i	.96-.26i	.70-.70i	.70+.70i
	.26-.96i	.26+.96i	-.26+.96i	-.26-.96i
	-.70-.70i	-.70-.70i	-.96+.26i	-.96-.26i

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.095229	Prob. F(11,72)	0.3776
Obs*R-squared	12.04071	Prob. Chi-Square(11)	0.3606
Scaled explained SS	17.75638	Prob. Chi-Square(11)	0.0874

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/22/23 Time: 16:38
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3672.762	1815.950	2.022502	0.0468
GRADF_01^2	-0.004341	0.003778	-1.148863	0.2544
GRADF_02^2	-19336.74	14327.88	-1.349588	0.1814
GRADF_03^2	18369.73	15150.33	1.212497	0.2293
GRADF_04^2	-7261.355	13635.98	-0.532514	0.5960
GRADF_05^2	9545.504	10138.29	0.941530	0.3496
GRADF_06^2	-6758.646	12048.92	-0.560934	0.5766
GRADF_07^2	14830.58	13831.23	1.072254	0.2872
GRADF_08^2	33195.98	19757.80	1.680146	0.0973
GRADF_09^2	180180.0	1934140.	0.093158	0.9260
GRADF_10^2	0.021438	0.012250	1.750030	0.0844
GRADF_11^2	0.001684	0.005271	0.319400	0.7503

R-squared	0.143342	Mean dependent var	4269.495
Adjusted R-squared	0.012463	S.D. dependent var	8216.663
S.E. of regression	8165.298	Akaike info criterion	20.98474
Sum squared resid	4.80E+09	Schwarz criterion	21.33200
Log likelihood	-869.3590	Hannan-Quinn criter.	21.12433
F-statistic	1.095229	Durbin-Watson stat	2.281413
Prob(F-statistic)	0.377559		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>22476.0</td><td>22478.2</td><td>-2.2</td><td>| . * . |</td></tr>
<tr><td>2016M02</td><td>22502.0</td><td>22477.0</td><td>25.0</td><td>| . |* . |</td></tr>
<tr><td>2016M03</td><td>22527.0</td><td>22547.3</td><td>-20.3</td><td>| . *| . |</td></tr>
<tr><td>2016M04</td><td>22435.0</td><td>22536.7</td><td>-101.7</td><td>| * . | . |</td></tr>
<tr><td>2016M05</td><td>22040.0</td><td>22060.3</td><td>-20.3</td><td>| . *| . |</td></tr>
<tr><td>2016M06</td><td>21770.0</td><td>21813.4</td><td>-43.4</td><td>| .* | . |</td></tr>
<tr><td>2016M07</td><td>21685.0</td><td>21663.7</td><td>21.3</td><td>| . |* . |</td></tr>
<tr><td>2016M08</td><td>21618.0</td><td>21609.3</td><td>8.7</td><td>| . * . |</td></tr>
<tr><td>2016M09</td><td>21908.0</td><td>22013.3</td><td>-105.3</td><td>| * . | . |</td></tr>
<tr><td>2016M10</td><td>22379.0</td><td>22470.3</td><td>-91.3</td><td>| *. | . |</td></tr>
<tr><td>2016M11</td><td>22628.0</td><td>22455.9</td><td>172.1</td><td>| . | . * |</td></tr>
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<tr><td>2017M01</td><td>22865.0</td><td>22848.5</td><td>16.5</td><td>| . |* . |</td></tr>
<tr><td>2017M02</td><td>22891.0</td><td>22924.0</td><td>-33.0</td><td>| .* | . |</td></tr>
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<tr><td>2017M09</td><td>22156.0</td><td>22123.0</td><td>33.0</td><td>| . | *. |</td></tr>
<tr><td>2017M10</td><td>22539.0</td><td>22518.8</td><td>20.2</td><td>| . |* . |</td></tr>
<tr><td>2017M11</td><td>23008.0</td><td>23008.4</td><td>-0.4</td><td>| . * . |</td></tr>
<tr><td>2017M12</td><td>23144.0</td><td>23089.2</td><td>54.8</td><td>| . | * |</td></tr>
<tr><td>2018M01</td><td>23223.0</td><td>23196.3</td><td>26.7</td><td>| . |* . |</td></tr>
<tr><td>2018M02</td><td>23234.0</td><td>23225.8</td><td>8.2</td><td>| . * . |</td></tr>
<tr><td>2018M03</td><td>23246.0</td><td>23249.9</td><td>-3.9</td><td>| . * . |</td></tr>
<tr><td>2018M04</td><td>23099.0</td><td>23165.4</td><td>-66.4</td><td>| * | . |</td></tr>
<tr><td>2018M05</td><td>22665.0</td><td>22674.2</td><td>-9.2</td><td>| . * . |</td></tr>
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<tr><td>2018M07</td><td>22339.0</td><td>22505.4</td><td>-166.4</td><td>| * . | . |</td></tr>
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<tr><td>2018M09</td><td>22513.0</td><td>22545.3</td><td>-32.3</td><td>| .* | . |</td></tr>
<tr><td>2018M10</td><td>23193.0</td><td>22976.7</td><td>216.3</td><td>| . | . *</td></tr>
<tr><td>2018M11</td><td>23511.0</td><td>23479.6</td><td>31.4</td><td>| . | *. |</td></tr>
<tr><td>2018M12</td><td>23636.0</td><td>23595.0</td><td>41.0</td><td>| . | *. |</td></tr>
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<tr><td>2019M03</td><td>23755.0</td><td>23771.0</td><td>-16.0</td><td>| . *| . |</td></tr>
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<tr><td>2019M10</td><td>23795.0</td><td>23903.0</td><td>-108.0</td><td>| * . | . |</td></tr>
<tr><td>2019M11</td><td>24183.0</td><td>24088.9</td><td>94.1</td><td>| . | . * |</td></tr>
<tr><td>2019M12</td><td>24286.0</td><td>24226.8</td><td>59.2</td><td>| . | * |</td></tr>
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<tr><td>2021M02</td><td>24725.0</td><td>24700.1</td><td>24.9</td><td>| . |* . |</td></tr>
<tr><td>2021M03</td><td>24721.0</td><td>24745.4</td><td>-24.4</td><td>| . *| . |</td></tr>
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<tr><td>2021M05</td><td>24266.0</td><td>24330.8</td><td>-64.8</td><td>| * | . |</td></tr>
<tr><td>2021M06</td><td>24061.0</td><td>24045.0</td><td>16.0</td><td>| . |* . |</td></tr>
<tr><td>2021M07</td><td>23936.0</td><td>23982.4</td><td>-46.4</td><td>| .* | . |</td></tr>
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<tr><td>2021M12</td><td>24871.0</td><td>24816.9</td><td>54.1</td><td>| . | * |</td></tr>
<tr><td>2022M01</td><td>24914.0</td><td>24911.1</td><td>2.9</td><td>| . * . |</td></tr>
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<tr><td>2022M04</td><td>24826</td><td>24853</td><td>-27.319</td><td>| . *| . |</td></tr>
<tr><td>2022M05</td><td>24351</td><td>24375</td><td>-23.694</td><td>| . *| . |</td></tr>
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</table>

Date: 03/22/23 Time: 16:53
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.056	-0.056	0.2770	
. | . |	. | . |	2	0.057	0.054	0.5654	
.*| . |	.*| . |	3	-0.123	-0.117	1.9071	0.167
. | . |	. | . |	4	0.026	0.011	1.9662	0.374
. |*. |	. |*. |	5	0.089	0.105	2.6878	0.442
. | . |	. | . |	6	-0.016	-0.024	2.7114	0.607
.*| . |	.*| . |	7	-0.081	-0.092	3.3225	0.650
. |*. |	. |*. |	8	0.075	0.097	3.8563	0.696
. |*. |	. |*. |	9	0.085	0.099	4.5475	0.715
. |*. |	. | . |	10	0.097	0.066	5.4683	0.707
. | . |	. | . |	11	0.042	0.069	5.6399	0.775
.*| . |	. | . |	12	-0.077	-0.048	6.2395	0.795

*Probabilities may not be valid for this equation specification.

2. Residential Customer Segment - Use Per Customer Model

Dependent Variable: RES_UPC
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 02/23/23 Time: 10:51
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 11 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HH_SIZE	5.337191	0.403572	13.22488	0.0000
BC_APR	0.071850	0.001712	41.97937	0.0000
BC_DEC	0.081650	0.001402	58.23022	0.0000
BC_FEB	0.086877	0.001185	73.30187	0.0000
BC_JAN	0.088753	0.001172	75.76030	0.0000
BC_JUN	0.038721	0.005110	7.577560	0.0000
BC_MAR	0.085500	0.001429	59.84032	0.0000
BC_NOV	0.058883	0.002275	25.88355	0.0000
BC_MAY	0.059969	0.002490	24.08049	0.0000
BC_OCT	0.034515	0.004017	8.592851	0.0000
D_2021M3	11.83394	2.807497	4.215120	0.0001
D_2021M4	-5.817365	2.747138	-2.117610	0.0378
D_2018M11	5.276086	2.628966	2.006905	0.0486
AR(1)	0.567888	0.107711	5.272312	0.0000

R-squared	0.996641	Mean dependent var	57.64206
Adjusted R-squared	0.996018	S.D. dependent var	42.27987
S.E. of regression	2.668100	Akaike info criterion	4.956257
Sum squared resid	498.3132	Schwarz criterion	5.361393
Log likelihood	-194.1628	Hannan-Quinn criter.	5.119119
Durbin-Watson stat	2.058827		

Inverted AR Roots	.57

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.275954	Prob. F(14,69)	0.0127
Obs*R-squared	26.53612	Prob. Chi-Square(14)	0.0221
Scaled explained SS	22.10192	Prob. Chi-Square(14)	0.0765

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/22/23 Time: 16:55
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.698692	4.143939	-0.168606	0.8666
GRADF_01^2	18.10580	18.74193	0.966058	0.3374
GRADF_02^2	8.14E-05	3.15E-05	2.587529	0.0118
GRADF_03^2	7.86E-05	2.15E-05	3.646306	0.0005
GRADF_04^2	7.68E-07	1.49E-05	0.051480	0.9591
GRADF_05^2	2.70E-05	1.43E-05	1.882856	0.0639
GRADF_06^2	-2.05E-06	0.000451	-0.004546	0.9964
GRADF_07^2	2.66E-05	2.02E-05	1.316318	0.1924
GRADF_08^2	6.15E-06	6.31E-05	0.097514	0.9226
GRADF_09^2	-1.65E-05	7.60E-05	-0.217164	0.8287
GRADF_10^2	3.90E-05	0.000279	0.139641	0.8894
GRADF_11^2	-44.39519	54.09261	-0.820726	0.4146
GRADF_12^2	-61.66869	52.35317	-1.177936	0.2429
GRADF_13^2	56.37988	57.56912	0.979342	0.3308
GRADF_14^2	-0.366355	0.541187	-0.676947	0.5007

R-squared	0.315906	Mean dependent var	5.932300
Adjusted R-squared	0.177104	S.D. dependent var	9.243069
S.E. of regression	8.384720	Akaike info criterion	7.251132
Sum squared resid	4850.943	Schwarz criterion	7.685206
Log likelihood	-289.5475	Hannan-Quinn criter.	7.425626
F-statistic	2.275954	Durbin-Watson stat	2.138243
Prob(F-statistic)	0.012733		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>104.9</td><td>108.7</td><td>-3.8</td><td>| * . | . |</td></tr>
<tr><td>2016M02</td><td>116.1</td><td>113.0</td><td>3.1</td><td>| . | .* |</td></tr>
<tr><td>2016M03</td><td>95.9</td><td>100.9</td><td>-5.0</td><td>| *   . | . |</td></tr>
<tr><td>2016M04</td><td>69.4</td><td>68.9</td><td>0.5</td><td>| . |* . |</td></tr>
<tr><td>2016M05</td><td>41.8</td><td>44.8</td><td>-3.0</td><td>| *. | . |</td></tr>
<tr><td>2016M06</td><td>19.9</td><td>17.5</td><td>2.4</td><td>| . | * |</td></tr>
<tr><td>2016M07</td><td>13.3</td><td>12.7</td><td>0.6</td><td>| . |* . |</td></tr>
<tr><td>2016M08</td><td>13.8</td><td>13.0</td><td>0.8</td><td>| . |* . |</td></tr>
<tr><td>2016M09</td><td>13.4</td><td>13.3</td><td>0.1</td><td>| . *   . |</td></tr>
<tr><td>2016M10</td><td>22.2</td><td>22.8</td><td>-0.6</td><td>| . *| . |</td></tr>
<tr><td>2016M11</td><td>50.9</td><td>49.0</td><td>1.9</td><td>| . | *. |</td></tr>
<tr><td>2016M12</td><td>89.3</td><td>94.6</td><td>-5.3</td><td>| *   . | . |</td></tr>
<tr><td>2017M01</td><td>116.3</td><td>117.5</td><td>-1.1</td><td>| . *| . |</td></tr>
<tr><td>2017M02</td><td>112.5</td><td>113.6</td><td>-1.1</td><td>| . *| . |</td></tr>
<tr><td>2017M03</td><td>103.9</td><td>105.6</td><td>-1.6</td><td>| .* | . |</td></tr>
<tr><td>2017M04</td><td>81.1</td><td>77.2</td><td>3.9</td><td>| . | . * |</td></tr>
<tr><td>2017M05</td><td>46.5</td><td>43.9</td><td>2.6</td><td>| . | * |</td></tr>
<tr><td>2017M06</td><td>27.1</td><td>25.1</td><td>2.0</td><td>| . | *. |</td></tr>
<tr><td>2017M07</td><td>15.4</td><td>15.0</td><td>0.4</td><td>| . |* . |</td></tr>
<tr><td>2017M08</td><td>13.7</td><td>14.2</td><td>-0.6</td><td>| . *| . |</td></tr>
<tr><td>2017M09</td><td>14.6</td><td>13.2</td><td>1.3</td><td>| . | * . |</td></tr>
<tr><td>2017M10</td><td>17.5</td><td>19.4</td><td>-2.0</td><td>| .* | . |</td></tr>
<tr><td>2017M11</td><td>40.4</td><td>43.6</td><td>-3.3</td><td>| *. | . |</td></tr>
<tr><td>2017M12</td><td>100.3</td><td>95.6</td><td>4.6</td><td>| . | . * |</td></tr>
<tr><td>2018M01</td><td>155.0</td><td>151.2</td><td>3.8</td><td>| . | . * |</td></tr>
<tr><td>2018M02</td><td>116.5</td><td>120.1</td><td>-3.6</td><td>| * . | . |</td></tr>
<tr><td>2018M03</td><td>96.4</td><td>95.6</td><td>0.8</td><td>| . |* . |</td></tr>
<tr><td>2018M04</td><td>82.6</td><td>80.8</td><td>1.8</td><td>| . | *. |</td></tr>
<tr><td>2018M05</td><td>42.1</td><td>43.4</td><td>-1.4</td><td>| . *| . |</td></tr>
<tr><td>2018M06</td><td>21.1</td><td>20.1</td><td>1.0</td><td>| . | * . |</td></tr>
<tr><td>2018M07</td><td>13.7</td><td>13.2</td><td>0.5</td><td>| . |* . |</td></tr>
<tr><td>2018M08</td><td>12.7</td><td>13.3</td><td>-0.5</td><td>| . *| . |</td></tr>
<tr><td>2018M09</td><td>12.7</td><td>12.7</td><td>0.0</td><td>| . *   . |</td></tr>
<tr><td>2018M10</td><td>25.2</td><td>23.3</td><td>1.9</td><td>| . | *. |</td></tr>
<tr><td>2018M11</td><td>67.1</td><td>64.0</td><td>3.1</td><td>| . | .* |</td></tr>
<tr><td>2018M12</td><td>110.5</td><td>105.0</td><td>5.5</td><td>| . | .   *|</td></tr>
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<tr><td>2019M03</td><td>114.3</td><td>113.0</td><td>1.2</td><td>| . | * . |</td></tr>
<tr><td>2019M04</td><td>79.2</td><td>75.4</td><td>3.8</td><td>| . | . * |</td></tr>
<tr><td>2019M05</td><td>47.6</td><td>47.7</td><td>-0.1</td><td>| . *   . |</td></tr>
<tr><td>2019M06</td><td>23.9</td><td>24.3</td><td>-0.4</td><td>| . *| . |</td></tr>
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<table>
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<tr><td>2019M08</td><td>12.3</td><td>14.1</td><td>-1.7</td><td>| .* | . |</td></tr>
<tr><td>2019M09</td><td>12.7</td><td>12.5</td><td>0.2</td><td>| . * . |</td></tr>
<tr><td>2019M10</td><td>24.9</td><td>22.4</td><td>2.6</td><td>| . | * |</td></tr>
<tr><td>2019M11</td><td>53.5</td><td>52.9</td><td>0.5</td><td>| . |* . |</td></tr>
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<tr><td>2020M02</td><td>115.9</td><td>114.2</td><td>1.8</td><td>| . | *. |</td></tr>
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<tr><td>2020M04</td><td>70.2</td><td>73.8</td><td>-3.5</td><td>| * . | . |</td></tr>
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<tr><td>2020M12</td><td>88.4</td><td>88.9</td><td>-0.5</td><td>| . *| . |</td></tr>
<tr><td>2021M01</td><td>108.5</td><td>114.5</td><td>-6.0</td><td>| * . | . |</td></tr>
<tr><td>2021M02</td><td>120.7</td><td>120.3</td><td>0.4</td><td>| . |* . |</td></tr>
<tr><td>2021M03</td><td>117.1</td><td>117.2</td><td>-0.1</td><td>| . * . |</td></tr>
<tr><td>2021M04</td><td>61.5</td><td>61.7</td><td>-0.2</td><td>| . * . |</td></tr>
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<tr><td>2021M09</td><td>12.4</td><td>12.7</td><td>-0.3</td><td>| . *| . |</td></tr>
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<tr><td>2021M11</td><td>46.1</td><td>45.6</td><td>0.6</td><td>| . |* . |</td></tr>
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<tr><td>2022M01</td><td>123.5</td><td>123.3</td><td>0.2</td><td>| . * . |</td></tr>
<tr><td>2022M02</td><td>131.8</td><td>130.9</td><td>0.9</td><td>| . |* . |</td></tr>
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<tr><td>2022M04</td><td>65.143</td><td>71.652</td><td>-6.5094</td><td>|* . | . |</td></tr>
<tr><td>2022M05</td><td>42.629</td><td>41.462</td><td>1.16715</td><td>| . | * . |</td></tr>
<tr><td>2022M06</td><td>17.268</td><td>19.311</td><td>-2.0438</td><td>| .* | . |</td></tr>
<tr><td>2022M07</td><td>12.895</td><td>11.194</td><td>1.70174</td><td>| . | *. |</td></tr>
<tr><td>2022M08</td><td>11.413</td><td>12.911</td><td>-1.4984</td><td>| . * | . |</td></tr>
<tr><td>2022M09</td><td>12.423</td><td>12.068</td><td>0.35458</td><td>| . |* . |</td></tr>
<tr><td>2022M10</td><td>23.795</td><td>24.065</td><td>-0.2697</td><td>| . * . |</td></tr>
<tr><td>2022M11</td><td>38.381</td><td>42.287</td><td>-3.906</td><td>| * . | . |</td></tr>
<tr><td>2022M12</td><td>81.464</td><td>86.788</td><td>-5.3245</td><td>| * . | . |</td></tr>
</table>

Date: 03/22/23 Time: 16:56
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.*| . |	.*| . |	1	-0.074	-0.074	0.4713	
. | . |	. | . |	2	0.062	0.057	0.8080	0.369
. | . |	. | . |	3	-0.002	0.007	0.8082	0.668
. | . |	. | . |	4	0.062	0.060	1.1577	0.763
.*| . |	.*| . |	5	-0.085	-0.078	1.8204	0.769
. | . |	. | . |	6	0.043	0.026	1.9953	0.850
. |*. |	. |*. |	7	0.085	0.100	2.6749	0.848
. |*. |	. |*. |	8	0.122	0.132	4.0983	0.768
. |*. |	. |*. |	9	0.106	0.128	5.1823	0.738
. | . |	. | . |	10	0.004	-0.003	5.1837	0.818
. |*. |	. |*. |	11	0.127	0.115	6.7917	0.745
.*| . |	. | . |	12	-0.073	-0.057	7.3331	0.772

*Probabilities may not be valid for this equation specification.

3. LLF Customer Segment - Customer Model

Dependent Variable: LLF_CUST
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/15/23 Time: 15:47
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 27 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GMP(-3)	49.21921	4.630230	10.62997	0.0000
SEP	36.87870	10.60025	3.479042	0.0009
OCT	177.4436	21.64816	8.196706	0.0000
NOV	250.2749	31.43497	7.961670	0.0000
DEC	268.8000	37.99549	7.074524	0.0000
JAN	272.4971	40.16800	6.783934	0.0000
FEB	267.6736	37.73925	7.092710	0.0000
MAR	251.9503	31.21293	8.071985	0.0000
APR	190.6793	21.63935	8.811693	0.0000
MAY	72.11797	11.16290	6.460506	0.0000
C	6338.707	143.6450	44.12757	0.0000
D_2019M7_F	-120.8420	33.81450	-3.573675	0.0007
D_2019M6	-123.8904	21.75894	-5.693769	0.0000
D_2018M5	-37.93431	13.17609	-2.879026	0.0053
AR(1)	1.502714	0.089907	16.71411	0.0000
AR(2)	-0.702501	0.093575	-7.507348	0.0000

R-squared	0.989984	Mean dependent var	8056.417
Adjusted R-squared	0.987774	S.D. dependent var	211.3534
S.E. of regression	23.36929	Akaike info criterion	9.344538
Sum squared resid	37136.43	Schwarz criterion	9.807551
Log likelihood	-376.4706	Hannan-Quinn criter.	9.530665
F-statistic	448.0663	Durbin-Watson stat	1.852223
Prob(F-statistic)	0.000000		

Inverted AR Roots	.75-.37i	.75+.37i

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.497744	Prob. F(16,67)	0.1269
Obs*R-squared	22.12931	Prob. Chi-Square(16)	0.1391
Scaled explained SS	13.62877	Prob. Chi-Square(16)	0.6263

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 08:55
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	802.4543	394.0999	2.036170	0.0457
GRADF_01^2	-6565.721	2823.870	-2.325079	0.0231
GRADF_02^2	-105563.2	64229.40	-1.643534	0.1050
GRADF_03^2	154224.3	64572.80	2.388378	0.0197
GRADF_04^2	-51171.98	72283.01	-0.707939	0.4814
GRADF_05^2	-12444.37	71120.49	-0.174976	0.8616
GRADF_06^2	-45532.45	72903.37	-0.624559	0.5344
GRADF_07^2	-7357.906	67491.60	-0.109020	0.9135
GRADF_08^2	-81046.72	69002.59	-1.174546	0.2443
GRADF_09^2	66121.76	61785.93	1.070175	0.2884
GRADF_10^2	15642.44	67982.16	0.230096	0.8187
GRADF_11^2	3934210.	3855226.	1.020487	0.3112
GRADF_12^2	45158.82	652625.7	0.069196	0.9450
GRADF_13^2	-105174.6	274776.6	-0.382764	0.7031
GRADF_14^2	-26507.65	115027.8	-0.230446	0.8184
GRADF_15^2	-8.459338	11.34664	-0.745537	0.4586
GRADF_16^2	8.619244	11.86824	0.726245	0.4702

R-squared	0.263444	Mean dependent var	442.1003
Adjusted R-squared	0.087550	S.D. dependent var	609.7491
S.E. of regression	582.4460	Akaike info criterion	15.75099
Sum squared resid	22729303	Schwarz criterion	16.24294
Log likelihood	-644.5415	Hannan-Quinn criter.	15.94875
F-statistic	1.497744	Durbin-Watson stat	2.277469
Prob(F-statistic)	0.126917		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>7928.0</td><td>7942.3</td><td>-14.3</td><td>| . * | . |</td></tr>
<tr><td>2016M02</td><td>7939.0</td><td>7932.4</td><td>6.6</td><td>| . |* . |</td></tr>
<tr><td>2016M03</td><td>7926.0</td><td>7943.9</td><td>-17.9</td><td>| .* | . |</td></tr>
<tr><td>2016M04</td><td>7857.0</td><td>7876.7</td><td>-19.7</td><td>| .* | . |</td></tr>
<tr><td>2016M05</td><td>7740.0</td><td>7744.8</td><td>-4.8</td><td>| . *| . |</td></tr>
<tr><td>2016M06</td><td>7655.0</td><td>7681.2</td><td>-26.2</td><td>| * | . |</td></tr>
<tr><td>2016M07</td><td>7622.0</td><td>7661.6</td><td>-39.6</td><td>| * . | . |</td></tr>
<tr><td>2016M08</td><td>7633.0</td><td>7622.0</td><td>11.0</td><td>| . | * . |</td></tr>
<tr><td>2016M09</td><td>7682.0</td><td>7699.9</td><td>-17.9</td><td>| .* | . |</td></tr>
<tr><td>2016M10</td><td>7856.0</td><td>7851.8</td><td>4.2</td><td>| . |* . |</td></tr>
<tr><td>2016M11</td><td>7930.0</td><td>7967.1</td><td>-37.1</td><td>| * . | . |</td></tr>
<tr><td>2016M12</td><td>7979.0</td><td>7965.0</td><td>14.0</td><td>| . | * . |</td></tr>
<tr><td>2017M01</td><td>7999.0</td><td>8015.0</td><td>-16.0</td><td>| .* | . |</td></tr>
<tr><td>2017M02</td><td>8002.0</td><td>8014.3</td><td>-12.3</td><td>| . * | . |</td></tr>
<tr><td>2017M03</td><td>7998.0</td><td>7999.5</td><td>-1.5</td><td>| . * . |</td></tr>
<tr><td>2017M04</td><td>7925.0</td><td>7951.3</td><td>-26.3</td><td>| * | . |</td></tr>
<tr><td>2017M05</td><td>7833.0</td><td>7806.4</td><td>26.6</td><td>| . | * |</td></tr>
<tr><td>2017M06</td><td>7783.0</td><td>7782.7</td><td>0.3</td><td>| . * . |</td></tr>
<tr><td>2017M07</td><td>7753.0</td><td>7798.7</td><td>-45.7</td><td>| * . | . |</td></tr>
<tr><td>2017M08</td><td>7764.0</td><td>7740.4</td><td>23.6</td><td>| . | * |</td></tr>
<tr><td>2017M09</td><td>7798.0</td><td>7818.3</td><td>-20.3</td><td>| .* | . |</td></tr>
<tr><td>2017M10</td><td>7939.0</td><td>7948.0</td><td>-9.0</td><td>| . * | . |</td></tr>
<tr><td>2017M11</td><td>8089.0</td><td>8025.4</td><td>63.6</td><td>| . | . *</td></tr>
<tr><td>2017M12</td><td>8160.0</td><td>8159.9</td><td>0.1</td><td>| . * . |</td></tr>
<tr><td>2018M01</td><td>8172.0</td><td>8189.6</td><td>-17.6</td><td>| .* | . |</td></tr>
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<tr><td>2018M05</td><td>7930.0</td><td>7964.5</td><td>-34.5</td><td>| * . | . |</td></tr>
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<tr><td>2018M08</td><td>7804.0</td><td>7786.2</td><td>17.8</td><td>| . | *. |</td></tr>
<tr><td>2018M09</td><td>7876.0</td><td>7862.6</td><td>13.4</td><td>| . | * . |</td></tr>
<tr><td>2018M10</td><td>8085.0</td><td>8051.1</td><td>33.9</td><td>| . | . * |</td></tr>
<tr><td>2018M11</td><td>8192.0</td><td>8204.0</td><td>-12.0</td><td>| . * | . |</td></tr>
<tr><td>2018M12</td><td>8238.0</td><td>8227.0</td><td>11.0</td><td>| . | * . |</td></tr>
<tr><td>2019M01</td><td>8264.0</td><td>8249.4</td><td>14.6</td><td>| . | * . |</td></tr>
<tr><td>2019M02</td><td>8281.0</td><td>8259.9</td><td>21.1</td><td>| . | * |</td></tr>
<tr><td>2019M03</td><td>8283.0</td><td>8262.5</td><td>20.5</td><td>| . | *. |</td></tr>
<tr><td>2019M04</td><td>8225.0</td><td>8213.9</td><td>11.1</td><td>| . | * . |</td></tr>
<tr><td>2019M05</td><td>8068.0</td><td>8087.7</td><td>-19.7</td><td>| .* | . |</td></tr>
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<tr><td>2019M08</td><td>7766.0</td><td>7740.4</td><td>25.6</td><td>| . | * |</td></tr>
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<tr><td>2020M02</td><td>8219.0</td><td>8224.4</td><td>-5.4</td><td>| . *| . |</td></tr>
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<tr><td>2020M04</td><td>8153.0</td><td>8143.1</td><td>9.9</td><td>| . |* . |</td></tr>
<tr><td>2020M05</td><td>8051.0</td><td>8006.6</td><td>44.4</td><td>| . | . * |</td></tr>
<tr><td>2020M06</td><td>7963.0</td><td>7923.7</td><td>39.3</td><td>| . | . * |</td></tr>
<tr><td>2020M07</td><td>7924.0</td><td>7896.0</td><td>28.0</td><td>| . | .* |</td></tr>
<tr><td>2020M08</td><td>7900.0</td><td>7887.5</td><td>12.5</td><td>| . |* . |</td></tr>
<tr><td>2020M09</td><td>7972.0</td><td>7956.6</td><td>15.4</td><td>| . | *. |</td></tr>
<tr><td>2020M10</td><td>8154.0</td><td>8167.0</td><td>-13.0</td><td>| . * | . |</td></tr>
<tr><td>2020M11</td><td>8222.0</td><td>8255.8</td><td>-33.8</td><td>| * . | . |</td></tr>
<tr><td>2020M12</td><td>8252.0</td><td>8211.8</td><td>40.2</td><td>| . | . * |</td></tr>
<tr><td>2021M01</td><td>8261.0</td><td>8241.6</td><td>19.4</td><td>| . | *. |</td></tr>
<tr><td>2021M02</td><td>8264.0</td><td>8254.1</td><td>9.9</td><td>| . |* . |</td></tr>
<tr><td>2021M03</td><td>8256.0</td><td>8261.8</td><td>-5.8</td><td>| . *| . |</td></tr>
<tr><td>2021M04</td><td>8211.0</td><td>8211.9</td><td>-0.9</td><td>| . * . |</td></tr>
<tr><td>2021M05</td><td>8084.0</td><td>8109.8</td><td>-25.8</td><td>| * | . |</td></tr>
<tr><td>2021M06</td><td>7991.0</td><td>8013.7</td><td>-22.7</td><td>| * | . |</td></tr>
<tr><td>2021M07</td><td>7987.0</td><td>7988.9</td><td>-1.9</td><td>| . * . |</td></tr>
<tr><td>2021M08</td><td>8000.0</td><td>7997.7</td><td>2.3</td><td>| . * . |</td></tr>
<tr><td>2021M09</td><td>8050.0</td><td>8057.5</td><td>-7.5</td><td>| . *| . |</td></tr>
<tr><td>2021M10</td><td>8210.0</td><td>8209.6</td><td>0.4</td><td>| . * . |</td></tr>
<tr><td>2021M11</td><td>8323.0</td><td>8306.7</td><td>16.3</td><td>| . | *. |</td></tr>
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<tr><td>2022M01</td><td>8409.0</td><td>8389.5</td><td>19.5</td><td>| . | *. |</td></tr>
<tr><td>2022M02</td><td>8414.0</td><td>8428.8</td><td>-14.8</td><td>| . * | . |</td></tr>
<tr><td>2022M03</td><td>8412.0</td><td>8401.3</td><td>10.7</td><td>| . |* . |</td></tr>
<tr><td>2022M04</td><td>8359</td><td>8356.6</td><td>2.39551</td><td>| . * . |</td></tr>
<tr><td>2022M05</td><td>8216</td><td>8242.4</td><td>-26.353</td><td>| * | . |</td></tr>
<tr><td>2022M06</td><td>8125</td><td>8131.5</td><td>-6.5391</td><td>| . *| . |</td></tr>
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<tr><td>2022M09</td><td>8178</td><td>8154.8</td><td>23.225</td><td>| . | * |</td></tr>
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<tr><td>2022M11</td><td>8459</td><td>8454.9</td><td>4.0553</td><td>| . |* . |</td></tr>
<tr><td>2022M12</td><td>8513</td><td>8510.2</td><td>2.79299</td><td>| . * . |</td></tr>
</table>

Date: 03/23/23 Time: 08:58
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	0.071	0.071	0.4380	
. | . |	. | . |	2	-0.012	-0.018	0.4516	
. |*. |	. |*. |	3	0.109	0.112	1.5157	0.218
.*| . |	.*| . |	4	-0.156	-0.176	3.7209	0.156
. | . |	. | . |	5	0.016	0.051	3.7456	0.290
. |*. |	. |*. |	6	0.101	0.078	4.6921	0.320
. | . |	. |*. |	7	0.050	0.078	4.9305	0.424
. |*. |	. |*. |	8	0.141	0.105	6.8320	0.337
. | . |	.*| . |	9	-0.042	-0.078	7.0050	0.428
. |*. |	. |*. |	10	0.111	0.154	8.2128	0.413
. | . |	. | . |	11	0.071	0.031	8.7061	0.465
.*| . |	.*| . |	12	-0.130	-0.097	10.389	0.407

*Probabilities may not be valid for this equation specification.

4. LLF Customer Segment - Use Per Customer Model

Dependent Variable: LLF_UPC
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/15/23 Time: 15:58
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 37 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GMP(-3)*Q4_TO_Q2	5.768885	0.350578	16.45534	0.0000
BC_OCT	0.656343	0.049796	13.18068	0.0000
BC_NOV	0.777321	0.021105	36.83191	0.0000
BC_DEC	0.862919	0.013049	66.13121	0.0000
BC_JAN	0.851006	0.010050	84.67489	0.0000
BC_FEB	0.795727	0.010808	73.62164	0.0000
BC_MAR	0.845921	0.012130	69.73958	0.0000
BC_APR	0.705366	0.015123	46.64289	0.0000
BC_MAY	0.576968	0.025034	23.04736	0.0000
BC_JUN	0.414042	0.059806	6.923118	0.0000
D_2020M11	-49.83477	20.15067	-2.473107	0.0161
D_2021M1	-140.2356	31.61630	-4.435547	0.0000
D_2021M3	185.4522	21.06101	8.805475	0.0000
JAN*D_2019M7_F*TREND	1.714488	0.238028	7.202874	0.0000
FEB*D_2019M7_F*TREND	1.400399	0.153369	9.130924	0.0000
JUL	230.5824	5.838559	39.49304	0.0000
AUG	223.4388	5.818609	38.40072	0.0000
SEP	238.3795	5.806183	41.05615	0.0000
AR(4)	0.405994	0.120794	3.361050	0.0013
AR(12)	-0.569236	0.116028	-4.906018	0.0000
MA(1)	-0.310136	0.119261	-2.600475	0.0116

R-squared	0.997998	Mean dependent var	661.2274
Adjusted R-squared	0.997363	S.D. dependent var	402.3675
S.E. of regression	20.66231	Akaike info criterion	9.186360
Sum squared resid	26896.66	Schwarz criterion	9.794064
Log likelihood	-364.8271	Hannan-Quinn criter.	9.430652
Durbin-Watson stat	1.930293		

Inverted AR Roots	.95-.22i	.95+.22i	.65-.65i	.65-.65i
	.22+.95i	.22-.95i	-.22-.95i	-.22+.95i
	-.65+.65i	-.65+.65i	-.95+.22i	-.95-.22i
Inverted MA Roots	.31			

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.091819	Prob. F(21,62)	0.3801
Obs*R-squared	22.67761	Prob. Chi-Square(21)	0.3614
Scaled explained SS	13.91161	Prob. Chi-Square(21)	0.8734

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 09:00
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	413.0482	196.0643	2.106697	0.0392
GRADF_01^2	3.092344	22.45101	0.137737	0.8909
GRADF_02^2	-0.238647	0.480606	-0.496555	0.6213
GRADF_03^2	-0.091821	0.120521	-0.761872	0.4490
GRADF_04^2	-0.005049	0.051168	-0.098680	0.9217
GRADF_05^2	0.035031	0.029211	1.199217	0.2350
GRADF_06^2	0.021681	0.029949	0.723924	0.4718
GRADF_07^2	-0.021412	0.035282	-0.606892	0.5461
GRADF_08^2	-0.026211	0.050847	-0.515475	0.6081
GRADF_09^2	-0.101647	0.137395	-0.739814	0.4622
GRADF_10^2	-0.642370	0.789536	-0.813604	0.4190
GRADF_11^2	-40374.88	167244.2	-0.241413	0.8100
GRADF_12^2	-19525.84	234764.9	-0.083172	0.9340
GRADF_13^2	125314.4	170573.5	0.734665	0.4653
GRADF_14^2	-17.01009	13.71272	-1.240460	0.2195
GRADF_15^2	-7.541975	9.976487	-0.755975	0.4525
GRADF_16^2	-20594.57	34243.90	-0.601409	0.5498
GRADF_17^2	-32718.50	32696.47	-1.000674	0.3209
GRADF_18^2	78234.98	32463.09	2.409967	0.0189
GRADF_19^2	-19.13194	32.72570	-0.584615	0.5609
GRADF_20^2	-22.03407	28.24707	-0.780048	0.4383
GRADF_21^2	-0.115592	35.73657	-0.003235	0.9974

R-squared	0.269971	Mean dependent var	320.1984
Adjusted R-squared	0.022704	S.D. dependent var	475.7333
S.E. of regression	470.3018	Akaike info criterion	15.36475
Sum squared resid	13713397	Schwarz criterion	16.00140
Log likelihood	-623.3197	Hannan-Quinn criter.	15.62068
F-statistic	1.091819	Durbin-Watson stat	1.771135
Prob(F-statistic)	0.380138		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>1125.4</td><td>1100.6</td><td>24.8</td><td>| . | .* |</td></tr>
<tr><td>2016M02</td><td>1154.9</td><td>1111.5</td><td>43.4</td><td>| . | . *|</td></tr>
<tr><td>2016M03</td><td>998.3</td><td>1006.6</td><td>-8.3</td><td>| . *| . |</td></tr>
<tr><td>2016M04</td><td>743.3</td><td>738.2</td><td>5.1</td><td>| . |* . |</td></tr>
<tr><td>2016M05</td><td>465.1</td><td>490.0</td><td>-24.9</td><td>| *. | . |</td></tr>
<tr><td>2016M06</td><td>271.4</td><td>272.8</td><td>-1.4</td><td>| . * . |</td></tr>
<tr><td>2016M07</td><td>204.5</td><td>214.2</td><td>-9.7</td><td>| . *| . |</td></tr>
<tr><td>2016M08</td><td>215.2</td><td>230.6</td><td>-15.4</td><td>| .* | . |</td></tr>
<tr><td>2016M09</td><td>217.1</td><td>219.8</td><td>-2.8</td><td>| . *| . |</td></tr>
<tr><td>2016M10</td><td>356.9</td><td>353.2</td><td>3.7</td><td>| . |* . |</td></tr>
<tr><td>2016M11</td><td>643.0</td><td>641.0</td><td>2.0</td><td>| . * . |</td></tr>
<tr><td>2016M12</td><td>987.4</td><td>1017.2</td><td>-29.8</td><td>| * . | . |</td></tr>
<tr><td>2017M01</td><td>1190.4</td><td>1172.6</td><td>17.8</td><td>| . | * |</td></tr>
<tr><td>2017M02</td><td>1109.7</td><td>1077.6</td><td>32.2</td><td>| . | . * |</td></tr>
<tr><td>2017M03</td><td>1104.9</td><td>1110.6</td><td>-5.7</td><td>| . *| . |</td></tr>
<tr><td>2017M04</td><td>814.3</td><td>806.6</td><td>7.7</td><td>| . | * . |</td></tr>
<tr><td>2017M05</td><td>482.1</td><td>464.3</td><td>17.7</td><td>| . | * |</td></tr>
<tr><td>2017M06</td><td>271.6</td><td>255.9</td><td>15.7</td><td>| . | *. |</td></tr>
<tr><td>2017M07</td><td>244.0</td><td>240.8</td><td>3.2</td><td>| . |* . |</td></tr>
<tr><td>2017M08</td><td>211.0</td><td>224.5</td><td>-13.5</td><td>| .* | . |</td></tr>
<tr><td>2017M09</td><td>221.9</td><td>264.3</td><td>-42.3</td><td>| * . | . |</td></tr>
<tr><td>2017M10</td><td>292.2</td><td>285.7</td><td>6.5</td><td>| . |* . |</td></tr>
<tr><td>2017M11</td><td>588.4</td><td>593.9</td><td>-5.5</td><td>| . *| . |</td></tr>
<tr><td>2017M12</td><td>1100.4</td><td>1089.6</td><td>10.8</td><td>| . | * . |</td></tr>
<tr><td>2018M01</td><td>1441.0</td><td>1482.0</td><td>-41.0</td><td>| * . | . |</td></tr>
<tr><td>2018M02</td><td>1118.0</td><td>1151.0</td><td>-33.0</td><td>| * . | . |</td></tr>
<tr><td>2018M03</td><td>1016.3</td><td>1010.7</td><td>5.6</td><td>| . |* . |</td></tr>
<tr><td>2018M04</td><td>835.0</td><td>856.0</td><td>-21.0</td><td>| * | . |</td></tr>
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<tr><td>2018M07</td><td>219.3</td><td>224.9</td><td>-5.6</td><td>| . *| . |</td></tr>
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<tr><td>2018M12</td><td>1110.7</td><td>1112.5</td><td>-1.8</td><td>| . * . |</td></tr>
<tr><td>2019M01</td><td>1278.1</td><td>1255.3</td><td>22.9</td><td>| . | .* |</td></tr>
<tr><td>2019M02</td><td>1246.9</td><td>1248.2</td><td>-1.2</td><td>| . * . |</td></tr>
<tr><td>2019M03</td><td>1146.9</td><td>1166.8</td><td>-19.9</td><td>| * | . |</td></tr>
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</table>

<table>
<tr><td>2019M07</td><td>227.7</td><td>224.9</td><td>2.9</td><td>| . |* . |</td></tr>
<tr><td>2019M08</td><td>223.7</td><td>225.8</td><td>-2.1</td><td>| . * . |</td></tr>
<tr><td>2019M09</td><td>232.6</td><td>252.3</td><td>-19.7</td><td>| * | . |</td></tr>
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<tr><td>2020M03</td><td>1053.6</td><td>1049.4</td><td>4.2</td><td>| . |* . |</td></tr>
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<tr><td>2021M10</td><td>330.3</td><td>350.1</td><td>-19.8</td><td>| * | . |</td></tr>
<tr><td>2021M11</td><td>687.1</td><td>692.7</td><td>-5.5</td><td>| . *| . |</td></tr>
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<tr><td>2022M01</td><td>1419.9</td><td>1409.9</td><td>10.0</td><td>| . | * . |</td></tr>
<tr><td>2022M02</td><td>1381.8</td><td>1403.1</td><td>-21.3</td><td>| * | . |</td></tr>
<tr><td>2022M03</td><td>1198.8</td><td>1165.2</td><td>33.6</td><td>| . | . * |</td></tr>
<tr><td>2022M04</td><td>788.05</td><td>771.29</td><td>16.7589</td><td>| . | * |</td></tr>
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<tr><td>2022M06</td><td>289.03</td><td>291.28</td><td>-2.2543</td><td>| . * . |</td></tr>
<tr><td>2022M07</td><td>251.05</td><td>250.35</td><td>0.69725</td><td>| . * . |</td></tr>
<tr><td>2022M08</td><td>229.8</td><td>212.95</td><td>16.8508</td><td>| . | * |</td></tr>
<tr><td>2022M09</td><td>272.52</td><td>222.05</td><td>50.4721</td><td>| . | .   *</td></tr>
<tr><td>2022M10</td><td>413.2</td><td>441.92</td><td>-28.721</td><td>| * . | . |</td></tr>
<tr><td>2022M11</td><td>619.93</td><td>633.89</td><td>-13.958</td><td>| .* | . |</td></tr>
<tr><td>2022M12</td><td>1024.1</td><td>1027.4</td><td>-3.2869</td><td>| . *| . |</td></tr>
</table>

Date: 03/23/23 Time: 09:01
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 3 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	0.023	0.023	0.0470	
.*| . |	.*| . |	2	-0.148	-0.149	1.9745	
. | . |	. | . |	3	0.025	0.034	2.0320	
. | . |	. | . |	4	0.059	0.036	2.3458	0.126
. |*. |	. |*. |	5	0.101	0.109	3.2722	0.195
.*| . |	.*| . |	6	-0.080	-0.075	3.8591	0.277
. | . |	. | . |	7	-0.035	-0.003	3.9754	0.409
. | . |	. | . |	8	0.030	-0.001	4.0604	0.541
.*| . |	.*| . |	9	-0.078	-0.092	4.6529	0.589
.*| . |	.*| . |	10	-0.136	-0.136	6.4497	0.488
. | . |	. | . |	11	-0.023	-0.026	6.5034	0.591
. | . |	. | . |	12	-0.008	-0.044	6.5104	0.688

*Probabilities may not be valid for this equation specification.

5. HLF Customer Segment - Customer Model

Dependent Variable: HLF_CUST
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/01/23 Time: 14:40
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Failure to improve likelihood (non-zero gradients) after 6 iterations
Coefficient covariance computed using outer product of gradients
MA Backcast: 2015M12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GMP(-3)*D_2021M11_F	0.416276	0.187631	2.218592	0.0294
D_2018M5_2019M6	48.21605	4.956835	9.727186	0.0000
C	1147.672	23.69634	48.43244	0.0000
AR(2)	0.925010	0.047803	19.35032	0.0000
MA(1)	0.887361	0.061507	14.42699	0.0000

R-squared	0.961960	Mean dependent var	1139.595
Adjusted R-squared	0.960034	S.D. dependent var	35.12323
S.E. of regression	7.021644	Akaike info criterion	6.793551
Sum squared resid	3894.976	Schwarz criterion	6.938242
Log likelihood	-280.3291	Hannan-Quinn criter.	6.851715
F-statistic	499.4437	Durbin-Watson stat	2.118708
Prob(F-statistic)	0.000000		

Inverted AR Roots	.96	-.96
Inverted MA Roots	-.89	

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.926651	Prob. F(5,78)	0.0993
Obs*R-squared	9.233861	Prob. Chi-Square(5)	0.1001
Scaled explained SS	24.04808	Prob. Chi-Square(5)	0.0002

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 09:02
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	104.4041	255.0703	0.409315	0.6834
GRADF_01^2	-0.002528	0.081696	-0.030942	0.9754
GRADF_02^2	223.2042	81.43100	2.741022	0.0076
GRADF_03^2	-31805.69	160310.3	-0.198401	0.8432
GRADF_04^2	-0.006336	0.019829	-0.319542	0.7502
GRADF_05^2	-0.053236	0.048869	-1.089365	0.2793

R-squared	0.109927	Mean dependent var	46.36876
Adjusted R-squared	0.052871	S.D. dependent var	113.1988
S.E. of regression	110.1657	Akaike info criterion	12.31060
Sum squared resid	946645.6	Schwarz criterion	12.48423
Log likelihood	-511.0451	Hannan-Quinn criter.	12.38040
F-statistic	1.926651	Durbin-Watson stat	1.830369
Prob(F-statistic)	0.099318		

obs	Actual	Fitted	Residual	Residual Plot
2016M01	2135.6	1968.4	167.2	| . | . * |
2016M02	2004.6	1961.2	43.4	| . |* . |
2016M03	2000.3	2012.3	-12.0	| . * . |
2016M04	1978.3	1872.7	105.6	| . | .* |
2016M05	1968.0	1892.4	75.6	| . | * |
2016M06	1963.7	1929.9	33.9	| . |* . |
2016M07	1766.5	1923.6	-157.1	| * . | . |
2016M08	1975.5	1861.3	114.2	| . | .* |
2016M09	1815.5	1835.9	-20.4	| . *| . |
2016M10	2014.6	1986.1	28.5	| . |* . |
2016M11	2035.3	2040.3	-5.0	| . * . |
2016M12	2044.5	1940.8	103.7	| . | * |
2017M01	2017.3	2059.7	-42.4	| . *| . |
2017M02	1976.7	1980.3	-3.6	| . * . |
2017M03	2057.8	1957.0	100.8	| . | * |
2017M04	1867.5	1879.4	-12.0	| . * . |
2017M05	2025.6	1883.3	142.3	| . | . * |
2017M06	1581.3	1898.3	-317.0	|* . | . |
2017M07	2014.4	1834.3	180.1	| . | . * |
2017M08	1850.9	1764.9	86.0	| . | * |
2017M09	1772.7	1922.3	-149.7	| * . | . |
2017M10	1978.1	1902.0	76.0	| . | * |
2017M11	2222.1	2080.3	141.8	| . | . * |
2017M12	2244.6	2158.9	85.8	| . | * |
2018M01	2351.7	2445.4	-93.7	| * | . |
2018M02	2001.2	1977.8	23.4	| . |* . |
2018M03	2150.2	2130.1	20.1	| . |* . |
2018M04	2081.5	2042.9	38.6	| . |* . |
2018M05	1792.5	1957.0	-164.5	| * . | . |
2018M06	1740.3	1859.8	-119.5	| *. | . |
2018M07	1660.9	1736.5	-75.6	| * | . |
2018M08	1728.5	1714.1	14.4	| . * . |
2018M09	1668.2	1719.7	-51.5	| .* | . |
2018M10	2011.5	1892.1	119.4	| . | .* |
2018M11	2091.0	2132.1	-41.2	| . *| . |
2018M12	2038.8	2076.7	-37.9	| . *| . |
2019M01	2237.0	2165.3	71.7	| . | *. |
2019M02	2060.3	2137.2	-76.9	| * | . |
2019M03	2118.4	2126.8	-8.4	| . * . |
2019M04	2021.9	1919.6	102.3	| . | * |
2019M05	1977.6	1918.5	59.0	| . | *. |
2019M06	1845.5	1912.6	-67.1	| .* | . |

<table>
<tr><td>2019M07</td><td>1885.9</td><td>1855.7</td><td>30.2</td><td>| . |* . |</td></tr>
<tr><td>2019M08</td><td>1906.6</td><td>1835.0</td><td>71.6</td><td>| . | *. |</td></tr>
<tr><td>2019M09</td><td>1919.0</td><td>1882.2</td><td>36.8</td><td>| . |* . |</td></tr>
<tr><td>2019M10</td><td>2058.1</td><td>2018.6</td><td>39.5</td><td>| . |* . |</td></tr>
<tr><td>2019M11</td><td>2196.2</td><td>2191.7</td><td>4.5</td><td>| . * . |</td></tr>
<tr><td>2019M12</td><td>2263.5</td><td>2140.5</td><td>123.0</td><td>| . | .* |</td></tr>
<tr><td>2020M01</td><td>2337.5</td><td>2300.0</td><td>37.6</td><td>| . |* . |</td></tr>
<tr><td>2020M02</td><td>2303.4</td><td>2278.5</td><td>24.9</td><td>| . |* . |</td></tr>
<tr><td>2020M03</td><td>2229.8</td><td>2219.7</td><td>10.1</td><td>| . * . |</td></tr>
<tr><td>2020M04</td><td>1809.8</td><td>1983.3</td><td>-173.5</td><td>| * . | . |</td></tr>
<tr><td>2020M05</td><td>1689.1</td><td>1750.0</td><td>-60.9</td><td>| .* | . |</td></tr>
<tr><td>2020M06</td><td>1680.1</td><td>1536.1</td><td>144.0</td><td>| . | . * |</td></tr>
<tr><td>2020M07</td><td>1619.1</td><td>1583.1</td><td>36.0</td><td>| . |* . |</td></tr>
<tr><td>2020M08</td><td>1634.2</td><td>1707.9</td><td>-73.7</td><td>| .* | . |</td></tr>
<tr><td>2020M09</td><td>1716.0</td><td>1757.2</td><td>-41.2</td><td>| . *| . |</td></tr>
<tr><td>2020M10</td><td>1877.5</td><td>1900.4</td><td>-22.9</td><td>| . *| . |</td></tr>
<tr><td>2020M11</td><td>2115.2</td><td>2059.7</td><td>55.5</td><td>| . | *. |</td></tr>
<tr><td>2020M12</td><td>2050.8</td><td>1985.8</td><td>65.0</td><td>| . | *. |</td></tr>
<tr><td>2021M01</td><td>2075.8</td><td>2161.0</td><td>-85.2</td><td>| * | . |</td></tr>
<tr><td>2021M02</td><td>2018.0</td><td>2078.2</td><td>-60.2</td><td>| .* | . |</td></tr>
<tr><td>2021M03</td><td>2138.2</td><td>2010.3</td><td>127.9</td><td>| . | .* |</td></tr>
<tr><td>2021M04</td><td>1879.9</td><td>1874.7</td><td>5.1</td><td>| . * . |</td></tr>
<tr><td>2021M05</td><td>1888.8</td><td>1858.9</td><td>29.9</td><td>| . |* . |</td></tr>
<tr><td>2021M06</td><td>1745.7</td><td>1787.4</td><td>-41.7</td><td>| . *| . |</td></tr>
<tr><td>2021M07</td><td>1742.6</td><td>1774.1</td><td>-31.5</td><td>| . *| . |</td></tr>
<tr><td>2021M08</td><td>1766.7</td><td>1738.1</td><td>28.6</td><td>| . |* . |</td></tr>
<tr><td>2021M09</td><td>1788.6</td><td>1760.5</td><td>28.1</td><td>| . |* . |</td></tr>
<tr><td>2021M10</td><td>1830.5</td><td>1889.9</td><td>-59.4</td><td>| .* | . |</td></tr>
<tr><td>2021M11</td><td>2051.4</td><td>2054.2</td><td>-2.8</td><td>| . * . |</td></tr>
<tr><td>2021M12</td><td>1988.4</td><td>1991.9</td><td>-3.5</td><td>| . * . |</td></tr>
<tr><td>2022M01</td><td>2161.0</td><td>2176.5</td><td>-15.5</td><td>| . *| . |</td></tr>
<tr><td>2022M02</td><td>2029.1</td><td>2100.4</td><td>-71.3</td><td>| .* | . |</td></tr>
<tr><td>2022M03</td><td>1887.5</td><td>2039.7</td><td>-152.2</td><td>| * . | . |</td></tr>
<tr><td>2022M04</td><td>1772.5</td><td>1826.2</td><td>-53.675</td><td>| .* | . |</td></tr>
<tr><td>2022M05</td><td>1828.8</td><td>1756</td><td>72.7797</td><td>| . | *. |</td></tr>
<tr><td>2022M06</td><td>1688.3</td><td>1753.9</td><td>-65.625</td><td>| .* | . |</td></tr>
<tr><td>2022M07</td><td>1622</td><td>1747.8</td><td>-125.81</td><td>| *. | . |</td></tr>
<tr><td>2022M08</td><td>1724.9</td><td>1688.7</td><td>36.1949</td><td>| . |* . |</td></tr>
<tr><td>2022M09</td><td>1720.2</td><td>1708.2</td><td>11.9693</td><td>| . * . |</td></tr>
<tr><td>2022M10</td><td>1796.9</td><td>1912.7</td><td>-115.74</td><td>| *. | . |</td></tr>
<tr><td>2022M11</td><td>1888.9</td><td>1943.9</td><td>-55.085</td><td>| .* | . |</td></tr>
<tr><td>2022M12</td><td>1709.5</td><td>1895.8</td><td>-186.3</td><td>| * . | . |</td></tr>
</table>

Date: 03/23/23 Time: 09:04
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.*| . |	.*| . |	1	-0.077	-0.077	0.5132	
. | . |	. | . |	2	0.048	0.042	0.7142	
. |*. |	. |*. |	3	0.102	0.110	1.6429	0.200
. | . |	. | . |	4	-0.028	-0.014	1.7133	0.425
. | . |	. | . |	5	-0.027	-0.041	1.7799	0.619
. | . |	.*| . |	6	-0.063	-0.079	2.1466	0.709
. | . |	. | . |	7	-0.051	-0.055	2.3900	0.793
.*| . |	.*| . |	8	-0.098	-0.095	3.3081	0.769
. | . |	. | . |	9	0.049	0.055	3.5424	0.831
. | . |	. | . |	10	-0.025	0.002	3.6011	0.891
.*| . |	.*| . |	11	-0.079	-0.075	4.2250	0.896
. | . |	. | . |	12	0.042	0.008	4.4038	0.927

*Probabilities may not be valid for this equation specification.

6. HLF Customer Segment - Use Per Customer Model

Dependent Variable: HLF_UPC
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/01/23 Time: 14:43
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Convergence achieved after 9 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEMP_RT(-1)	-38.92861	12.16159	-3.200949	0.0020
BC_DEC+BC_FEB	0.082400	0.037778	2.181186	0.0324
BC_JAN	0.160811	0.041997	3.829057	0.0003
BC_MAR	0.108100	0.039050	2.768211	0.0071
BC_NOV	0.326041	0.065012	5.015113	0.0000
BC_OCT	0.370237	0.130697	2.832779	0.0060
D_2017M09_F*BC_EDD	0.173506	0.047100	3.683750	0.0004
D_2018_M02	-225.1990	88.33268	-2.549441	0.0129
C	1909.704	63.35549	30.14268	0.0000
AR(1)	0.301170	0.112975	2.665810	0.0095
AR(2)	0.448404	0.114953	3.900740	0.0002

R-squared	0.762541	Mean dependent var	1939.575
Adjusted R-squared	0.730012	S.D. dependent var	185.2815
S.E. of regression	96.27292	Akaike info criterion	12.09380
Sum squared resid	676598.7	Schwarz criterion	12.41212
Log likelihood	-496.9395	Hannan-Quinn criter.	12.22176
F-statistic	23.44213	Durbin-Watson stat	2.111396
Prob(F-statistic)	0.000000		

Inverted AR Roots	.84	-.54

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.089450	Prob. F(10,73)	0.3816
Obs*R-squared	10.90820	Prob. Chi-Square(10)	0.3647
Scaled explained SS	11.23007	Prob. Chi-Square(10)	0.3399

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 09:08
Sample: 2016M01 2022M12
Included observations: 84
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4224.363	3078.661	1.372143	0.1742
GRADF_01^2	309.5210	340.6919	0.908507	0.3666
GRADF_02^2	-0.000455	0.006339	-0.071710	0.9430
GRADF_03^2	-0.001777	0.004336	-0.409837	0.6831
GRADF_04^2	0.000123	0.004917	0.024994	0.9801
GRADF_05^2	-0.010428	0.015735	-0.662705	0.5096
GRADF_06^2	0.003512	0.071358	0.049215	0.9609
GRADF_07^2	0.001939	0.013079	0.148242	0.8826
GRADF_08^2	-4920.476	13766.29	-0.357429	0.7218
GRADF_10^2	0.337597	0.121971	2.767854	0.0071
GRADF_11^2	0.005587	0.122979	0.045431	0.9639

R-squared	0.129859	Mean dependent var	8054.746
Adjusted R-squared	0.010662	S.D. dependent var	13379.46
S.E. of regression	13307.94	Akaike info criterion	21.95166
Sum squared resid	1.29E+10	Schwarz criterion	22.26998
Log likelihood	-910.9696	Hannan-Quinn criter.	22.07962
F-statistic	1.089450	Durbin-Watson stat	1.857778
Prob(F-statistic)	0.381601		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>2135.6</td><td>1968.4</td><td>167.2</td><td>| . | . * |</td></tr>
<tr><td>2016M02</td><td>2004.6</td><td>1961.2</td><td>43.4</td><td>| . |* . |</td></tr>
<tr><td>2016M03</td><td>2000.3</td><td>2012.3</td><td>-12.0</td><td>| . * . |</td></tr>
<tr><td>2016M04</td><td>1978.3</td><td>1872.7</td><td>105.6</td><td>| . | .* |</td></tr>
<tr><td>2016M05</td><td>1968.0</td><td>1892.4</td><td>75.6</td><td>| . | * |</td></tr>
<tr><td>2016M06</td><td>1963.7</td><td>1929.9</td><td>33.9</td><td>| . |* . |</td></tr>
<tr><td>2016M07</td><td>1766.5</td><td>1923.6</td><td>-157.1</td><td>| * . | . |</td></tr>
<tr><td>2016M08</td><td>1975.5</td><td>1861.3</td><td>114.2</td><td>| . | .* |</td></tr>
<tr><td>2016M09</td><td>1815.5</td><td>1835.9</td><td>-20.4</td><td>| . *| . |</td></tr>
<tr><td>2016M10</td><td>2014.6</td><td>1986.1</td><td>28.5</td><td>| . |* . |</td></tr>
<tr><td>2016M11</td><td>2035.3</td><td>2040.3</td><td>-5.0</td><td>| . * . |</td></tr>
<tr><td>2016M12</td><td>2044.5</td><td>1940.8</td><td>103.7</td><td>| . | * |</td></tr>
<tr><td>2017M01</td><td>2017.3</td><td>2059.7</td><td>-42.4</td><td>| . *| . |</td></tr>
<tr><td>2017M02</td><td>1976.7</td><td>1980.3</td><td>-3.6</td><td>| . * . |</td></tr>
<tr><td>2017M03</td><td>2057.8</td><td>1957.0</td><td>100.8</td><td>| . | * |</td></tr>
<tr><td>2017M04</td><td>1867.5</td><td>1879.4</td><td>-12.0</td><td>| . * . |</td></tr>
<tr><td>2017M05</td><td>2025.6</td><td>1883.3</td><td>142.3</td><td>| . | . * |</td></tr>
<tr><td>2017M06</td><td>1581.3</td><td>1898.3</td><td>-317.0</td><td>|* . | . |</td></tr>
<tr><td>2017M07</td><td>2014.4</td><td>1834.3</td><td>180.1</td><td>| . | . * |</td></tr>
<tr><td>2017M08</td><td>1850.9</td><td>1764.9</td><td>86.0</td><td>| . | * |</td></tr>
<tr><td>2017M09</td><td>1772.7</td><td>1922.3</td><td>-149.7</td><td>| * . | . |</td></tr>
<tr><td>2017M10</td><td>1978.1</td><td>1902.0</td><td>76.0</td><td>| . | * |</td></tr>
<tr><td>2017M11</td><td>2222.1</td><td>2080.3</td><td>141.8</td><td>| . | . * |</td></tr>
<tr><td>2017M12</td><td>2244.6</td><td>2158.9</td><td>85.8</td><td>| . | * |</td></tr>
<tr><td>2018M01</td><td>2351.7</td><td>2445.4</td><td>-93.7</td><td>| * | . |</td></tr>
<tr><td>2018M02</td><td>2001.2</td><td>1977.8</td><td>23.4</td><td>| . |* . |</td></tr>
<tr><td>2018M03</td><td>2150.2</td><td>2130.1</td><td>20.1</td><td>| . |* . |</td></tr>
<tr><td>2018M04</td><td>2081.5</td><td>2042.9</td><td>38.6</td><td>| . |* . |</td></tr>
<tr><td>2018M05</td><td>1792.5</td><td>1957.0</td><td>-164.5</td><td>| * . | . |</td></tr>
<tr><td>2018M06</td><td>1740.3</td><td>1859.8</td><td>-119.5</td><td>| *. | . |</td></tr>
<tr><td>2018M07</td><td>1660.9</td><td>1736.5</td><td>-75.6</td><td>| * | . |</td></tr>
<tr><td>2018M08</td><td>1728.5</td><td>1714.1</td><td>14.4</td><td>| . * . |</td></tr>
<tr><td>2018M09</td><td>1668.2</td><td>1719.7</td><td>-51.5</td><td>| .* | . |</td></tr>
<tr><td>2018M10</td><td>2011.5</td><td>1892.1</td><td>119.4</td><td>| . | .* |</td></tr>
<tr><td>2018M11</td><td>2091.0</td><td>2132.1</td><td>-41.2</td><td>| . *| . |</td></tr>
<tr><td>2018M12</td><td>2038.8</td><td>2076.7</td><td>-37.9</td><td>| . *| . |</td></tr>
<tr><td>2019M01</td><td>2237.0</td><td>2165.3</td><td>71.7</td><td>| . | *. |</td></tr>
<tr><td>2019M02</td><td>2060.3</td><td>2137.2</td><td>-76.9</td><td>| * | . |</td></tr>
<tr><td>2019M03</td><td>2118.4</td><td>2126.8</td><td>-8.4</td><td>| . * . |</td></tr>
<tr><td>2019M04</td><td>2021.9</td><td>1919.6</td><td>102.3</td><td>| . | * |</td></tr>
<tr><td>2019M05</td><td>1977.6</td><td>1918.5</td><td>59.0</td><td>| . | *. |</td></tr>
<tr><td>2019M06</td><td>1845.5</td><td>1912.6</td><td>-67.1</td><td>| .* | . |</td></tr>
</table>

<table>
<tr><td>2019M07</td><td>1885.9</td><td>1855.7</td><td>30.2</td><td>| . |* . |</td></tr>
<tr><td>2019M08</td><td>1906.6</td><td>1835.0</td><td>71.6</td><td>| . | *. |</td></tr>
<tr><td>2019M09</td><td>1919.0</td><td>1882.2</td><td>36.8</td><td>| . |* . |</td></tr>
<tr><td>2019M10</td><td>2058.1</td><td>2018.6</td><td>39.5</td><td>| . |* . |</td></tr>
<tr><td>2019M11</td><td>2196.2</td><td>2191.7</td><td>4.5</td><td>| . * . |</td></tr>
<tr><td>2019M12</td><td>2263.5</td><td>2140.5</td><td>123.0</td><td>| . | .* |</td></tr>
<tr><td>2020M01</td><td>2337.5</td><td>2300.0</td><td>37.6</td><td>| . |* . |</td></tr>
<tr><td>2020M02</td><td>2303.4</td><td>2278.5</td><td>24.9</td><td>| . |* . |</td></tr>
<tr><td>2020M03</td><td>2229.8</td><td>2219.7</td><td>10.1</td><td>| . * . |</td></tr>
<tr><td>2020M04</td><td>1809.8</td><td>1983.3</td><td>-173.5</td><td>| * . | . |</td></tr>
<tr><td>2020M05</td><td>1689.1</td><td>1750.0</td><td>-60.9</td><td>| .* | . |</td></tr>
<tr><td>2020M06</td><td>1680.1</td><td>1536.1</td><td>144.0</td><td>| . | . * |</td></tr>
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<tr><td>2020M08</td><td>1634.2</td><td>1707.9</td><td>-73.7</td><td>| .* | . |</td></tr>
<tr><td>2020M09</td><td>1716.0</td><td>1757.2</td><td>-41.2</td><td>| . *| . |</td></tr>
<tr><td>2020M10</td><td>1877.5</td><td>1900.4</td><td>-22.9</td><td>| . *| . |</td></tr>
<tr><td>2020M11</td><td>2115.2</td><td>2059.7</td><td>55.5</td><td>| . | *. |</td></tr>
<tr><td>2020M12</td><td>2050.8</td><td>1985.8</td><td>65.0</td><td>| . | *. |</td></tr>
<tr><td>2021M01</td><td>2075.8</td><td>2161.0</td><td>-85.2</td><td>| * | . |</td></tr>
<tr><td>2021M02</td><td>2018.0</td><td>2078.2</td><td>-60.2</td><td>| .* | . |</td></tr>
<tr><td>2021M03</td><td>2138.2</td><td>2010.3</td><td>127.9</td><td>| . | .* |</td></tr>
<tr><td>2021M04</td><td>1879.9</td><td>1874.7</td><td>5.1</td><td>| . * . |</td></tr>
<tr><td>2021M05</td><td>1888.8</td><td>1858.9</td><td>29.9</td><td>| . |* . |</td></tr>
<tr><td>2021M06</td><td>1745.7</td><td>1787.4</td><td>-41.7</td><td>| . *| . |</td></tr>
<tr><td>2021M07</td><td>1742.6</td><td>1774.1</td><td>-31.5</td><td>| . *| . |</td></tr>
<tr><td>2021M08</td><td>1766.7</td><td>1738.1</td><td>28.6</td><td>| . |* . |</td></tr>
<tr><td>2021M09</td><td>1788.6</td><td>1760.5</td><td>28.1</td><td>| . |* . |</td></tr>
<tr><td>2021M10</td><td>1830.5</td><td>1889.9</td><td>-59.4</td><td>| .* | . |</td></tr>
<tr><td>2021M11</td><td>2051.4</td><td>2054.2</td><td>-2.8</td><td>| . * . |</td></tr>
<tr><td>2021M12</td><td>1988.4</td><td>1991.9</td><td>-3.5</td><td>| . * . |</td></tr>
<tr><td>2022M01</td><td>2161.0</td><td>2176.5</td><td>-15.5</td><td>| . *| . |</td></tr>
<tr><td>2022M02</td><td>2029.1</td><td>2100.4</td><td>-71.3</td><td>| .* | . |</td></tr>
<tr><td>2022M03</td><td>1887.5</td><td>2039.7</td><td>-152.2</td><td>| * . | . |</td></tr>
<tr><td>2022M04</td><td>1772.5</td><td>1826.2</td><td>-53.675</td><td>| .* | . |</td></tr>
<tr><td>2022M05</td><td>1828.8</td><td>1756</td><td>72.7797</td><td>| . | *. |</td></tr>
<tr><td>2022M06</td><td>1688.3</td><td>1753.9</td><td>-65.625</td><td>| .* | . |</td></tr>
<tr><td>2022M07</td><td>1622</td><td>1747.8</td><td>-125.81</td><td>| *. | . |</td></tr>
<tr><td>2022M08</td><td>1724.9</td><td>1688.7</td><td>36.1949</td><td>| . |* . |</td></tr>
<tr><td>2022M09</td><td>1720.2</td><td>1708.2</td><td>11.9693</td><td>| . * . |</td></tr>
<tr><td>2022M10</td><td>1796.9</td><td>1912.7</td><td>-115.74</td><td>| *. | . |</td></tr>
<tr><td>2022M11</td><td>1888.9</td><td>1943.9</td><td>-55.085</td><td>| .* | . |</td></tr>
<tr><td>2022M12</td><td>1709.5</td><td>1895.8</td><td>-186.3</td><td>| * . | . |</td></tr>
</table>

Date: 03/23/23 Time: 09:11
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.*| . |	.*| . |	1	-0.102	-0.102	0.9055	
.*| . |	.*| . |	2	-0.138	-0.150	2.5830	
. |*. |	. | . |	3	0.100	0.071	3.4812	0.062
. |*. |	. |*. |	4	0.170	0.175	6.1039	0.047
. | . |	. |*. |	5	0.059	0.130	6.4225	0.093
.*| . |	. | . |	6	-0.106	-0.051	7.4618	0.113
. | . |	. | . |	7	0.029	-0.004	7.5415	0.183
. | . |	. | . |	8	0.012	-0.060	7.5543	0.273
. |*. |	. |*. |	9	0.166	0.163	10.221	0.176
.*| . |	.*| . |	10	-0.122	-0.075	11.673	0.166
. |*. |	. |*. |	11	0.154	0.209	14.022	0.122
.*| . |	.*| . |	12	-0.073	-0.124	14.562	0.149

*Probabilities may not be valid for this equation specification.

7. Capacity Exempt Customer Segment - Demand Model

Dependent Variable: CE_PERCENT
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/10/23 Time: 12:43
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 20 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D_2020M5	-0.046242	0.013971	-3.309849	0.0015
D_2020M9	-0.044298	0.013920	-3.182377	0.0022
MONTH=1	0.197440	0.013748	14.36111	0.0000
MONTH=2	0.182214	0.013949	13.06332	0.0000
MONTH=3	0.203593	0.014081	14.45875	0.0000
MONTH=4	0.235430	0.014180	16.60265	0.0000
MONTH=5	0.297393	0.014357	20.71460	0.0000
MONTH=6	0.355445	0.014253	24.93880	0.0000
MONTH=7	0.379183	0.014239	26.62939	0.0000
MONTH=8	0.392417	0.014211	27.61449	0.0000
MONTH=9	0.390960	0.014291	27.35700	0.0000
MONTH=10	0.353627	0.014052	25.16515	0.0000
MONTH=11	0.275833	0.013923	19.81165	0.0000
MONTH=12	0.216350	0.013717	15.77207	0.0000
AR(2)	0.719591	0.118503	6.072335	0.0000
MA(1)	0.923104	0.075228	12.27083	0.0000

R-squared	0.964207	Mean dependent var	0.290357
Adjusted R-squared	0.956311	S.D. dependent var	0.082454
S.E. of regression	0.017234	Akaike info criterion	-5.096660
Sum squared resid	0.020198	Schwarz criterion	-4.633648
Log likelihood	230.0597	Hannan-Quinn criter.	-4.910533
Durbin-Watson stat	2.101461		

Inverted AR Roots	.85	-.85
Inverted MA Roots	-.92	

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.647694	Prob. F(16,67)	0.8329
Obs*R-squared	11.25215	Prob. Chi-Square(16)	0.7937
Scaled explained SS	11.34213	Prob. Chi-Square(16)	0.7879

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 11:57
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000229	0.000371	0.618418	0.5384
GRADF_01^2	-3.09E-08	8.90E-08	-0.347457	0.7293
GRADF_02^2	-3.54E-08	8.87E-08	-0.399290	0.6909
GRADF_03^2	-7.70E-09	8.53E-08	-0.090228	0.9284
GRADF_04^2	-1.68E-08	7.91E-08	-0.211997	0.8328
GRADF_05^2	-1.55E-08	8.31E-08	-0.186273	0.8528
GRADF_06^2	-4.82E-09	7.86E-08	-0.061356	0.9513
GRADF_07^2	-1.85E-08	8.34E-08	-0.221909	0.8251
GRADF_08^2	4.93E-08	7.85E-08	0.627538	0.5324
GRADF_09^2	3.74E-08	8.27E-08	0.452515	0.6524
GRADF_10^2	-1.96E-08	7.89E-08	-0.248515	0.8045
GRADF_11^2	-2.13E-08	8.40E-08	-0.253237	0.8009
GRADF_12^2	4.54E-09	7.95E-08	0.057073	0.9547
GRADF_13^2	-2.20E-08	8.43E-08	-0.260614	0.7952
GRADF_14^2	6.85E-09	7.93E-08	0.086394	0.9314
GRADF_15^2	1.33E-05	1.59E-05	0.832098	0.4083
GRADF_16^2	3.20E-06	7.21E-06	0.443754	0.6587

R-squared	0.133954	Mean dependent var	0.000240
Adjusted R-squared	-0.072863	S.D. dependent var	0.000424
S.E. of regression	0.000439	Akaike info criterion	-12.44344
Sum squared resid	1.29E-05	Schwarz criterion	-11.95149
Log likelihood	539.6245	Hannan-Quinn criter.	-12.24568
F-statistic	0.647694	Durbin-Watson stat	1.895080
Prob(F-statistic)	0.832896		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2016M02</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2016M03</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2016M04</td><td>0.3</td><td>0.2</td><td>0.0</td><td>| . | .* |</td></tr>
<tr><td>2016M05</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2016M06</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2016M07</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . | .* |</td></tr>
<tr><td>2016M08</td><td>0.5</td><td>0.4</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2016M09</td><td>0.5</td><td>0.4</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2016M10</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2016M11</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| * | . |</td></tr>
<tr><td>2016M12</td><td>0.3</td><td>0.2</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2017M01</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| * | . |</td></tr>
<tr><td>2017M02</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2017M03</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2017M04</td><td>0.2</td><td>0.3</td><td>0.0</td><td>| * . | . |</td></tr>
<tr><td>2017M05</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2017M06</td><td>0.3</td><td>0.4</td><td>0.0</td><td>| * . | . |</td></tr>
<tr><td>2017M07</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2017M08</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . | . * |</td></tr>
<tr><td>2017M09</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2017M10</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2017M11</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | .* |</td></tr>
<tr><td>2017M12</td><td>0.2</td><td>0.3</td><td>0.0</td><td>| * . | . |</td></tr>
<tr><td>2018M01</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| * . | . |</td></tr>
<tr><td>2018M02</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | .* |</td></tr>
<tr><td>2018M03</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | *. |</td></tr>
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<tr><td>2018M05</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2018M06</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . | *. |</td></tr>
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<tr><td>2018M08</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2018M09</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2018M10</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2018M11</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| * | . |</td></tr>
<tr><td>2018M12</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2019M01</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | .* |</td></tr>
<tr><td>2019M02</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| .* | . |</td></tr>
<tr><td>2019M03</td><td>0.2</td><td>0.2</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2019M04</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2019M05</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2019M06</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| .* | . |</td></tr>
</table>

2019M07	0.4	0.4	0.0	| . | * |
2019M08	0.4	0.4	0.0	| . *| . |
2019M09	0.4	0.4	0.0	| . |* . |
2019M10	0.4	0.4	0.0	| * | . |
2019M11	0.3	0.3	0.0	| . | .* |
2019M12	0.2	0.2	0.0	| .* | . |
2020M01	0.2	0.2	0.0	| . | * |
2020M02	0.2	0.2	0.0	| . * . |
2020M03	0.2	0.2	0.0	| . *| . |
2020M04	0.3	0.2	0.0	| . |* . |
2020M05	0.3	0.3	0.0	| .* | . |
2020M06	0.3	0.4	0.0	| * | . |
2020M07	0.4	0.4	0.0	| . *| . |
2020M08	0.4	0.4	0.0	| . *| . |
2020M09	0.3	0.3	0.0	| . |* . |
2020M10	0.3	0.3	0.0	| . * . |
2020M11	0.3	0.3	0.0	| .* | . |
2020M12	0.2	0.2	0.0	| . |* . |
2021M01	0.2	0.2	0.0	| . |* . |
2021M02	0.2	0.2	0.0	| * | . |
2021M03	0.2	0.2	0.0	| *. | . |
2021M04	0.2	0.2	0.0	| . * . |
2021M05	0.3	0.3	0.0	| . | *. |
2021M06	0.4	0.3	0.0	| . | *. |
2021M07	0.4	0.4	0.0	| . *| . |
2021M08	0.4	0.4	0.0	| * | . |
2021M09	0.4	0.4	0.0	| . * . |
2021M10	0.4	0.3	0.0	| . | .* |
2021M11	0.3	0.3	0.0	| . *| . |
2021M12	0.2	0.2	0.0	| .* | . |
2022M01	0.2	0.2	0.0	| . * . |
2022M02	0.2	0.2	0.0	| . *| . |
2022M03	0.2	0.2	0.0	| . *| . |
2022M04	0.23	0.22	0.01	| . |* . |
2022M05	0.28	0.29	-0.01	| * | . |
2022M06	0.36	0.34	0.02	| . | .* |
2022M07	0.33	0.39	-0.06	|* . | . |
2022M08	0.32	0.34	-0.02	| * . | . |
2022M09	0.31	0.33	-0.02	| *. | . |
2022M10	0.26	0.28	-0.02	| *. | . |
2022M11	0.2	0.20	0.00	| . * . |
2022M12	0.17	0.15	0.02	| . | .* |

Date: 03/23/23 Time: 12:01
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.065	-0.065	0.3713	
. | . |	. | . |	2	-0.024	-0.028	0.4206	
. |*. |	. |*. |	3	0.124	0.121	1.7846	0.182
.*| . |	.*| . |	4	-0.142	-0.129	3.6109	0.164
. | . |	. | . |	5	-0.019	-0.030	3.6432	0.303
. |*. |	. |*. |	6	0.120	0.101	4.9798	0.289
. | . |	. | . |	7	-0.051	-0.009	5.2208	0.390
. |*. |	. |*. |	8	0.103	0.094	6.2293	0.398
.*| . |	.*| . |	9	-0.117	-0.147	7.5590	0.373
. | . |	. | . |	10	0.011	0.041	7.5705	0.477
. | . |	. | . |	11	0.053	0.029	7.8456	0.550
.*| . |	. | . |	12	-0.102	-0.063	8.8862	0.543

*Probabilities may not be valid for this equation specification.

8. Company Use Model

Dependent Variable: CO_USE_ME
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/22/23 Time: 16:03
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 26 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC_NOV	0.061746	0.020182	3.059385	0.0031
BC_DEC	0.095223	0.012820	7.427792	0.0000
BC_JAN	0.139963	0.010506	13.32189	0.0000
BC_FEB	0.152549	0.010384	14.69089	0.0000
BC_MAR	0.152373	0.011861	12.84642	0.0000
BC_APR	0.116614	0.014843	7.856502	0.0000
C	18.31669	4.377402	4.184374	0.0001
AR(4)	-0.262271	0.118772	-2.208194	0.0303
MA(12)	0.637245	0.137102	4.647954	0.0000

R-squared	0.939778	Mean dependent var	80.94750
Adjusted R-squared	0.933354	S.D. dependent var	75.70202
S.E. of regression	19.54311	Akaike info criterion	8.960696
Sum squared resid	28644.99	Schwarz criterion	9.221141
Log likelihood	-367.3492	Hannan-Quinn criter.	9.065392
F-statistic	146.2988	Durbin-Watson stat	2.105252
Prob(F-statistic)	0.000000		

Inverted AR Roots	.51-.51i	.51+.51i	-.51+.51i	-.51-.51i
Inverted MA Roots	.93-.25i	.93+.25i	.68-.68i	.68+.68i
	.25-.93i	.25+.93i	-.25+.93i	-.25-.93i
	-.68+.68i	-.68+.68i	-.93-.25i	-.93+.25i

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.083602	Prob. F(9,74)	0.0417
Obs*R-squared	16.98288	Prob. Chi-Square(9)	0.0490
Scaled explained SS	23.81504	Prob. Chi-Square(9)	0.0046

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 12:04
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	180.6188	244.0094	0.740212	0.4615
GRADF_01^2	-0.252728	0.427628	-0.590998	0.5563
GRADF_02^2	-0.100872	0.197651	-0.510353	0.6113
GRADF_03^2	0.082207	0.132333	0.621211	0.5364
GRADF_04^2	0.302401	0.130478	2.317634	0.0232
GRADF_05^2	0.293994	0.174963	1.680319	0.0971
GRADF_06^2	-0.115615	0.282665	-0.409017	0.6837
GRADF_07^2	17933.61	115055.7	0.155869	0.8766
GRADF_08^2	-4.425325	36.39240	-0.121600	0.9035
GRADF_09^2	82.26489	39.83053	2.065373	0.0424

R-squared	0.202177	Mean dependent var	341.0118
Adjusted R-squared	0.105145	S.D. dependent var	643.4620
S.E. of regression	608.6944	Akaike info criterion	15.77185
Sum squared resid	27417660	Schwarz criterion	16.06124
Log likelihood	-652.4178	Hannan-Quinn criter.	15.88818
F-statistic	2.083602	Durbin-Watson stat	2.310832
Prob(F-statistic)	0.041701		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>143.5</td><td>166.1</td><td>-22.6</td><td>| *. | . |</td></tr>
<tr><td>2016M02</td><td>183.6</td><td>196.3</td><td>-12.7</td><td>| .* | . |</td></tr>
<tr><td>2016M03</td><td>155.8</td><td>171.5</td><td>-15.7</td><td>| * | . |</td></tr>
<tr><td>2016M04</td><td>127.0</td><td>116.3</td><td>10.7</td><td>| . | *. |</td></tr>
<tr><td>2016M05</td><td>57.4</td><td>29.8</td><td>27.6</td><td>| . | .* |</td></tr>
<tr><td>2016M06</td><td>7.1</td><td>19.6</td><td>-12.5</td><td>| .* | . |</td></tr>
<tr><td>2016M07</td><td>2.8</td><td>19.6</td><td>-16.9</td><td>| * | . |</td></tr>
<tr><td>2016M08</td><td>2.6</td><td>13.3</td><td>-10.7</td><td>| .* | . |</td></tr>
<tr><td>2016M09</td><td>2.9</td><td>10.0</td><td>-7.2</td><td>| . *| . |</td></tr>
<tr><td>2016M10</td><td>19.8</td><td>22.5</td><td>-2.7</td><td>| . * . |</td></tr>
<tr><td>2016M11</td><td>71.8</td><td>64.1</td><td>7.8</td><td>| . |* . |</td></tr>
<tr><td>2016M12</td><td>119.2</td><td>115.9</td><td>3.3</td><td>| . |* . |</td></tr>
<tr><td>2017M01</td><td>160.1</td><td>177.7</td><td>-17.6</td><td>| * | . |</td></tr>
<tr><td>2017M02</td><td>158.0</td><td>190.1</td><td>-32.1</td><td>| * . | . |</td></tr>
<tr><td>2017M03</td><td>152.8</td><td>174.2</td><td>-21.4</td><td>| * | . |</td></tr>
<tr><td>2017M04</td><td>121.2</td><td>129.9</td><td>-8.7</td><td>| . *| . |</td></tr>
<tr><td>2017M05</td><td>64.0</td><td>41.5</td><td>22.5</td><td>| . | .* |</td></tr>
<tr><td>2017M06</td><td>38.0</td><td>23.0</td><td>15.1</td><td>| . | *. |</td></tr>
<tr><td>2017M07</td><td>2.7</td><td>17.2</td><td>-14.5</td><td>| .* | . |</td></tr>
<tr><td>2017M08</td><td>2.7</td><td>13.2</td><td>-10.6</td><td>| .* | . |</td></tr>
<tr><td>2017M09</td><td>3.9</td><td>3.1</td><td>0.8</td><td>| . * . |</td></tr>
<tr><td>2017M10</td><td>14.1</td><td>12.8</td><td>1.4</td><td>| . * . |</td></tr>
<tr><td>2017M11</td><td>65.7</td><td>60.5</td><td>5.1</td><td>| . |* . |</td></tr>
<tr><td>2017M12</td><td>118.2</td><td>123.4</td><td>-5.2</td><td>| . *| . |</td></tr>
<tr><td>2018M01</td><td>255.9</td><td>228.2</td><td>27.7</td><td>| . | .* |</td></tr>
<tr><td>2018M02</td><td>197.4</td><td>183.8</td><td>13.6</td><td>| . | *. |</td></tr>
<tr><td>2018M03</td><td>167.7</td><td>150.7</td><td>17.0</td><td>| . | * |</td></tr>
<tr><td>2018M04</td><td>123.4</td><td>123.0</td><td>0.4</td><td>| . * . |</td></tr>
<tr><td>2018M05</td><td>75.2</td><td>27.4</td><td>47.8</td><td>| . | . * |</td></tr>
<tr><td>2018M06</td><td>11.8</td><td>28.2</td><td>-16.4</td><td>| * | . |</td></tr>
<tr><td>2018M07</td><td>1.9</td><td>9.2</td><td>-7.3</td><td>| . *| . |</td></tr>
<tr><td>2018M08</td><td>1.9</td><td>13.0</td><td>-11.1</td><td>| .* | . |</td></tr>
<tr><td>2018M09</td><td>2.0</td><td>3.6</td><td>-1.6</td><td>| . * . |</td></tr>
<tr><td>2018M10</td><td>18.6</td><td>20.7</td><td>-2.1</td><td>| . * . |</td></tr>
<tr><td>2018M11</td><td>68.8</td><td>72.6</td><td>-3.8</td><td>| . *| . |</td></tr>
<tr><td>2018M12</td><td>140.4</td><td>124.6</td><td>15.8</td><td>| . | * |</td></tr>
<tr><td>2019M01</td><td>182.2</td><td>212.2</td><td>-30.0</td><td>| * . | . |</td></tr>
<tr><td>2019M02</td><td>226.0</td><td>228.8</td><td>-2.8</td><td>| . * . |</td></tr>
<tr><td>2019M03</td><td>191.1</td><td>205.9</td><td>-14.8</td><td>| .* | . |</td></tr>
<tr><td>2019M04</td><td>142.5</td><td>114.6</td><td>27.9</td><td>| . | . * |</td></tr>
<tr><td>2019M05</td><td>66.9</td><td>50.6</td><td>16.3</td><td>| . | * |</td></tr>
<tr><td>2019M06</td><td>11.6</td><td>6.6</td><td>5.0</td><td>| . |* . |</td></tr>
</table>

<table>
<tr><td>2019M07</td><td>3.8</td><td>15.0</td><td>-11.2</td><td>| .* | . |</td></tr>
<tr><td>2019M08</td><td>2.6</td><td>5.1</td><td>-2.5</td><td>| . * . |</td></tr>
<tr><td>2019M09</td><td>5.5</td><td>4.7</td><td>0.8</td><td>| . * . |</td></tr>
<tr><td>2019M10</td><td>16.9</td><td>18.8</td><td>-1.9</td><td>| . * . |</td></tr>
<tr><td>2019M11</td><td>45.6</td><td>60.3</td><td>-14.7</td><td>| .* | . |</td></tr>
<tr><td>2019M12</td><td>130.0</td><td>132.3</td><td>-2.3</td><td>| . * . |</td></tr>
<tr><td>2020M01</td><td>172.0</td><td>157.8</td><td>14.2</td><td>| . | *. |</td></tr>
<tr><td>2020M02</td><td>189.4</td><td>188.2</td><td>1.2</td><td>| . * . |</td></tr>
<tr><td>2020M03</td><td>195.3</td><td>161.6</td><td>33.7</td><td>| . | . * |</td></tr>
<tr><td>2020M04</td><td>120.1</td><td>125.9</td><td>-5.8</td><td>| . *| . |</td></tr>
<tr><td>2020M05</td><td>66.7</td><td>29.1</td><td>37.6</td><td>| . | . * |</td></tr>
<tr><td>2020M06</td><td>26.9</td><td>21.5</td><td>5.4</td><td>| . |* . |</td></tr>
<tr><td>2020M07</td><td>4.0</td><td>3.9</td><td>0.1</td><td>| . * . |</td></tr>
<tr><td>2020M08</td><td>3.2</td><td>14.4</td><td>-11.2</td><td>| .* | . |</td></tr>
<tr><td>2020M09</td><td>8.1</td><td>6.1</td><td>2.0</td><td>| . * . |</td></tr>
<tr><td>2020M10</td><td>27.0</td><td>14.9</td><td>12.1</td><td>| . | *. |</td></tr>
<tr><td>2020M11</td><td>44.5</td><td>51.3</td><td>-6.8</td><td>| . *| . |</td></tr>
<tr><td>2020M12</td><td>117.7</td><td>109.1</td><td>8.6</td><td>| . |* . |</td></tr>
<tr><td>2021M01</td><td>146.0</td><td>190.2</td><td>-44.2</td><td>| * . | . |</td></tr>
<tr><td>2021M02</td><td>181.6</td><td>211.3</td><td>-29.7</td><td>| * . | . |</td></tr>
<tr><td>2021M03</td><td>259.2</td><td>210.7</td><td>48.5</td><td>| . | . * |</td></tr>
<tr><td>2021M04</td><td>95.4</td><td>101.7</td><td>-6.3</td><td>| . *| . |</td></tr>
<tr><td>2021M05</td><td>73.4</td><td>50.8</td><td>22.6</td><td>| . | .* |</td></tr>
<tr><td>2021M06</td><td>26.5</td><td>29.9</td><td>-3.4</td><td>| . *| . |</td></tr>
<tr><td>2021M07</td><td>11.0</td><td>-0.8</td><td>11.8</td><td>| . | *. |</td></tr>
<tr><td>2021M08</td><td>4.4</td><td>14.6</td><td>-10.2</td><td>| .* | . |</td></tr>
<tr><td>2021M09</td><td>3.0</td><td>5.2</td><td>-2.2</td><td>| . * . |</td></tr>
<tr><td>2021M10</td><td>9.8</td><td>23.9</td><td>-14.1</td><td>| .* | . |</td></tr>
<tr><td>2021M11</td><td>63.0</td><td>51.7</td><td>11.3</td><td>| . | *. |</td></tr>
<tr><td>2021M12</td><td>104.9</td><td>118.7</td><td>-13.8</td><td>| .* | . |</td></tr>
<tr><td>2022M01</td><td>162.3</td><td>168.6</td><td>-6.3</td><td>| . *| . |</td></tr>
<tr><td>2022M02</td><td>274.3</td><td>208.9</td><td>65.4</td><td>| . | . *</td></tr>
<tr><td>2022M03</td><td>179.9</td><td>209.9</td><td>-30.0</td><td>| * . | . |</td></tr>
<tr><td>2022M04</td><td>105.5</td><td>108.7</td><td>-3.2</td><td>| . *| . |</td></tr>
<tr><td>2022M05</td><td>63.8</td><td>40.7</td><td>23.1</td><td>| . | .* |</td></tr>
<tr><td>2022M06</td><td>6.7</td><td>3.3</td><td>3.4</td><td>| . |* . |</td></tr>
<tr><td>2022M07</td><td>3.8</td><td>26.2</td><td>-22.4</td><td>| *. | . |</td></tr>
<tr><td>2022M08</td><td>2.2</td><td>13.4</td><td>-11.2</td><td>| .* | . |</td></tr>
<tr><td>2022M09</td><td>3</td><td>5.0</td><td>-2.0</td><td>| . * . |</td></tr>
<tr><td>2022M10</td><td>15.9</td><td>12.4</td><td>3.5</td><td>| . |* . |</td></tr>
<tr><td>2022M11</td><td>56.9</td><td>60.4</td><td>-3.5</td><td>| . *| . |</td></tr>
<tr><td>2022M12</td><td>87.8</td><td>102.7</td><td>-14.9</td><td>| .* | . |</td></tr>
</table>

Date: 03/23/23 Time: 12:05
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.065	-0.065	0.3714	
. | . |	. | . |	2	-0.038	-0.042	0.4979	
.*| . |	.*| . |	3	-0.088	-0.094	1.1848	0.276
. | . |	. | . |	4	-0.025	-0.040	1.2400	0.538
. | . |	. | . |	5	-0.009	-0.022	1.2472	0.742
. | . |	. | . |	6	-0.004	-0.018	1.2487	0.870
. |*. |	. | . |	7	0.077	0.069	1.8002	0.876
.*| . |	.*| . |	8	-0.089	-0.085	2.5614	0.862
. | . |	. | . |	9	0.015	0.007	2.5841	0.921
.*| . |	.*| . |	10	-0.182	-0.181	5.8024	0.669
. |*. |	. |*. |	11	0.161	0.134	8.3816	0.496
. | . |	. | . |	12	-0.006	-0.012	8.3847	0.591

*Probabilities may not be valid for this equation specification.

9. Design Day Model - Total Throughput

Dependent Variable: ME
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/07/23 Time: 14:24
Sample: 11/01/2021 10/31/2022
Included observations: 365
Convergence achieved after 10 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ME_EDD	761.7274	15.27650	49.86269	0.0000
ME_EDD_50	133.0725	50.16445	2.652725	0.0084
ME_EDD(-1)	127.5060	13.30992	9.579773	0.0000
NOV	1933.355	860.7461	2.246138	0.0253
DEC	4927.538	960.1441	5.132082	0.0000
JAN	7922.300	1058.078	7.487446	0.0000
FEB	7287.685	1023.136	7.122887	0.0000
MAR	3282.115	887.7268	3.697212	0.0003
@WEEKDAY=1	12602.27	446.4029	28.23071	0.0000
@WEEKDAY=2	13019.12	449.1675	28.98500	0.0000
@WEEKDAY=3	13058.48	444.7703	29.36006	0.0000
@WEEKDAY=4	12680.14	440.9532	28.75620	0.0000
@WEEKDAY=5	11110.72	443.3921	25.05844	0.0000
@WEEKDAY=6	9549.785	450.0271	21.22047	0.0000
@WEEKDAY=7	10930.01	452.5882	24.15002	0.0000
AR(1)	0.688932	0.053372	12.90808	0.0000
AR(2)	-0.113640	0.053622	-2.119278	0.0348
AR(7)	0.113334	0.042574	2.662044	0.0081

R-squared	0.992316	Mean dependent var	31481.15
Adjusted R-squared	0.991939	S.D. dependent var	17922.52
S.E. of regression	1609.102	Akaike info criterion	17.65280
Sum squared resid	8.98E+08	Schwarz criterion	17.84512
Log likelihood	-3203.636	Hannan-Quinn criter.	17.72923
Durbin-Watson stat	1.981212		

Inverted AR Roots	.85	.57+.56i	.57-.56i	-.07-.70i
	-.07+.70i	-.58+.31i	-.58-.31i	

10. Design Day Model - Planning Load

Dependent Variable: ME_PL
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/07/23 Time: 14:27
Sample: 11/01/2021 10/31/2022
Included observations: 365
Convergence achieved after 15 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ME_EDD	673.2066	14.47470	46.50921	0.0000
ME_EDD_50	138.0786	46.37837	2.977219	0.0031
ME_EDD(-1)	119.2066	12.64109	9.430085	0.0000
DEC	3987.129	1137.438	3.505359	0.0005
JAN	5956.069	1245.314	4.782783	0.0000
FEB	5197.835	1189.036	4.371469	0.0000
NOV+MAR	1584.345	781.3198	2.027780	0.0433
@WEEKDAY=1	8742.846	615.8627	14.19610	0.0000
@WEEKDAY=2	9023.326	615.8424	14.65200	0.0000
@WEEKDAY=3	9099.289	613.6828	14.82735	0.0000
@WEEKDAY=4	8866.792	610.3431	14.52755	0.0000
@WEEKDAY=5	7834.077	610.1823	12.83891	0.0000
@WEEKDAY=6	6614.848	616.7908	10.72462	0.0000
@WEEKDAY=7	7614.231	619.2793	12.29531	0.0000
AR(1)	0.754368	0.053333	14.14440	0.0000
AR(2)	-0.109478	0.053290	-2.054401	0.0407
AR(7)	0.172346	0.039643	4.347416	0.0000

R-squared	0.991052	Mean dependent var	25417.32
Adjusted R-squared	0.990640	S.D. dependent var	15935.13
S.E. of regression	1541.648	Akaike info criterion	17.56455
Sum squared resid	8.27E+08	Schwarz criterion	17.74619
Log likelihood	-3188.530	Hannan-Quinn criter.	17.63673
Durbin-Watson stat	1.992085		

Inverted AR Roots	.92	.60-.58i	.60+.58i	-.08+.74i
	-.08-.74i	-.61+.33i	-.61-.33i	

New Hampshire Division Statistical Model Results

Variable Nomenclature

Variable	Description	Type
HH	Total Households	Actual/Forecast
INC_HH	Average Household Income	Actual/Forecast
GMP(-3)	Gross Metro Product Lagged by 3	Actual/Forecast
EMP_MAN	Empoyment in Manufacturing	Actual/Forecast
C	Constant	Intercept Value
TREND	Linear Trend	Linear Count (e.g. i=i+1)
JAN	January	Boolean
FEB	February	Boolean
MAR	March	Boolean
APR	April	Boolean
MAY	May	Boolean
JUN	June	Boolean
JUL	July	Boolean
AUG	August	Boolean
SEP	September	Boolean
OCT	October	Boolean
NOV	November	Boolean
DEC	December	Boolean
Winter	December through March	Boolean
BC_EDD	Billing Cycle EDDs	Actual/Forecast
BC_JAN	January Bill Cycle EDD	Actual/Forecast
BC_FEB	February Bill Cycle EDD	Actual/Forecast
BC_MAR	March Bill Cycle EDD	Actual/Forecast
BC_APR	April Bill Cycle EDD	Actual/Forecast
BC_MAY	May Bill Cycle EDD	Actual/Forecast
BC_JUN	June Bill Cycle EDD	Actual/Forecast
BC_JUL	July Bill Cycle EDD	Actual/Forecast
BC_AUG	August Bill Cycle EDD	Actual/Forecast
BC_SEP	September Bill Cycle EDD	Actual/Forecast
BC_OCT	October Bill Cycle EDD	Actual/Forecast
BC_NOV	November Bill Cycle EDD	Actual/Forecast
BC_DEC	December Bill Cycle EDD	Actual/Forecast
NH_EDD	New Hampshire Calendar EDD	Actual
NH_EDD(-1)	New Hampshire Calendar EDD Lagged by 1	Actual
NH_EDD_50	New Hampshire Calendar EDD Base 15	Actual
@WEEKDAY=X	Xth Day of Week (i.e. X=1 is Sunday)	Boolean
AR(X)	Autoregressive Term at Lag X (where X is a real integer)	ARMA
MA(X)	Moving Average Term at Lag X (where X is a real integer)	ARMA
D_*YearMx*	Dummy Variable for *Year* and *Month x*	Boolean
D_*YearMx_f*	Dummy Variable for *Year* and *Month x* and all future months	Boolean
D_*Year1Mx_Year2My*	Dummy Variable for time between *Year 1-Month x and Year 2-Month y*	Boolean

11. Residential Customer Segment - Customer Model

Dependent Variable: RES_CUST
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/01/23 Time: 16:37
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Convergence achieved after 4 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HH*TREND	0.314898	0.014534	21.66690	0.0000
NOV	239.1119	30.48741	7.842971	0.0000
OCT	122.5238	22.95183	5.338303	0.0000
DEC	294.8019	34.89187	8.449013	0.0000
JAN	321.2978	37.07813	8.665426	0.0000
FEB	309.9434	37.82896	8.193283	0.0000
MAR	285.0016	37.12897	7.675991	0.0000
APR	293.2273	34.82543	8.419918	0.0000
MAY	210.2675	30.50249	6.893452	0.0000
JUN	105.6103	22.97249	4.597252	0.0000
C	23653.23	173.5852	136.2630	0.0000
AR(1)	0.891131	0.056927	15.65395	0.0000

R-squared	0.998292	Mean dependent var	26958.83
Adjusted R-squared	0.998032	S.D. dependent var	1371.574
S.E. of regression	60.85307	Akaike info criterion	11.18637
Sum squared resid	266622.9	Schwarz criterion	11.53362
Log likelihood	-457.8273	Hannan-Quinn criter.	11.32596
F-statistic	3826.633	Durbin-Watson stat	2.026558
Prob(F-statistic)	0.000000		

Inverted AR Roots	.89

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.600332	Prob. F(11,72)	0.0076
Obs*R-squared	23.88290	Prob. Chi-Square(11)	0.0132
Scaled explained SS	36.46099	Prob. Chi-Square(11)	0.0001

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 10:20
Sample: 2016M01 2022M12
Included observations: 84
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9964.434	1863.785	5.346342	0.0000
GRADF_01^2	0.000403	0.000567	0.711156	0.4793
GRADF_02^2	-2212.793	2846.045	-0.777498	0.4394
GRADF_03^2	-8710.723	2734.388	-3.185620	0.0021
GRADF_04^2	-5928.386	3437.216	-1.724764	0.0889
GRADF_05^2	-3831.358	3313.790	-1.156186	0.2514
GRADF_06^2	-6952.676	3595.784	-1.933563	0.0571
GRADF_07^2	-3862.953	3304.595	-1.168964	0.2463
GRADF_08^2	-5247.397	3437.823	-1.526372	0.1313
GRADF_09^2	-3737.354	2844.790	-1.313754	0.1931
GRADF_10^2	-5910.662	2732.749	-2.162900	0.0339
GRADF_12^2	-0.036534	0.032492	-1.124392	0.2646

R-squared	0.284320	Mean dependent var	3174.082
Adjusted R-squared	0.174980	S.D. dependent var	6509.554
S.E. of regression	5912.667	Akaike info criterion	20.33915
Sum squared resid	2.52E+09	Schwarz criterion	20.68640
Log likelihood	-842.2441	Hannan-Quinn criter.	20.47874
F-statistic	2.600332	Durbin-Watson stat	2.310094
Prob(F-statistic)	0.007625		

obs	Actual	Fitted	Residual	Residual Plot
2016M01	24888.0	24896.0	-8.0	| . * . |
2016M02	24935.0	24919.7	15.3	| . |* . |
2016M03	25000.0	24952.9	47.1	| . | *. |
2016M04	25039.0	25047.4	-8.4	| . * . |
2016M05	25005.0	24997.9	7.1	| . * . |
2016M06	25005.0	24942.8	62.2	| . | * |
2016M07	24846.0	24936.4	-90.4	| *. | . |
2016M08	24774.0	24895.0	-121.0	| * . | . |
2016M09	24928.0	24837.1	90.9	| . | .* |
2016M10	25086.0	25103.0	-17.0	| . *| . |
2016M11	25233.0	25257.6	-24.6	| . *| . |
2016M12	25342.0	25346.5	-4.5	| . * . |
2017M01	25395.0	25426.6	-31.6	| . *| . |
2017M02	25432.0	25444.7	-12.7	| . *| . |
2017M03	25440.0	25468.3	-28.3	| . *| . |
2017M04	25500.0	25511.8	-11.8	| . *| . |
2017M05	25425.0	25481.2	-56.2	| * | . |
2017M06	25390.0	25390.2	-0.2	| . * . |
2017M07	25399.0	25353.1	45.9	| . | *. |
2017M08	25559.0	25461.1	97.9	| . | . * |
2017M09	25706.0	25609.2	96.8	| . | . * |
2017M10	25822.0	25868.4	-46.4	| .* | . |
2017M11	26029.0	25985.0	44.0	| . | *. |
2017M12	26110.0	26127.4	-17.4	| . *| . |
2018M01	26135.0	26182.5	-47.5	| .* | . |
2018M02	26155.0	26175.5	-20.5	| . *| . |
2018M03	26173.0	26184.2	-11.2	| . *| . |
2018M04	26225.0	26236.2	-11.2	| . *| . |
2018M05	26178.0	26198.4	-20.4	| . *| . |
2018M06	26103.0	26132.1	-29.1	| . *| . |
2018M07	26047.0	26059.4	-12.4	| . *| . |
2018M08	26041.0	26110.5	-69.5	| * | . |
2018M09	26169.0	26111.9	57.1	| . | * |
2018M10	26406.0	26354.9	51.1	| . | *. |
2018M11	26592.0	26579.1	12.9	| . |* . |
2018M12	26699.0	26701.9	-2.9	| . * . |
2019M01	26828.0	26779.8	48.2	| . | *. |
2019M02	26888.0	26866.5	21.5	| . |* . |
2019M03	26896.0	26912.4	-16.4	| . *| . |
2019M04	26907.0	26957.2	-50.2	| .* | . |
2019M05	26870.0	26882.1	-12.1	| . *| . |
2019M06	26752.0	26822.9	-70.9	| * | . |

<table>
<tr><td>2019M07</td><td>26587.0</td><td>26710.0</td><td>-123.0</td><td>| * . | . |</td></tr>
<tr><td>2019M08</td><td>26589.0</td><td>26662.4</td><td>-73.4</td><td>| * | . |</td></tr>
<tr><td>2019M09</td><td>26731.0</td><td>26670.4</td><td>60.6</td><td>| . | * |</td></tr>
<tr><td>2019M10</td><td>26949.0</td><td>26925.7</td><td>23.3</td><td>| . |* . |</td></tr>
<tr><td>2019M11</td><td>27162.0</td><td>27133.6</td><td>28.4</td><td>| . |* . |</td></tr>
<tr><td>2019M12</td><td>27206.0</td><td>27281.0</td><td>-75.0</td><td>| *. | . |</td></tr>
<tr><td>2020M01</td><td>27345.0</td><td>27301.8</td><td>43.2</td><td>| . | *. |</td></tr>
<tr><td>2020M02</td><td>27387.0</td><td>27394.0</td><td>-7.0</td><td>| . * . |</td></tr>
<tr><td>2020M03</td><td>27395.0</td><td>27418.9</td><td>-23.9</td><td>| . *| . |</td></tr>
<tr><td>2020M04</td><td>27454.0</td><td>27459.4</td><td>-5.4</td><td>| . * . |</td></tr>
<tr><td>2020M05</td><td>27510.0</td><td>27427.1</td><td>82.9</td><td>| . | .* |</td></tr>
<tr><td>2020M06</td><td>27460.0</td><td>27453.1</td><td>6.9</td><td>| . * . |</td></tr>
<tr><td>2020M07</td><td>27480.0</td><td>27403.6</td><td>76.4</td><td>| . | .* |</td></tr>
<tr><td>2020M08</td><td>27502.0</td><td>27522.2</td><td>-20.2</td><td>| . *| . |</td></tr>
<tr><td>2020M09</td><td>27773.0</td><td>27547.9</td><td>225.1</td><td>| . | . *</td></tr>
<tr><td>2020M10</td><td>27924.0</td><td>27917.9</td><td>6.1</td><td>| . * . |</td></tr>
<tr><td>2020M11</td><td>28077.0</td><td>28065.9</td><td>11.1</td><td>| . |* . |</td></tr>
<tr><td>2020M12</td><td>28217.0</td><td>28159.7</td><td>57.3</td><td>| . | * |</td></tr>
<tr><td>2021M01</td><td>28278.0</td><td>28268.4</td><td>9.6</td><td>| . * . |</td></tr>
<tr><td>2021M02</td><td>28301.0</td><td>28295.8</td><td>5.2</td><td>| . * . |</td></tr>
<tr><td>2021M03</td><td>28316.0</td><td>28310.7</td><td>5.3</td><td>| . * . |</td></tr>
<tr><td>2021M04</td><td>28466.0</td><td>28363.5</td><td>102.5</td><td>| . | . * |</td></tr>
<tr><td>2021M05</td><td>28435.0</td><td>28415.0</td><td>20.0</td><td>| . |* . |</td></tr>
<tr><td>2021M06</td><td>28342.0</td><td>28364.3</td><td>-22.3</td><td>| . *| . |</td></tr>
<tr><td>2021M07</td><td>28299.0</td><td>28276.2</td><td>22.8</td><td>| . |* . |</td></tr>
<tr><td>2021M08</td><td>28243.0</td><td>28339.2</td><td>-96.2</td><td>| * . | . |</td></tr>
<tr><td>2021M09</td><td>28309.0</td><td>28295.7</td><td>13.3</td><td>| . |* . |</td></tr>
<tr><td>2021M10</td><td>28513.0</td><td>28483.7</td><td>29.3</td><td>| . |* . |</td></tr>
<tr><td>2021M11</td><td>28635.0</td><td>28678.9</td><td>-43.9</td><td>| .* | . |</td></tr>
<tr><td>2021M12</td><td>28829.0</td><td>28745.6</td><td>83.4</td><td>| . | .* |</td></tr>
<tr><td>2022M01</td><td>28874.0</td><td>28901.4</td><td>-27.4</td><td>| . *| . |</td></tr>
<tr><td>2022M02</td><td>28896.0</td><td>28913.0</td><td>-17.0</td><td>| . *| . |</td></tr>
<tr><td>2022M03</td><td>28935.0</td><td>28924.6</td><td>10.4</td><td>| . * . |</td></tr>
<tr><td>2022M04</td><td>28962</td><td>28997</td><td>-34.6</td><td>| .* | . |</td></tr>
<tr><td>2022M05</td><td>28893</td><td>28936</td><td>-42.742</td><td>| .* | . |</td></tr>
<tr><td>2022M06</td><td>28878</td><td>28849</td><td>29.2935</td><td>| . |* . |</td></tr>
<tr><td>2022M07</td><td>28882</td><td>28828</td><td>53.7266</td><td>| . | * |</td></tr>
<tr><td>2022M08</td><td>28787</td><td>28932</td><td>-145.26</td><td>| * . | . |</td></tr>
<tr><td>2022M09</td><td>28907</td><td>28854</td><td>53.3869</td><td>| . | * |</td></tr>
<tr><td>2022M10</td><td>29034</td><td>29090</td><td>-55.955</td><td>| * | . |</td></tr>
<tr><td>2022M11</td><td>29178</td><td>29217</td><td>-38.587</td><td>| .* | . |</td></tr>
<tr><td>2022M12</td><td>29250</td><td>29303</td><td>-53.031</td><td>| .* | . |</td></tr>
</table>

Date: 03/23/23 Time: 10:23
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.019	-0.019	0.0303	
. | . |	. | . |	2	0.061	0.061	0.3626	0.547
. |*. |	. |*. |	3	0.131	0.134	1.9014	0.386
. | . |	. | . |	4	0.039	0.042	2.0402	0.564
.*| . |	.*| . |	5	-0.090	-0.107	2.7785	0.596
. | . |	.*| . |	6	-0.043	-0.074	2.9522	0.707
. | . |	. | . |	7	0.066	0.068	3.3612	0.762
. | . |	. |*. |	8	0.035	0.077	3.4772	0.838
.*| . |	. | . |	9	-0.069	-0.054	3.9350	0.863
. | . |	. | . |	10	-0.018	-0.060	3.9678	0.914
.*| . |	.*| . |	11	-0.104	-0.135	5.0347	0.889
. |*. |	. |*. |	12	0.092	0.125	5.8793	0.881

*Probabilities may not be valid for this equation specification.

12. Residential Customer Segment - Use Per Customer Model

Dependent Variable: RES_UPC
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/01/23 Time: 16:36
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 8 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC_EDD*WINTER	0.089362	0.001121	79.71743	0.0000
BC_JUN	0.046447	0.007007	6.628348	0.0000
BC_MAY	0.061968	0.002974	20.83464	0.0000
BC_NOV	0.062902	0.002358	26.67220	0.0000
BC_OCT	0.032853	0.005221	6.292172	0.0000
BC_APR	0.075890	0.001837	41.31016	0.0000
D_2018M01	10.47930	2.891172	3.624586	0.0005
D_2021M3	9.450857	3.038427	3.110444	0.0027
D_2021M4	-7.993735	3.164518	-2.526051	0.0137
C	12.98196	0.888218	14.61575	0.0000
AR(1)	0.393934	0.111405	3.536065	0.0007

R-squared	0.995509	Mean dependent var	57.08762
Adjusted R-squared	0.994894	S.D. dependent var	42.30665
S.E. of regression	3.023112	Akaike info criterion	5.174006
Sum squared resid	667.1621	Schwarz criterion	5.492327
Log likelihood	-206.3082	Hannan-Quinn criter.	5.301968
F-statistic	1618.199	Durbin-Watson stat	2.002945
Prob(F-statistic)	0.000000		

Inverted AR Roots	.39

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.176712	Prob. F(11,72)	0.0251
Obs*R-squared	20.96312	Prob. Chi-Square(11)	0.0338
Scaled explained SS	23.80686	Prob. Chi-Square(11)	0.0136

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 10:35
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.05556	10.83058	1.667091	0.0998
GRADF_01^2	0.000126	4.65E-05	2.711056	0.0084
GRADF_02^2	3.95E-06	0.001239	0.003186	0.9975
GRADF_03^2	-6.82E-05	0.000193	-0.353564	0.7247
GRADF_04^2	0.000300	0.000120	2.496032	0.0149
GRADF_05^2	-0.000213	0.000708	-0.301541	0.7639
GRADF_06^2	0.000181	6.71E-05	2.698129	0.0087
GRADF_07^2	-155.4881	112.7174	-1.379451	0.1720
GRADF_08^2	-63.15435	103.4773	-0.610321	0.5436
GRADF_09^2	-133.5674	106.9352	-1.249050	0.2157
GRADF_10^2	-304.4358	227.7623	-1.336638	0.1855
GRADF_11^2	-0.820953	0.829737	-0.989413	0.3258

R-squared	0.249561	Mean dependent var	7.942406
Adjusted R-squared	0.134911	S.D. dependent var	13.85630
S.E. of regression	12.88777	Akaike info criterion	8.081998
Sum squared resid	11958.81	Schwarz criterion	8.429258
Log likelihood	-327.4439	Hannan-Quinn criter.	8.221594
F-statistic	2.176712	Durbin-Watson stat	2.062716
Prob(F-statistic)	0.025050		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>105.3</td><td>105.5</td><td>-0.2</td><td>| . * . |</td></tr>
<tr><td>2016M02</td><td>121.0</td><td>115.1</td><td>5.9</td><td>| . | . * |</td></tr>
<tr><td>2016M03</td><td>98.7</td><td>102.0</td><td>-3.2</td><td>| * | . |</td></tr>
<tr><td>2016M04</td><td>68.1</td><td>70.4</td><td>-2.3</td><td>| .* | . |</td></tr>
<tr><td>2016M05</td><td>42.0</td><td>43.2</td><td>-1.1</td><td>| . *| . |</td></tr>
<tr><td>2016M06</td><td>19.5</td><td>19.2</td><td>0.2</td><td>| . * . |</td></tr>
<tr><td>2016M07</td><td>13.4</td><td>12.7</td><td>0.6</td><td>| . |* . |</td></tr>
<tr><td>2016M08</td><td>14.1</td><td>13.1</td><td>0.9</td><td>| . |* . |</td></tr>
<tr><td>2016M09</td><td>13.5</td><td>13.4</td><td>0.1</td><td>| . * . |</td></tr>
<tr><td>2016M10</td><td>22.7</td><td>21.7</td><td>1.0</td><td>| . |* . |</td></tr>
<tr><td>2016M11</td><td>48.9</td><td>49.9</td><td>-1.0</td><td>| . *| . |</td></tr>
<tr><td>2016M12</td><td>91.4</td><td>96.9</td><td>-5.5</td><td>| * . | . |</td></tr>
<tr><td>2017M01</td><td>118.5</td><td>112.8</td><td>5.7</td><td>| . | . * |</td></tr>
<tr><td>2017M02</td><td>111.6</td><td>114.3</td><td>-2.7</td><td>| .* | . |</td></tr>
<tr><td>2017M03</td><td>103.9</td><td>104.5</td><td>-0.6</td><td>| . *| . |</td></tr>
<tr><td>2017M04</td><td>85.5</td><td>78.6</td><td>6.9</td><td>| . | . *|</td></tr>
<tr><td>2017M05</td><td>43.6</td><td>42.9</td><td>0.7</td><td>| . |* . |</td></tr>
<tr><td>2017M06</td><td>27.1</td><td>25.4</td><td>1.8</td><td>| . | * . |</td></tr>
<tr><td>2017M07</td><td>15.8</td><td>14.2</td><td>1.7</td><td>| . | * . |</td></tr>
<tr><td>2017M08</td><td>13.8</td><td>14.1</td><td>-0.4</td><td>| . * . |</td></tr>
<tr><td>2017M09</td><td>14.8</td><td>13.3</td><td>1.5</td><td>| . | * . |</td></tr>
<tr><td>2017M10</td><td>17.3</td><td>18.3</td><td>-1.0</td><td>| . *| . |</td></tr>
<tr><td>2017M11</td><td>37.4</td><td>43.8</td><td>-6.4</td><td>| * . | . |</td></tr>
<tr><td>2017M12</td><td>101.1</td><td>99.1</td><td>2.0</td><td>| . | *. |</td></tr>
<tr><td>2018M01</td><td>157.8</td><td>156.3</td><td>1.5</td><td>| . | * . |</td></tr>
<tr><td>2018M02</td><td>119.7</td><td>116.0</td><td>3.8</td><td>| . | .* |</td></tr>
<tr><td>2018M03</td><td>97.8</td><td>97.6</td><td>0.2</td><td>| . * . |</td></tr>
<tr><td>2018M04</td><td>87.1</td><td>83.9</td><td>3.2</td><td>| . | * |</td></tr>
<tr><td>2018M05</td><td>42.2</td><td>42.2</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2018M06</td><td>20.9</td><td>21.2</td><td>-0.2</td><td>| . * . |</td></tr>
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<tr><td>2018M08</td><td>12.1</td><td>13.4</td><td>-1.2</td><td>| . * | . |</td></tr>
<tr><td>2018M09</td><td>12.5</td><td>12.6</td><td>-0.2</td><td>| . * . |</td></tr>
<tr><td>2018M10</td><td>22.2</td><td>21.8</td><td>0.4</td><td>| . * . |</td></tr>
<tr><td>2018M11</td><td>61.5</td><td>59.0</td><td>2.5</td><td>| . | *. |</td></tr>
<tr><td>2018M12</td><td>111.7</td><td>109.3</td><td>2.4</td><td>| . | *. |</td></tr>
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<tr><td>2019M03</td><td>115.3</td><td>115.4</td><td>-0.1</td><td>| . * . |</td></tr>
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<tr><td>2019M06</td><td>21.6</td><td>23.3</td><td>-1.7</td><td>| . * | . |</td></tr>
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<tr><td>2019M08</td><td>12.6</td><td>13.7</td><td>-1.1</td><td>| . *| . |</td></tr>
<tr><td>2019M09</td><td>12.6</td><td>12.8</td><td>-0.3</td><td>| . * . |</td></tr>
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<tr><td>2020M08</td><td>11.4</td><td>13.3</td><td>-1.8</td><td>| .*| . |</td></tr>
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<tr><td>2021M03</td><td>114.9</td><td>115.0</td><td>-0.1</td><td>| . * . |</td></tr>
<tr><td>2021M04</td><td>57.9</td><td>58.1</td><td>-0.2</td><td>| . * . |</td></tr>
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<tr><td>2022M02</td><td>124.8</td><td>126.9</td><td>-2.1</td><td>| .* | . |</td></tr>
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<tr><td>2022M11</td><td>50.05</td><td>41.75813159</td><td>8.291868411</td><td>| . | .   *</td></tr>
<tr><td>2022M12</td><td>96.18</td><td>95.33041388</td><td>0.849586125</td><td>| . |* . |</td></tr>
</table>

Date: 03/23/23 Time: 10:36
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.002	-0.002	0.0004	
. | . |	. | . |	2	-0.027	-0.027	0.0627	0.802
. | . |	. | . |	3	0.059	0.059	0.3770	0.828
. | . |	. | . |	4	0.029	0.028	0.4518	0.929
. |*. |	. |*. |	5	0.082	0.086	1.0669	0.899
. | . |	. | . |	6	0.005	0.004	1.0694	0.957
.*| . |	.*| . |	7	-0.171	-0.171	3.7971	0.704
. |*. |	. |*. |	8	0.139	0.132	5.6402	0.582
. | . |	. | . |	9	0.030	0.016	5.7256	0.678
. | . |	. | . |	10	0.017	0.037	5.7531	0.764
. |*. |	. |*. |	11	0.112	0.112	6.9839	0.727
. | . |	. | . |	12	0.050	0.068	7.2378	0.780

*Probabilities may not be valid for this equation specification.

13. LLF Customer Segment - Customer Model

Dependent Variable: LLF_CUST
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/28/23 Time: 16:34
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Failure to improve likelihood (non-zero gradients) after 11 iterations
Coefficient covariance computed using outer product of gradients
MA Backcast: 2015M01 2015M12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INC_HH	0.004256	0.000657	6.481474	0.0000
C	4885.498	122.0650	40.02374	0.0000
OCT	134.9704	19.85551	6.797628	0.0000
NOV	217.3649	26.77860	8.117112	0.0000
DEC	255.4447	29.09260	8.780401	0.0000
JAN	256.3956	29.81657	8.599096	0.0000
FEB	246.1860	28.98291	8.494175	0.0000
MAR	215.4283	26.72703	8.060316	0.0000
APR	122.8948	19.75750	6.220162	0.0000
AR(1)	0.523342	0.112513	4.651391	0.0000
MA(1)	0.437739	0.091709	4.773112	0.0000
MA(12)	0.532122	0.078479	6.780431	0.0000

R-squared	0.962837	Mean dependent var	5782.214
Adjusted R-squared	0.957159	S.D. dependent var	159.5827
S.E. of regression	33.03042	Akaike info criterion	9.964298
Sum squared resid	78552.60	Schwarz criterion	10.31156
Log likelihood	-406.5005	Hannan-Quinn criter.	10.10389
F-statistic	169.5827	Durbin-Watson stat	1.990634
Prob(F-statistic)	0.000000		

Inverted AR Roots	.52			
Inverted MA Roots	.89+.24i	.89-.24i	.64-.67i	.64+.67i
	.21+.91i	.21-.91i	-.28-.91i	-.28+.91i
	-.71+.66i	-.71-.66i	-.96-.24i	-.96+.24i

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.484055	Prob. F(12,71)	0.0089
Obs*R-squared	24.83842	Prob. Chi-Square(12)	0.0156
Scaled explained SS	17.34936	Prob. Chi-Square(12)	0.1369

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 10:41
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	130.6459	718.6242	0.181800	0.8563
GRADF_01^2	1.52E-07	3.37E-07	0.450198	0.6539
GRADF_02^2	10933.89	13011.56	0.840321	0.4035
GRADF_03^2	-2725.584	1300.201	-2.096278	0.0396
GRADF_04^2	-148.3618	1249.391	-0.118747	0.9058
GRADF_05^2	-1280.051	1297.428	-0.986606	0.3272
GRADF_06^2	-906.6791	1294.497	-0.700411	0.4860
GRADF_07^2	-1644.571	1358.923	-1.210201	0.2302
GRADF_08^2	-269.3192	1256.585	-0.214326	0.8309
GRADF_09^2	-1195.871	1170.206	-1.021932	0.3103
GRADF_10^2	0.197884	0.074409	2.659415	0.0097
GRADF_11^2	0.019649	0.013345	1.472348	0.1453
GRADF_12^2	-0.012084	0.009443	-1.279701	0.2048

R-squared	0.295695	Mean dependent var	935.1500
Adjusted R-squared	0.176658	S.D. dependent var	1297.249
S.E. of regression	1177.101	Akaike info criterion	17.12088
Sum squared resid	98375188	Schwarz criterion	17.49708
Log likelihood	-706.0771	Hannan-Quinn criter.	17.27211
F-statistic	2.484055	Durbin-Watson stat	1.996995
Prob(F-statistic)	0.008926		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>5764.0</td><td>5768.8</td><td>-4.8</td><td>| . *| . |</td></tr>
<tr><td>2016M02</td><td>5779.0</td><td>5773.6</td><td>5.4</td><td>| . |* . |</td></tr>
<tr><td>2016M03</td><td>5756.0</td><td>5737.2</td><td>18.8</td><td>| . | * . |</td></tr>
<tr><td>2016M04</td><td>5681.0</td><td>5691.3</td><td>-10.3</td><td>| . *| . |</td></tr>
<tr><td>2016M05</td><td>5574.0</td><td>5529.8</td><td>44.2</td><td>| . | . * |</td></tr>
<tr><td>2016M06</td><td>5574.0</td><td>5610.2</td><td>-36.2</td><td>| *. | . |</td></tr>
<tr><td>2016M07</td><td>5477.0</td><td>5514.9</td><td>-37.9</td><td>| *. | . |</td></tr>
<tr><td>2016M08</td><td>5430.0</td><td>5495.6</td><td>-65.6</td><td>| * . | . |</td></tr>
<tr><td>2016M09</td><td>5540.0</td><td>5459.2</td><td>80.8</td><td>| . | . *</td></tr>
<tr><td>2016M10</td><td>5695.0</td><td>5732.4</td><td>-37.4</td><td>| *. | . |</td></tr>
<tr><td>2016M11</td><td>5766.0</td><td>5739.2</td><td>26.8</td><td>| . | * |</td></tr>
<tr><td>2016M12</td><td>5831.0</td><td>5829.8</td><td>1.2</td><td>| . * . |</td></tr>
<tr><td>2017M01</td><td>5820.0</td><td>5824.3</td><td>-4.3</td><td>| . *| . |</td></tr>
<tr><td>2017M02</td><td>5824.0</td><td>5812.5</td><td>11.5</td><td>| . | * . |</td></tr>
<tr><td>2017M03</td><td>5815.0</td><td>5803.3</td><td>11.7</td><td>| . | * . |</td></tr>
<tr><td>2017M04</td><td>5722.0</td><td>5706.9</td><td>15.1</td><td>| . | * . |</td></tr>
<tr><td>2017M05</td><td>5613.0</td><td>5615.9</td><td>-2.9</td><td>| . * . |</td></tr>
<tr><td>2017M06</td><td>5526.0</td><td>5575.9</td><td>-49.9</td><td>| * . | . |</td></tr>
<tr><td>2017M07</td><td>5513.0</td><td>5511.8</td><td>1.2</td><td>| . * . |</td></tr>
<tr><td>2017M08</td><td>5496.0</td><td>5513.5</td><td>-17.5</td><td>| . * | . |</td></tr>
<tr><td>2017M09</td><td>5523.0</td><td>5573.0</td><td>-50.0</td><td>| * . | . |</td></tr>
<tr><td>2017M10</td><td>5657.0</td><td>5644.1</td><td>12.9</td><td>| . | * . |</td></tr>
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<tr><td>2017M12</td><td>5851.0</td><td>5852.6</td><td>-1.6</td><td>| . * . |</td></tr>
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<tr><td>2018M02</td><td>5883.0</td><td>5874.4</td><td>8.6</td><td>| . |* . |</td></tr>
<tr><td>2018M03</td><td>5891.0</td><td>5844.6</td><td>46.4</td><td>| . | . * |</td></tr>
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<tr><td>2018M09</td><td>5595.0</td><td>5557.7</td><td>37.3</td><td>| . | .* |</td></tr>
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<tr><td>2018M11</td><td>5862.0</td><td>5859.3</td><td>2.7</td><td>| . * . |</td></tr>
<tr><td>2018M12</td><td>5885.0</td><td>5900.4</td><td>-15.4</td><td>| . * | . |</td></tr>
<tr><td>2019M01</td><td>5899.0</td><td>5908.9</td><td>-9.9</td><td>| . *| . |</td></tr>
<tr><td>2019M02</td><td>5908.0</td><td>5902.2</td><td>5.8</td><td>| . |* . |</td></tr>
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<tr><td>2019M04</td><td>5830.0</td><td>5820.7</td><td>9.3</td><td>| . |* . |</td></tr>
<tr><td>2019M05</td><td>5717.0</td><td>5694.0</td><td>23.0</td><td>| . | *. |</td></tr>
<tr><td>2019M06</td><td>5606.0</td><td>5686.0</td><td>-80.0</td><td>| * . | . |</td></tr>
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<tr><td>2019M11</td><td>5848.0</td><td>5844.2</td><td>3.8</td><td>| . |* . |</td></tr>
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<tr><td>2020M12</td><td>6003.0</td><td>5987.8</td><td>15.2</td><td>| . | * . |</td></tr>
<tr><td>2021M01</td><td>6015.0</td><td>6029.8</td><td>-14.8</td><td>| . * | . |</td></tr>
<tr><td>2021M02</td><td>6038.0</td><td>6016.5</td><td>21.5</td><td>| . | *. |</td></tr>
<tr><td>2021M03</td><td>6031.0</td><td>6008.9</td><td>22.1</td><td>| . | *. |</td></tr>
<tr><td>2021M04</td><td>5966.0</td><td>5937.6</td><td>28.4</td><td>| . | * |</td></tr>
<tr><td>2021M05</td><td>5853.0</td><td>5800.5</td><td>52.5</td><td>| . | . * |</td></tr>
<tr><td>2021M06</td><td>5761.0</td><td>5811.6</td><td>-50.6</td><td>| * . | . |</td></tr>
<tr><td>2021M07</td><td>5718.0</td><td>5738.6</td><td>-20.6</td><td>| .* | . |</td></tr>
<tr><td>2021M08</td><td>5724.0</td><td>5750.8</td><td>-26.8</td><td>| * | . |</td></tr>
<tr><td>2021M09</td><td>5750.0</td><td>5769.9</td><td>-19.9</td><td>| .* | . |</td></tr>
<tr><td>2021M10</td><td>5876.0</td><td>5917.2</td><td>-41.2</td><td>| *. | . |</td></tr>
<tr><td>2021M11</td><td>5980.0</td><td>5937.5</td><td>42.5</td><td>| . | . * |</td></tr>
<tr><td>2021M12</td><td>6027.0</td><td>6049.6</td><td>-22.6</td><td>| .* | . |</td></tr>
<tr><td>2022M01</td><td>6047.0</td><td>6005.6</td><td>41.4</td><td>| . | .* |</td></tr>
<tr><td>2022M02</td><td>6053.0</td><td>6051.9</td><td>1.1</td><td>| . * . |</td></tr>
<tr><td>2022M03</td><td>6014.0</td><td>6016.1</td><td>-2.1</td><td>| . * . |</td></tr>
<tr><td>2022M04</td><td>5961</td><td>5926.3</td><td>34.7</td><td>| . | .* |</td></tr>
<tr><td>2022M05</td><td>5854</td><td>5856.6</td><td>-2.6</td><td>| . * . |</td></tr>
<tr><td>2022M06</td><td>5772</td><td>5794.9</td><td>-22.9</td><td>| .* | . |</td></tr>
<tr><td>2022M07</td><td>5758</td><td>5759.3</td><td>-1.3</td><td>| . * . |</td></tr>
<tr><td>2022M08</td><td>5742</td><td>5758.6</td><td>-16.6</td><td>| . * | . |</td></tr>
<tr><td>2022M09</td><td>5786</td><td>5748.0</td><td>38.0</td><td>| . | .* |</td></tr>
<tr><td>2022M10</td><td>5939</td><td>5919.5</td><td>19.5</td><td>| . | *. |</td></tr>
<tr><td>2022M11</td><td>6011</td><td>6048.8</td><td>-37.8</td><td>| *. | . |</td></tr>
<tr><td>2022M12</td><td>6058</td><td>6022.7</td><td>35.3</td><td>| . | .* |</td></tr>
</table>

Date: 03/23/23 Time: 10:42
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 3 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.004	-0.004	0.0011	
. |*. |	. |*. |	2	0.092	0.092	0.7516	
.*| . |	.*| . |	3	-0.108	-0.109	1.8010	
.*| . |	.*| . |	4	-0.104	-0.114	2.7712	0.096
. | . |	. | . |	5	-0.010	0.011	2.7797	0.249
. | . |	. |*. |	6	0.072	0.084	3.2552	0.354
.*| . |	.*| . |	7	-0.086	-0.114	3.9560	0.412
. | . |	. | . |	8	0.059	0.032	4.2855	0.509
.*| . |	.*| . |	9	-0.126	-0.093	5.8218	0.443
.*| . |	.*| . |	10	-0.068	-0.086	6.2771	0.508
. |*. |	. |*. |	11	0.116	0.135	7.6066	0.473
.*| . |	.*| . |	12	-0.099	-0.113	8.5966	0.475

*Probabilities may not be valid for this equation specification.

14. LLF Customer Segment - Use Per Customer Model

Dependent Variable: LLF_UPC
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/01/23 Time: 16:39
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Convergence achieved after 4 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC_APR	0.512579	0.012877	39.80641	0.0000
BC_DEC	0.627852	0.010786	58.21156	0.0000
BC_FEB	0.644884	0.008848	72.88302	0.0000
BC_JAN	0.672333	0.008812	76.29469	0.0000
BC_MAR	0.650791	0.010375	62.72448	0.0000
BC_JUN	0.262052	0.047871	5.474143	0.0000
BC_MAY	0.407200	0.020589	19.77739	0.0000
BC_NOV	0.504947	0.017154	29.43526	0.0000
BC_OCT	0.335837	0.036147	9.290974	0.0000
C	103.0396	8.660396	11.89779	0.0000
TREND*D_2017M11_F	0.142555	0.117558	1.212642	0.2292
AR(1)	0.424663	0.110428	3.845602	0.0003

R-squared	0.995950	Mean dependent var	428.0715
Adjusted R-squared	0.995331	S.D. dependent var	303.2711
S.E. of regression	20.72207	Akaike info criterion	9.031839
Sum squared resid	30917.10	Schwarz criterion	9.379099
Log likelihood	-367.3373	Hannan-Quinn criter.	9.171435
F-statistic	1609.603	Durbin-Watson stat	2.026622
Prob(F-statistic)	0.000000		

Inverted AR Roots	.42

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.580393	Prob. F(11,72)	0.1231
Obs*R-squared	16.33713	Prob. Chi-Square(11)	0.1291
Scaled explained SS	24.30089	Prob. Chi-Square(11)	0.0115

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 10:43
Sample: 2016M01 2022M12
Included observations: 84
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	37.09083	187.9646	0.197329	0.8441
GRADF_01^2	0.001018	0.000470	2.164905	0.0337
GRADF_02^2	-0.000143	0.000335	-0.427059	0.6706
GRADF_03^2	-0.000133	0.000221	-0.602272	0.5489
GRADF_04^2	0.000383	0.000211	1.814142	0.0738
GRADF_05^2	0.000382	0.000296	1.290557	0.2010
GRADF_06^2	-0.000592	0.008894	-0.066528	0.9471
GRADF_07^2	-0.001173	0.001324	-0.885490	0.3788
GRADF_08^2	0.000867	0.000865	1.002662	0.3194
GRADF_09^2	-0.002158	0.005044	-0.427849	0.6700
GRADF_11^2	0.194774	0.081604	2.386831	0.0196
GRADF_12^2	-0.044484	0.111536	-0.398830	0.6912

R-squared	0.194490	Mean dependent var	368.0608
Adjusted R-squared	0.071426	S.D. dependent var	745.0839
S.E. of regression	717.9820	Akaike info criterion	16.12233
Sum squared resid	37115865	Schwarz criterion	16.46959
Log likelihood	-665.1378	Hannan-Quinn criter.	16.26193
F-statistic	1.580393	Durbin-Watson stat	1.866098
Prob(F-statistic)	0.123095		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>778.9</td><td>782.1</td><td>-3.2</td><td>| . *| . |</td></tr>
<tr><td>2016M02</td><td>847.0</td><td>832.3</td><td>14.8</td><td>| . | *. |</td></tr>
<tr><td>2016M03</td><td>694.4</td><td>737.0</td><td>-42.6</td><td>| * . | . |</td></tr>
<tr><td>2016M04</td><td>491.6</td><td>476.2</td><td>15.4</td><td>| . | *. |</td></tr>
<tr><td>2016M05</td><td>294.7</td><td>307.6</td><td>-12.9</td><td>| .* | . |</td></tr>
<tr><td>2016M06</td><td>141.5</td><td>137.4</td><td>4.1</td><td>| . |* . |</td></tr>
<tr><td>2016M07</td><td>95.2</td><td>102.3</td><td>-7.2</td><td>| . *| . |</td></tr>
<tr><td>2016M08</td><td>102.5</td><td>99.7</td><td>2.8</td><td>| . * . |</td></tr>
<tr><td>2016M09</td><td>110.7</td><td>102.8</td><td>7.9</td><td>| . |* . |</td></tr>
<tr><td>2016M10</td><td>198.3</td><td>193.3</td><td>5.0</td><td>| . |* . |</td></tr>
<tr><td>2016M11</td><td>381.0</td><td>398.9</td><td>-18.0</td><td>| * | . |</td></tr>
<tr><td>2016M12</td><td>667.9</td><td>687.7</td><td>-19.8</td><td>| * | . |</td></tr>
<tr><td>2017M01</td><td>839.6</td><td>859.8</td><td>-20.3</td><td>| * | . |</td></tr>
<tr><td>2017M02</td><td>798.2</td><td>811.4</td><td>-13.2</td><td>| .* | . |</td></tr>
<tr><td>2017M03</td><td>770.4</td><td>762.1</td><td>8.3</td><td>| . |* . |</td></tr>
<tr><td>2017M04</td><td>580.8</td><td>547.7</td><td>33.0</td><td>| . | . * |</td></tr>
<tr><td>2017M05</td><td>302.4</td><td>296.5</td><td>5.9</td><td>| . |* . |</td></tr>
<tr><td>2017M06</td><td>171.5</td><td>173.9</td><td>-2.5</td><td>| . * . |</td></tr>
<tr><td>2017M07</td><td>114.6</td><td>105.5</td><td>9.1</td><td>| . |* . |</td></tr>
<tr><td>2017M08</td><td>109.8</td><td>107.9</td><td>1.8</td><td>| . * . |</td></tr>
<tr><td>2017M09</td><td>126.3</td><td>105.9</td><td>20.4</td><td>| . | * |</td></tr>
<tr><td>2017M10</td><td>164.5</td><td>159.9</td><td>4.5</td><td>| . |* . |</td></tr>
<tr><td>2017M11</td><td>336.8</td><td>362.4</td><td>-25.6</td><td>| *. | . |</td></tr>
<tr><td>2017M12</td><td>745.4</td><td>723.0</td><td>22.4</td><td>| . | .* |</td></tr>
<tr><td>2018M01</td><td>1140.2</td><td>1115.7</td><td>24.5</td><td>| . | .* |</td></tr>
<tr><td>2018M02</td><td>855.1</td><td>861.4</td><td>-6.3</td><td>| . *| . |</td></tr>
<tr><td>2018M03</td><td>730.6</td><td>715.7</td><td>14.9</td><td>| . | *. |</td></tr>
<tr><td>2018M04</td><td>614.5</td><td>590.2</td><td>24.3</td><td>| . | .* |</td></tr>
<tr><td>2018M05</td><td>308.6</td><td>304.3</td><td>4.3</td><td>| . |* . |</td></tr>
<tr><td>2018M06</td><td>162.3</td><td>159.6</td><td>2.7</td><td>| . * . |</td></tr>
<tr><td>2018M07</td><td>110.1</td><td>113.8</td><td>-3.7</td><td>| . *| . |</td></tr>
<tr><td>2018M08</td><td>106.7</td><td>109.9</td><td>-3.2</td><td>| . *| . |</td></tr>
<tr><td>2018M09</td><td>113.1</td><td>108.5</td><td>4.6</td><td>| . |* . |</td></tr>
<tr><td>2018M10</td><td>213.1</td><td>204.0</td><td>9.1</td><td>| . |* . |</td></tr>
<tr><td>2018M11</td><td>485.8</td><td>483.6</td><td>2.2</td><td>| . * . |</td></tr>
<tr><td>2018M12</td><td>782.0</td><td>782.3</td><td>-0.3</td><td>| . * . |</td></tr>
<tr><td>2019M01</td><td>895.2</td><td>910.1</td><td>-14.9</td><td>| .* | . |</td></tr>
<tr><td>2019M02</td><td>916.2</td><td>928.7</td><td>-12.6</td><td>| .* | . |</td></tr>
<tr><td>2019M03</td><td>832.3</td><td>834.9</td><td>-2.6</td><td>| . * . |</td></tr>
<tr><td>2019M04</td><td>537.5</td><td>517.4</td><td>20.1</td><td>| . | * |</td></tr>
<tr><td>2019M05</td><td>320.2</td><td>318.7</td><td>1.5</td><td>| . * . |</td></tr>
<tr><td>2019M06</td><td>160.4</td><td>170.6</td><td>-10.1</td><td>| .* | . |</td></tr>
</table>

2019M07	111.9	108.3	3.5	| . |* . |
2019M08	103.2	111.6	-8.4	| . *| . |
2019M09	117.2	108.0	9.2	| . |* . |
2019M10	204.2	199.3	4.8	| . |* . |
2019M11	438.8	435.0	3.8	| . |* . |
2019M12	765.7	773.4	-7.7	| . *| . |
2020M01	874.4	844.2	30.3	| . | . * |
2020M02	849.5	832.2	17.3	| . | * |
2020M03	724.5	743.0	-18.5	| * | . |
2020M04	479.0	507.6	-28.6	| * . | . |
2020M05	326.6	326.2	0.5	| . * . |
2020M06	146.2	152.9	-6.7	| . *| . |
2020M07	98.9	107.7	-8.8	| . *| . |
2020M08	77.7	107.1	-29.4	| * . | . |
2020M09	124.8	98.2	26.7	| . | .* |
2020M10	189.8	201.2	-11.4	| .* | . |
2020M11	397.0	396.5	0.5	| . * . |
2020M12	646.5	658.3	-11.7	| .* | . |
2021M01	797.3	849.3	-52.0	| * . | . |
2021M02	894.8	891.7	3.1	| . * . |
2021M03	827.7	787.7	40.0	| . | . * |
2021M04	426.9	489.2	-62.3	|* . | . |
2021M05	276.8	264.9	11.9	| . | *. |
2021M06	126.4	145.8	-19.4	| * | . |
2021M07	96.6	104.7	-8.1	| . *| . |
2021M08	92.1	107.1	-15.0	| .* | . |
2021M09	100.5	105.3	-4.8	| . *| . |
2021M10	147.7	162.6	-14.9	| .* | . |
2021M11	353.1	378.9	-25.8	| *. | . |
2021M12	662.0	660.0	2.1	| . * . |
2022M01	921.1	896.0	25.1	| . | .* |
2022M02	944.5	948.1	-3.6	| . *| . |
2022M03	762.0	770.5	-8.6	| . *| . |
2022M04	472.78	488.3	-15.5	| .* | . |
2022M05	289.1	296.8	-7.7	| . *| . |
2022M06	182.44	148.4	34.1	| . | . * |
2022M07	131.03	128.0	3.1	| . * . |
2022M08	131.31	122.7	8.6	| . |* . |
2022M09	131.6	122.9	8.7	| . |* . |
2022M10	229.78	218.8	11.0	| . | *. |
2022M11	420.35	353.5	66.9	| . | . *
2022M12	716.58	703.6	13.0	| . | *. |

Date: 03/23/23 Time: 10:44
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.016	-0.016	0.0229	
. | . |	. | . |	2	-0.031	-0.031	0.1072	0.743
. |*. |	. |*. |	3	0.084	0.083	0.7311	0.694
. | . |	. | . |	4	0.051	0.053	0.9637	0.810
. |*. |	. |*. |	5	0.133	0.141	2.5768	0.631
. |*. |	. |*. |	6	0.115	0.120	3.7927	0.580
.*| . |	.*| . |	7	-0.122	-0.119	5.1983	0.519
. |*. |	. | . |	8	0.080	0.058	5.8026	0.563
. | . |	. | . |	9	0.042	0.003	5.9763	0.650
. |*. |	. |*. |	10	0.188	0.193	9.4112	0.400
.*| . |	.*| . |	11	-0.091	-0.121	10.239	0.420
.*| . |	.*| . |	12	-0.099	-0.089	11.224	0.425

*Probabilities may not be valid for this equation specification.

15. HLF Customer Segment - Customer Model

Dependent Variable: HLF_CUST
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/01/23 Time: 16:57
Sample: 2016M01 2022M12
Included observations: 84
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GMP(-3)*D_2018M10_F	1.651933	0.112163	14.72801	0.0000
OCT	-18.05317	2.697196	-6.693310	0.0000
NOV	-27.83772	3.233165	-8.610053	0.0000
DEC	-28.47943	3.405677	-8.362341	0.0000
JAN	-26.74723	3.428057	-7.802448	0.0000
FEB	-28.10918	3.388798	-8.294734	0.0000
MAR	-23.09065	3.182269	-7.256032	0.0000
APR	-10.20767	2.640882	-3.865250	0.0002
C	1112.908	2.835638	392.4719	0.0000
AR(1)	0.579640	0.098358	5.893154	0.0000

R-squared	0.945592	Mean dependent var	1128.560
Adjusted R-squared	0.938975	S.D. dependent var	26.69748
S.E. of regression	6.595166	Akaike info criterion	6.726769
Sum squared resid	3218.720	Schwarz criterion	7.016152
Log likelihood	-272.5243	Hannan-Quinn criter.	6.843098
F-statistic	142.8987	Durbin-Watson stat	1.998958
Prob(F-statistic)	0.000000		

Inverted AR Roots	.58

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.870918	Prob. F(10,73)	0.5638
Obs*R-squared	8.953351	Prob. Chi-Square(10)	0.5365
Scaled explained SS	29.78060	Prob. Chi-Square(10)	0.0009

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 10:46
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	66.29393	53.05915	1.249435	0.2155
GRADF_01^2	-3.399809	5.076663	-0.669694	0.5052
GRADF_02^2	610.0929	1900.058	0.321092	0.7491
GRADF_03^2	-1534.095	1814.488	-0.845470	0.4006
GRADF_04^2	-504.7691	1866.479	-0.270439	0.7876
GRADF_05^2	-1648.072	1958.109	-0.841665	0.4027
GRADF_06^2	-1276.184	1869.542	-0.682619	0.4970
GRADF_07^2	-1244.399	1815.998	-0.685242	0.4954
GRADF_08^2	-1503.561	1832.583	-0.820460	0.4146
GRADF_09^2	-1868.685	9405.081	-0.198689	0.8431
GRADF_10^2	6.998729	3.653221	1.915769	0.0593

R-squared	0.106588	Mean dependent var	38.31810
Adjusted R-squared	-0.015798	S.D. dependent var	112.8602
S.E. of regression	113.7482	Akaike info criterion	12.42740
Sum squared resid	944522.1	Schwarz criterion	12.74572
Log likelihood	-510.9508	Hannan-Quinn criter.	12.55536
F-statistic	0.870918	Durbin-Watson stat	2.031925
Prob(F-statistic)	0.563842		

obs	Actual	Fitted	Residual	Residual Plot
2016M01	1089.0	1086.7	2.3	| . |*. |
2016M02	1085.0	1086.4	-1.4	| . * . |
2016M03	1097.0	1089.9	7.1	| . | * |
2016M04	1113.0	1106.9	6.1	| . | * |
2016M05	1127.0	1118.9	8.1	| . | .* |
2016M06	1127.0	1121.1	5.9	| . | * |
2016M07	1118.0	1121.1	-3.1	| .*| . |
2016M08	1147.0	1115.9	31.1	| . | . *
2016M09	1115.0	1132.7	-17.7	| * . | . |
2016M10	1085.0	1096.1	-11.1	| * . | . |
2016M11	1084.0	1079.4	4.6	| . | * |
2016M12	1090.0	1083.8	6.2	| . | * |
2017M01	1094.0	1089.4	4.6	| . | * |
2017M02	1092.0	1089.3	2.7	| . |*. |
2017M03	1097.0	1094.0	3.0	| . |*. |
2017M04	1105.0	1106.9	-1.9	| .*| . |
2017M05	1113.0	1114.2	-1.2	| . * . |
2017M06	1115.0	1113.0	2.0	| . |*. |
2017M07	1116.0	1114.1	1.9	| . |*. |
2017M08	1113.0	1114.7	-1.7	| .*| . |
2017M09	1107.0	1113.0	-6.0	| * | . |
2017M10	1096.0	1091.4	4.6	| . | * |
2017M11	1075.0	1085.7	-10.7	| * . | . |
2017M12	1076.0	1078.6	-2.6	| .*| . |
2018M01	1077.0	1081.3	-4.3	| .*| . |
2018M02	1074.0	1079.5	-5.5	| * | . |
2018M03	1082.0	1083.6	-1.6	| .*| . |
2018M04	1097.0	1098.2	-1.2	| . * . |
2018M05	1109.0	1109.6	-0.6	| . * . |
2018M06	1110.0	1110.6	-0.6	| . * . |
2018M07	1099.0	1111.2	-12.2	| * . | . |
2018M08	1096.0	1104.8	-8.8	| *. | . |
2018M09	1114.0	1103.1	10.9	| . | . * |
2018M10	1151.0	1138.7	12.3	| . | . * |
2018M11	1131.0	1135.9	-4.9	| * | . |
2018M12	1131.0	1129.3	1.7	| . |*. |
2019M01	1133.0	1131.3	1.7	| . |*. |
2019M02	1130.0	1130.2	-0.2	| . * . |
2019M03	1134.0	1134.4	-0.4	| . * . |
2019M04	1145.0	1146.8	-1.8	| .*| . |
2019M05	1156.0	1155.9	0.1	| . * . |
2019M06	1151.0	1156.4	-5.4	| * | . |

2019M07	1150.0	1153.5	-3.5	| .*| . |
2019M08	1148.0	1153.1	-5.1	| * | . |
2019M09	1155.0	1152.2	2.8	| . |*. |
2019M10	1143.0	1138.4	4.6	| . | * |
2019M11	1135.0	1132.1	2.9	| . |*. |
2019M12	1138.0	1132.4	5.6	| . | * |
2020M01	1137.0	1136.3	0.7	| . * . |
2020M02	1139.0	1133.8	5.2	| . | * |
2020M03	1141.0	1141.5	-0.5	| . * . |
2020M04	1148.0	1152.7	-4.7	| * | . |
2020M05	1161.0	1158.4	2.6	| . |*. |
2020M06	1166.0	1157.9	8.1	| . | .* |
2020M07	1160.0	1159.4	0.6	| . * . |
2020M08	1153.0	1156.3	-3.3	| .*| . |
2020M09	1149.0	1154.5	-5.5	| * | . |
2020M10	1133.0	1136.4	-3.4	| .*| . |
2020M11	1129.0	1128.8	0.2	| . * . |
2020M12	1126.0	1130.8	-4.8	| * | . |
2021M01	1127.0	1130.2	-3.2	| .*| . |
2021M02	1127.0	1128.0	-1.0	| . * . |
2021M03	1132.0	1134.3	-2.3	| .*| . |
2021M04	1151.0	1147.8	3.2	| . |*. |
2021M05	1161.0	1162.0	-1.0	| . * . |
2021M06	1160.0	1162.1	-2.1	| .*| . |
2021M07	1163.0	1161.7	1.3	| . * . |
2021M08	1164.0	1163.5	0.5	| . * . |
2021M09	1166.0	1164.1	1.9	| . |*. |
2021M10	1150.0	1147.3	2.7	| . |*. |
2021M11	1142.0	1139.0	3.0	| . |*. |
2021M12	1142.0	1139.9	2.1	| . |*. |
2022M01	1142.0	1142.3	-0.3	| . * . |
2022M02	1142.0	1139.9	2.1	| . |*. |
2022M03	1143.0	1145.3	-2.3	| .*| . |
2022M04	1161	1155.4	5.56509	| . | * |
2022M05	1170	1168.6	1.39886	| . * . |
2022M06	1169	1168.2	0.75175	| . * . |
2022M07	1167	1168.1	-1.1015	| . * . |
2022M08	1161	1167.2	-6.214	| * | . |
2022M09	1156	1163.8	-7.814	| *. | . |
2022M10	1133	1142.9	-9.8875	| *. | . |
2022M11	1135	1130.3	4.65329	| . | * |
2022M12	1128	1136.7	-8.746	| *. | . |

Date: 03/23/23 Time: 10:47
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.012	-0.012	0.0129	
. | . |	. | . |	2	-0.049	-0.050	0.2281	0.633
. |*. |	. |*. |	3	0.081	0.080	0.8205	0.663
. | . |	. | . |	4	0.045	0.045	1.0048	0.800
. | . |	. | . |	5	0.053	0.063	1.2623	0.868
.*| . |	.*| . |	6	-0.068	-0.070	1.6918	0.890
. | . |	. | . |	7	0.072	0.070	2.1795	0.902
. | . |	. | . |	8	-0.035	-0.054	2.2968	0.942
. | . |	. | . |	9	-0.045	-0.032	2.4876	0.962
.*| . |	.*| . |	10	-0.092	-0.110	3.3078	0.951
. | . |	. | . |	11	-0.018	-0.014	3.3416	0.972
. | . |	. | . |	12	-0.021	-0.037	3.3846	0.985

*Probabilities may not be valid for this equation specification.

16. HLF Customer Segment - Use Per Customer

Dependent Variable: HLF_UPC
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/01/23 Time: 16:52
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Convergence achieved after 10 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EMP_MAN	117.1330	1.296859	90.32054	0.0000
BC_APR	0.229463	0.064422	3.561847	0.0006
BC_DEC	0.274235	0.053433	5.132346	0.0000
BC_FEB	0.257756	0.043542	5.919776	0.0000
BC_JAN	0.383185	0.046608	8.221471	0.0000
BC_MAR	0.515305	0.050454	10.21333	0.0000
BC_NOV	0.416274	0.088170	4.721266	0.0000
BC_OCT	0.794346	0.215811	3.680753	0.0004
D_2020M03_2020M12	-117.0448	56.67702	-2.065119	0.0424
AR(3)	0.314714	0.118335	2.659521	0.0096

R-squared	0.748788	Mean dependent var	2612.165
Adjusted R-squared	0.718235	S.D. dependent var	243.0022
S.E. of regression	128.9894	Akaike info criterion	12.66868
Sum squared resid	1231231.	Schwarz criterion	12.95806
Log likelihood	-522.0846	Hannan-Quinn criter.	12.78501
Durbin-Watson stat	1.718469		

Inverted AR Roots	.68	-.34+.59i	-.34-.59i

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.595111	Prob. F(10,73)	0.8129
Obs*R-squared	6.331684	Prob. Chi-Square(10)	0.7867
Scaled explained SS	8.623504	Prob. Chi-Square(10)	0.5682

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 10:47
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	60394.32	65280.10	0.925157	0.3579
GRADF_01^2	-197.6579	315.0902	-0.627306	0.5324
GRADF_02^2	-0.011943	0.018128	-0.658791	0.5121
GRADF_03^2	0.008911	0.012820	0.695112	0.4892
GRADF_04^2	-0.001083	0.008390	-0.129091	0.8976
GRADF_05^2	0.002942	0.008148	0.360989	0.7192
GRADF_06^2	-0.013745	0.011552	-1.189872	0.2380
GRADF_07^2	-0.042251	0.034075	-1.239940	0.2190
GRADF_08^2	-0.208026	0.193484	-1.075163	0.2858
GRADF_09^2	-8133.780	17435.05	-0.466519	0.6422
GRADF_10^2	-0.066516	0.106283	-0.625839	0.5334

R-squared	0.075377	Mean dependent var	14657.51
Adjusted R-squared	-0.051283	S.D. dependent var	27625.21
S.E. of regression	28324.71	Akaike info criterion	23.46240
Sum squared resid	5.86E+10	Schwarz criterion	23.78073
Log likelihood	-974.4210	Hannan-Quinn criter.	23.59037
F-statistic	0.595111	Durbin-Watson stat	1.708186
Prob(F-statistic)	0.812878		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>3062.6</td><td>2792.1</td><td>270.4</td><td>| . | . * |</td></tr>
<tr><td>2016M02</td><td>2963.9</td><td>2678.9</td><td>284.9</td><td>| . | . * |</td></tr>
<tr><td>2016M03</td><td>2917.2</td><td>2916.9</td><td>0.3</td><td>| . * . |</td></tr>
<tr><td>2016M04</td><td>2665.5</td><td>2642.6</td><td>22.9</td><td>| . |* . |</td></tr>
<tr><td>2016M05</td><td>2458.8</td><td>2469.7</td><td>-10.9</td><td>| . * . |</td></tr>
<tr><td>2016M06</td><td>2316.8</td><td>2393.7</td><td>-76.9</td><td>| .* | . |</td></tr>
<tr><td>2016M07</td><td>2190.6</td><td>2421.2</td><td>-230.6</td><td>| * . | . |</td></tr>
<tr><td>2016M08</td><td>2367.4</td><td>2418.9</td><td>-51.5</td><td>| . *| . |</td></tr>
<tr><td>2016M09</td><td>2398.8</td><td>2383.6</td><td>15.1</td><td>| . * . |</td></tr>
<tr><td>2016M10</td><td>2591.5</td><td>2559.9</td><td>31.6</td><td>| . |* . |</td></tr>
<tr><td>2016M11</td><td>2670.5</td><td>2657.6</td><td>12.9</td><td>| . * . |</td></tr>
<tr><td>2016M12</td><td>2687.4</td><td>2687.1</td><td>0.4</td><td>| . * . |</td></tr>
<tr><td>2017M01</td><td>2802.9</td><td>2861.2</td><td>-58.2</td><td>| . *| . |</td></tr>
<tr><td>2017M02</td><td>2587.8</td><td>2720.4</td><td>-132.7</td><td>| * | . |</td></tr>
<tr><td>2017M03</td><td>2912.7</td><td>2957.4</td><td>-44.7</td><td>| . *| . |</td></tr>
<tr><td>2017M04</td><td>2572.1</td><td>2600.7</td><td>-28.6</td><td>| . *| . |</td></tr>
<tr><td>2017M05</td><td>2586.5</td><td>2381.0</td><td>205.4</td><td>| . | . * |</td></tr>
<tr><td>2017M06</td><td>1989.8</td><td>2412.8</td><td>-423.0</td><td>|* . | . |</td></tr>
<tr><td>2017M07</td><td>2546.0</td><td>2416.0</td><td>130.0</td><td>| . | * |</td></tr>
<tr><td>2017M08</td><td>2431.2</td><td>2484.5</td><td>-53.3</td><td>| . *| . |</td></tr>
<tr><td>2017M09</td><td>2249.6</td><td>2289.4</td><td>-39.8</td><td>| . *| . |</td></tr>
<tr><td>2017M10</td><td>2646.3</td><td>2567.1</td><td>79.1</td><td>| . | *. |</td></tr>
<tr><td>2017M11</td><td>2682.3</td><td>2621.5</td><td>60.8</td><td>| . | *. |</td></tr>
<tr><td>2017M12</td><td>2820.7</td><td>2642.0</td><td>178.6</td><td>| . | .* |</td></tr>
<tr><td>2018M01</td><td>2981.2</td><td>3046.7</td><td>-65.4</td><td>| .* | . |</td></tr>
<tr><td>2018M02</td><td>2735.8</td><td>2766.2</td><td>-30.4</td><td>| . *| . |</td></tr>
<tr><td>2018M03</td><td>2882.2</td><td>2974.3</td><td>-92.1</td><td>| .* | . |</td></tr>
<tr><td>2018M04</td><td>2752.6</td><td>2661.5</td><td>91.1</td><td>| . | *. |</td></tr>
<tr><td>2018M05</td><td>2598.4</td><td>2460.9</td><td>137.5</td><td>| . | * |</td></tr>
<tr><td>2018M06</td><td>2374.8</td><td>2458.2</td><td>-83.4</td><td>| .* | . |</td></tr>
<tr><td>2018M07</td><td>2320.9</td><td>2513.7</td><td>-192.8</td><td>| * . | . |</td></tr>
<tr><td>2018M08</td><td>2544.8</td><td>2535.9</td><td>8.9</td><td>| . * . |</td></tr>
<tr><td>2018M09</td><td>2463.0</td><td>2458.7</td><td>4.3</td><td>| . * . |</td></tr>
<tr><td>2018M10</td><td>2641.0</td><td>2649.9</td><td>-8.9</td><td>| . * . |</td></tr>
<tr><td>2018M11</td><td>2807.8</td><td>2803.6</td><td>4.2</td><td>| . * . |</td></tr>
<tr><td>2018M12</td><td>2734.9</td><td>2781.0</td><td>-46.2</td><td>| . *| . |</td></tr>
<tr><td>2019M01</td><td>3057.0</td><td>2951.9</td><td>105.1</td><td>| . | * |</td></tr>
<tr><td>2019M02</td><td>2951.9</td><td>2865.9</td><td>86.0</td><td>| . | *. |</td></tr>
<tr><td>2019M03</td><td>3057.7</td><td>3096.1</td><td>-38.4</td><td>| . *| . |</td></tr>
<tr><td>2019M04</td><td>2839.3</td><td>2739.9</td><td>99.4</td><td>| . | *. |</td></tr>
<tr><td>2019M05</td><td>2849.8</td><td>2553.3</td><td>296.5</td><td>| . | . * |</td></tr>
<tr><td>2019M06</td><td>2456.7</td><td>2506.7</td><td>-50.0</td><td>| . *| . |</td></tr>
</table>

2019M07	2518.9	2565.2	-46.2	| . *| . |
2019M08	2526.6	2624.3	-97.7	| .* | . |
2019M09	2393.5	2488.9	-95.4	| .* | . |
2019M10	2689.9	2701.7	-11.8	| . * . |
2019M11	2680.5	2777.9	-97.4	| .* | . |
2019M12	2546.8	2793.9	-247.1	| * . | . |
2020M01	2692.7	2980.5	-287.8	| * . | . |
2020M02	2794.8	2795.8	-1.0	| . * . |
2020M03	2731.1	2737.1	-6.0	| . * . |
2020M04	2089.1	2308.2	-219.1	| * . | . |
2020M05	2103.2	2135.0	-31.8	| . *| . |
2020M06	2194.9	2117.1	77.8	| . | *. |
2020M07	2185.4	2104.3	81.1	| . | *. |
2020M08	2212.2	2247.7	-35.5	| . *| . |
2020M09	2390.1	2299.2	90.9	| . | *. |
2020M10	2499.8	2475.1	24.7	| . |* . |
2020M11	2516.2	2502.2	14.0	| . * . |
2020M12	2727.1	2562.8	164.3	| . | .* |
2021M01	2934.0	2853.0	81.0	| . | *. |
2021M02	2796.0	2754.3	41.8	| . |* . |
2021M03	3000.7	3032.1	-31.4	| . *| . |
2021M04	2616.1	2605.9	10.2	| . * . |
2021M05	2617.9	2417.8	200.2	| . | . * |
2021M06	2343.9	2410.9	-67.0	| .* | . |
2021M07	2636.7	2417.7	219.0	| . | . * |
2021M08	2388.1	2481.2	-93.1	| .* | . |
2021M09	2351.6	2401.9	-50.3	| . *| . |
2021M10	2468.4	2625.6	-157.2	| *. | . |
2021M11	2651.0	2650.6	0.4	| . * . |
2021M12	2461.5	2668.6	-207.0	| * . | . |
2022M01	2870.6	2881.1	-10.5	| . * . |
2022M02	2791.9	2799.6	-7.7	| . * . |
2022M03	2955.3	2928.1	27.1	| . |* . |
2022M04	2643.8	2648.9	-5.0231	| . * . |
2022M05	2468.8	2497.6	-28.805	| . *| . |
2022M06	2544.6	2493.7	50.8291	| . |* . |
2022M07	2546.9	2508.4	38.5275	| . |* . |
2022M08	2549.3	2508.3	41.0549	| . |* . |
2022M09	2551.7	2534.6	17.1255	| . * . |
2022M10	2810.2	2762.2	47.9852	| . |* . |
2022M11	2853.8	2725.3	128.494	| . | * |
2022M12	2907.8	2778	129.82	| . | * |

Date: 03/23/23 Time: 10:49
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

<table>
<tr><th>Autocorrelation</th><th>Partial Correlation</th><th></th><th>AC</th><th>PAC</th><th>Q-Stat</th><th>Prob*</th></tr>
<tr><td>. |*. |</td><td>. |*. |</td><td>1</td><td>0.104</td><td>0.104</td><td>0.9467</td><td></td></tr>
<tr><td>. |*. |</td><td>. |*. |</td><td>2</td><td>0.100</td><td>0.090</td><td>1.8324</td><td>0.176</td></tr>
<tr><td>. | . |</td><td>. | . |</td><td>3</td><td>0.030</td><td>0.011</td><td>1.9118</td><td>0.384</td></tr>
<tr><td>. |*. |</td><td>. |*. |</td><td>4</td><td>0.115</td><td>0.104</td><td>3.0965</td><td>0.377</td></tr>
<tr><td>. | . |</td><td>. | . |</td><td>5</td><td>-0.022</td><td>-0.047</td><td>3.1392</td><td>0.535</td></tr>
<tr><td>.*| . |</td><td>.*| . |</td><td>6</td><td>-0.126</td><td>-0.144</td><td>4.6105</td><td>0.465</td></tr>
<tr><td>. | . |</td><td>. | . |</td><td>7</td><td>-0.050</td><td>-0.024</td><td>4.8494</td><td>0.563</td></tr>
<tr><td>.*| . |</td><td>.*| . |</td><td>8</td><td>-0.150</td><td>-0.137</td><td>6.9883</td><td>0.430</td></tr>
<tr><td>. | . |</td><td>. | . |</td><td>9</td><td>-0.060</td><td>-0.018</td><td>7.3318</td><td>0.501</td></tr>
<tr><td>.*| . |</td><td>.*| . |</td><td>10</td><td>-0.180</td><td>-0.125</td><td>10.491</td><td>0.312</td></tr>
<tr><td>.*| . |</td><td>.*| . |</td><td>11</td><td>-0.171</td><td>-0.147</td><td>13.380</td><td>0.203</td></tr>
<tr><td>.*| . |</td><td>.*| . |</td><td>12</td><td>-0.130</td><td>-0.076</td><td>15.066</td><td>0.180</td></tr>
</table>

*Probabilities may not be valid for this equation specification.

17. Capacity Exempt Customer Segment – Demand Model

Dependent Variable: CE_PERCENT
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/10/23 Time: 12:51
Sample (adjusted): 2016M01 2022M12
Included observations: 84 after adjustments
Failure to improve likelihood (non-zero gradients) after 24 iterations
Coefficient covariance computed using outer product of gradients
MA Backcast: 2015M01 2015M12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
@MONTH=1	0.267397	0.003732	71.64662	0.0000
@MONTH=2	0.269585	0.003714	72.58119	0.0000
@MONTH=3	0.288824	0.003811	75.78498	0.0000
@MONTH=4	0.351915	0.003708	94.91660	0.0000
@MONTH=5	0.431266	0.003705	116.4004	0.0000
@MONTH=6	0.519825	0.003711	140.0756	0.0000
@MONTH=7	0.540047	0.003702	145.8814	0.0000
@MONTH=8	0.554889	0.003712	149.4883	0.0000
@MONTH=9	0.540804	0.003720	145.3582	0.0000
@MONTH=10	0.496756	0.003720	133.5425	0.0000
@MONTH=11	0.399130	0.003778	105.6413	0.0000
@MONTH=12	0.299116	0.003733	80.13196	0.0000
AR(1)	0.279852	0.108494	2.579438	0.0120
MA(12)	-0.914370	0.031862	-28.69779	0.0000

R-squared	0.973396	Mean dependent var	0.417738
Adjusted R-squared	0.968455	S.D. dependent var	0.111953
S.E. of regression	0.019884	Akaike info criterion	-4.846813
Sum squared resid	0.027676	Schwarz criterion	-4.441677
Log likelihood	217.5662	Hannan-Quinn criter.	-4.683952
Durbin-Watson stat	2.158062		

Inverted AR Roots	.28			
Inverted MA Roots	.99	.86+.50i	.86-.50i	.50+.86i
	.50-.86i	.00+.99i	-.00-.99i	-.50+.86i
	-.50-.86i	-.86+.50i	-.86-.50i	-.99

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.352967	Prob. F(14,69)	0.2006
Obs*R-squared	18.09258	Prob. Chi-Square(14)	0.2026
Scaled explained SS	12.18586	Prob. Chi-Square(14)	0.5914

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 12:15
Sample: 2016M01 2022M12
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000242	9.74E-05	2.486547	0.0153
GRADF_01^2	-2.43E-05	2.94E-05	-0.826571	0.4113
GRADF_02^2	-4.06E-05	3.03E-05	-1.338832	0.1850
GRADF_03^2	-5.43E-05	3.01E-05	-1.803305	0.0757
GRADF_04^2	-1.98E-05	2.96E-05	-0.671009	0.5045
GRADF_05^2	-4.00E-05	2.95E-05	-1.356728	0.1793
GRADF_06^2	1.84E-05	2.98E-05	0.618518	0.5383
GRADF_07^2	-7.89E-06	2.91E-05	-0.271599	0.7867
GRADF_08^2	4.61E-06	3.02E-05	0.152757	0.8790
GRADF_09^2	-4.42E-06	2.92E-05	-0.151354	0.8801
GRADF_10^2	4.96E-06	2.91E-05	0.170096	0.8654
GRADF_11^2	-4.31E-05	3.84E-05	-1.121331	0.2660
GRADF_12^2	-3.62E-05	2.95E-05	-1.226518	0.2242
GRADF_13^2	0.083930	0.097444	0.861311	0.3921
GRADF_14^2	0.027868	0.010025	2.779892	0.0070

R-squared	0.215388	Mean dependent var	0.000329
Adjusted R-squared	0.056191	S.D. dependent var	0.000462
S.E. of regression	0.000448	Akaike info criterion	-12.42103
Sum squared resid	1.39E-05	Schwarz criterion	-11.98695
Log likelihood	536.6832	Hannan-Quinn criter.	-12.24653
F-statistic	1.352967	Durbin-Watson stat	2.020956
Prob(F-statistic)	0.200607		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2016M02</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2016M03</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2016M04</td><td>0.4</td><td>0.3</td><td>0.0</td><td>| . | * . |</td></tr>
<tr><td>2016M05</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2016M06</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| *. | . |</td></tr>
<tr><td>2016M07</td><td>0.6</td><td>0.5</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2016M08</td><td>0.6</td><td>0.6</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2016M09</td><td>0.5</td><td>0.6</td><td>0.0</td><td>| * | . |</td></tr>
<tr><td>2016M10</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2016M11</td><td>0.4</td><td>0.5</td><td>0.0</td><td>| *. | . |</td></tr>
<tr><td>2016M12</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2017M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | *. |</td></tr>
<tr><td>2017M02</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2017M03</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | * . |</td></tr>
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<tr><td>2017M08</td><td>0.6</td><td>0.5</td><td>0.0</td><td>| . | . * |</td></tr>
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<tr><td>2017M11</td><td>0.5</td><td>0.4</td><td>0.0</td><td>| . | . *|</td></tr>
<tr><td>2017M12</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2018M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2018M02</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | .* |</td></tr>
<tr><td>2018M03</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | . * |</td></tr>
<tr><td>2018M04</td><td>0.3</td><td>0.4</td><td>0.0</td><td>| * . | . |</td></tr>
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<tr><td>2018M12</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | * . |</td></tr>
<tr><td>2019M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2019M02</td><td>0.3</td><td>0.2</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2019M03</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2019M04</td><td>0.3</td><td>0.4</td><td>0.0</td><td>| * . | . |</td></tr>
<tr><td>2019M05</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . | * . |</td></tr>
<tr><td>2019M06</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . * . |</td></tr>
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<tr><td>2019M08</td><td>0.6</td><td>0.5</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2019M09</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . | * . |</td></tr>
<tr><td>2019M10</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . | * . |</td></tr>
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<tr><td>2019M12</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2020M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . |* . |</td></tr>
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<tr><td>2020M04</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| .* | . |</td></tr>
<tr><td>2020M05</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| .* | . |</td></tr>
<tr><td>2020M06</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . *| . |</td></tr>
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<tr><td>2020M08</td><td>0.6</td><td>0.6</td><td>0.0</td><td>| . | . * |</td></tr>
<tr><td>2020M09</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2020M10</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2020M11</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| .* | . |</td></tr>
<tr><td>2020M12</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | * |</td></tr>
<tr><td>2021M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . | * . |</td></tr>
<tr><td>2021M02</td><td>0.3</td><td>0.2</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2021M03</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . |* . |</td></tr>
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<tr><td>2021M05</td><td>0.4</td><td>0.5</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2021M06</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . *| . |</td></tr>
<tr><td>2021M07</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| .* | . |</td></tr>
<tr><td>2021M08</td><td>0.6</td><td>0.5</td><td>0.0</td><td>| . | . *</td></tr>
<tr><td>2021M09</td><td>0.5</td><td>0.6</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2021M10</td><td>0.5</td><td>0.5</td><td>0.0</td><td>| . | . * |</td></tr>
<tr><td>2021M11</td><td>0.4</td><td>0.4</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2021M12</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * | . |</td></tr>
<tr><td>2022M01</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . * . |</td></tr>
<tr><td>2022M02</td><td>0.2</td><td>0.3</td><td>0.0</td><td>| .* | . |</td></tr>
<tr><td>2022M03</td><td>0.3</td><td>0.3</td><td>0.0</td><td>| . |* . |</td></tr>
<tr><td>2022M04</td><td>0.35</td><td>0.34</td><td>0.01</td><td>| . |* . |</td></tr>
<tr><td>2022M05</td><td>0.45</td><td>0.44</td><td>0.01</td><td>| . | * . |</td></tr>
<tr><td>2022M06</td><td>0.53</td><td>0.53</td><td>0.00</td><td>| . * . |</td></tr>
<tr><td>2022M07</td><td>0.57</td><td>0.56</td><td>0.01</td><td>| . | * . |</td></tr>
<tr><td>2022M08</td><td>0.5</td><td>0.52</td><td>-0.02</td><td>| * | . |</td></tr>
<tr><td>2022M09</td><td>0.54</td><td>0.54</td><td>0.00</td><td>| . |* . |</td></tr>
<tr><td>2022M10</td><td>0.45</td><td>0.47</td><td>-0.02</td><td>| .* | . |</td></tr>
<tr><td>2022M11</td><td>0.41</td><td>0.39</td><td>0.02</td><td>| . | *. |</td></tr>
<tr><td>2022M12</td><td>0.32</td><td>0.31</td><td>0.01</td><td>| . |* . |</td></tr>
</table>

Date: 03/23/23 Time: 12:16
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.*| . |	.*| . |	1	-0.138	-0.138	1.6620	
. | . |	. | . |	2	0.021	0.001	1.6992	
. | . |	. | . |	3	0.012	0.015	1.7115	0.191
. | . |	. | . |	4	-0.005	-0.001	1.7137	0.424
. | . |	. | . |	5	0.052	0.052	1.9646	0.580
. | . |	. |*. |	6	0.074	0.090	2.4665	0.651
. | . |	. | . |	7	-0.008	0.014	2.4722	0.781
. |*. |	. |*. |	8	0.081	0.081	3.0966	0.797
. | . |	. | . |	9	0.047	0.071	3.3114	0.855
. | . |	. | . |	10	-0.003	0.010	3.3124	0.913
.*| . |	.*| . |	11	-0.082	-0.097	3.9808	0.913
. |*. |	. | . |	12	0.085	0.053	4.7089	0.910

*Probabilities may not be valid for this equation specification.

18. Company Use Model

Dependent Variable: CO_USE_NH
Method: ARMA Generalized Least Squares (Gauss-Newton)
Date: 03/08/23 Time: 11:00
Sample: 2016M01 2022M12
Included observations: 81
Convergence achieved after 10 iterations
Coefficient covariance computed using outer product of gradients
d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC_DEC	0.130743	0.013288	9.839400	0.0000
BC_JAN	0.181744	0.011373	15.98071	0.0000
BC_FEB	0.177857	0.012171	14.61275	0.0000
BC_MAR	0.175852	0.013992	12.56798	0.0000
BC_APR	0.138580	0.016168	8.571159	0.0000
BC_MAY+BC_NOV	0.049929	0.016026	3.115567	0.0026
C	76.04524	7.362864	10.32822	0.0000
AR(1)	0.443080	0.108180	4.095746	0.0001

R-squared	0.905262	Mean dependent var	146.5062
Adjusted R-squared	0.896177	S.D. dependent var	86.60718
S.E. of regression	27.90619	Akaike info criterion	9.594493
Sum squared resid	56849.14	Schwarz criterion	9.830982
Log likelihood	-380.5770	Hannan-Quinn criter.	9.689376
F-statistic	99.64895	Durbin-Watson stat	1.908732
Prob(F-statistic)	0.000000		

Inverted AR Roots	.44

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.212466	Prob. F(8,72)	0.9878
Obs*R-squared	1.868091	Prob. Chi-Square(8)	0.9848
Scaled explained SS	1.196739	Prob. Chi-Square(8)	0.9967

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/23/23 Time: 12:18
Sample: 2016M01 2022M12
Included observations: 81

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	668.4616	508.4039	1.314824	0.1927
GRADF_01^2	-0.130876	0.282146	-0.463861	0.6441
GRADF_02^2	0.130250	0.189419	0.687628	0.4939
GRADF_03^2	0.049855	0.207486	0.240278	0.8108
GRADF_04^2	0.149771	0.280017	0.534865	0.5944
GRADF_05^2	0.153548	0.423091	0.362918	0.7177
GRADF_06^2	-0.286218	0.693016	-0.413003	0.6808
GRADF_07^2	38952.79	1019513.	0.038207	0.9696
GRADF_08^2	-8.246553	70.50046	-0.116972	0.9072

R-squared	0.023063	Mean dependent var	701.8413
Adjusted R-squared	-0.085486	S.D. dependent var	886.9810
S.E. of regression	924.1157	Akaike info criterion	16.59999
Sum squared resid	61487269	Schwarz criterion	16.86604
Log likelihood	-663.2996	Hannan-Quinn criter.	16.70673
F-statistic	0.212466	Durbin-Watson stat	1.552815
Prob(F-statistic)	0.987762		

<table>
<tr><th>obs</th><th>Actual</th><th>Fitted</th><th>Residual</th><th>Residual Plot</th></tr>
<tr><td>2016M01</td><td>305.0</td><td>268.4</td><td>36.6</td><td>| . | .* |</td></tr>
<tr><td>2016M02</td><td>332.0</td><td>297.6</td><td>34.4</td><td>| . | .* |</td></tr>
<tr><td>2016M03</td><td>226.0</td><td>269.9</td><td>-43.9</td><td>| * . | . |</td></tr>
<tr><td>2016M04</td><td>236.0</td><td>172.4</td><td>63.6</td><td>| . | . *</td></tr>
<tr><td>2016M05</td><td>83.0</td><td>125.4</td><td>-42.4</td><td>| * . | . |</td></tr>
<tr><td>2016M06</td><td>46.0</td><td>68.0</td><td>-22.0</td><td>| .* | . |</td></tr>
<tr><td>2016M07</td><td>48.0</td><td>62.7</td><td>-14.7</td><td>| . *| . |</td></tr>
<tr><td>2016M08</td><td>77.0</td><td>63.6</td><td>13.4</td><td>| . | * . |</td></tr>
<tr><td>2016M09</td><td>85.0</td><td>76.5</td><td>8.5</td><td>| . |* . |</td></tr>
<tr><td>2016M10</td><td>76.0</td><td>80.0</td><td>-4.0</td><td>| . *| . |</td></tr>
<tr><td>2016M11</td><td>109.0</td><td>104.9</td><td>4.1</td><td>| . |* . |</td></tr>
<tr><td>2016M12</td><td>180.0</td><td>200.9</td><td>-20.9</td><td>| . * | . |</td></tr>
<tr><td>2017M01</td><td>219.0</td><td>275.1</td><td>-56.1</td><td>| * . | . |</td></tr>
<tr><td>2017M02</td><td>218.0</td><td>246.4</td><td>-28.4</td><td>| * | . |</td></tr>
<tr><td>2017M03</td><td>211.0</td><td>231.9</td><td>-20.9</td><td>| . * | . |</td></tr>
<tr><td>2017M04</td><td>162.0</td><td>176.2</td><td>-14.2</td><td>| . * | . |</td></tr>
<tr><td>2017M05</td><td>74.0</td><td>82.8</td><td>-8.8</td><td>| . *| . |</td></tr>
<tr><td>2017M06</td><td>56.0</td><td>65.4</td><td>-9.4</td><td>| . * | . |</td></tr>
<tr><td>2017M07</td><td>59.0</td><td>67.2</td><td>-8.2</td><td>| . *| . |</td></tr>
<tr><td>2017M08</td><td>62.0</td><td>68.5</td><td>-6.5</td><td>| . *| . |</td></tr>
<tr><td>2017M09</td><td>56.0</td><td>69.8</td><td>-13.8</td><td>| . * | . |</td></tr>
<tr><td>2017M10</td><td>32.0</td><td>67.2</td><td>-35.2</td><td>| *. | . |</td></tr>
<tr><td>2017M11</td><td>71.0</td><td>81.0</td><td>-10.0</td><td>| . * | . |</td></tr>
<tr><td>2017M12</td><td>209.0</td><td>192.6</td><td>16.4</td><td>| . | * . |</td></tr>
<tr><td>2018M01</td><td>373.0</td><td>348.1</td><td>24.9</td><td>| . | *. |</td></tr>
<tr><td>2018M02</td><td>270.0</td><td>291.7</td><td>-21.7</td><td>| .* | . |</td></tr>
<tr><td>2018M03</td><td>239.0</td><td>234.8</td><td>4.2</td><td>| . |* . |</td></tr>
<tr><td>2018M04</td><td>211.0</td><td>204.0</td><td>7.0</td><td>| . |* . |</td></tr>
<tr><td>2018M05</td><td>108.0</td><td>101.4</td><td>6.6</td><td>| . |* . |</td></tr>
<tr><td>2018M06</td><td>40.0</td><td>80.3</td><td>-40.3</td><td>| * . | . |</td></tr>
<tr><td>2018M07</td><td>92.0</td><td>60.1</td><td>31.9</td><td>| . | * |</td></tr>
<tr><td>2018M08</td><td>131.0</td><td>83.1</td><td>47.9</td><td>| . | . * |</td></tr>
<tr><td>2018M09</td><td>131.0</td><td>100.4</td><td>30.6</td><td>| . | * |</td></tr>
<tr><td>2018M10</td><td>100.0</td><td>100.4</td><td>-0.4</td><td>| . * . |</td></tr>
<tr><td>2018M11</td><td>142.0</td><td>123.2</td><td>18.8</td><td>| . | * . |</td></tr>
<tr><td>2018M12</td><td>207.0</td><td>228.5</td><td>-21.5</td><td>| .* | . |</td></tr>
<tr><td>2019M01</td><td>254.0</td><td>288.2</td><td>-34.2</td><td>| *. | . |</td></tr>
<tr><td>2019M02</td><td>257.0</td><td>286.5</td><td>-29.5</td><td>| * | . |</td></tr>
<tr><td>2019M03</td><td>251.0</td><td>253.3</td><td>-2.3</td><td>| . * . |</td></tr>
<tr><td>2019M04</td><td>173.0</td><td>177.0</td><td>-4.0</td><td>| . *| . |</td></tr>
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<tr><td>2019M08</td><td>140.0</td><td>79.1</td><td>60.9</td><td>| . | . *|</td></tr>
<tr><td>2019M09</td><td>100.0</td><td>104.4</td><td>-4.4</td><td>| . *| . |</td></tr>
<tr><td>2019M10</td><td>89.0</td><td>86.7</td><td>2.3</td><td>| . * . |</td></tr>
<tr><td>2019M11</td><td>84.0</td><td>113.4</td><td>-29.4</td><td>| * | . |</td></tr>
<tr><td>2019M12</td><td>240.0</td><td>202.7</td><td>37.3</td><td>| . | .* |</td></tr>
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<tr><td>2020M02</td><td>289.0</td><td>280.0</td><td>9.0</td><td>| . |* . |</td></tr>
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Date: 03/23/23 Time: 12:19
Sample (adjusted): 2016M01 2022M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	0.039	0.039	0.1307	
.*| . |	.*| . |	2	-0.083	-0.085	0.7160	0.397
.*| . |	.*| . |	3	-0.109	-0.103	1.7378	0.419
. | . |	. | . |	4	0.042	0.044	1.8886	0.596
.*| . |	.*| . |	5	-0.073	-0.095	2.3611	0.670
. | . |	. |*. |	6	0.071	0.075	2.8081	0.730
. |*. |	. |*. |	7	0.144	0.137	4.6798	0.585
. | . |	. | . |	8	-0.012	-0.034	4.6937	0.697
.*| . |	. | . |	9	-0.072	-0.025	5.1713	0.739
. | . |	. | . |	10	-0.002	0.016	5.1719	0.819
. | . |	. | . |	11	-0.043	-0.064	5.3533	0.866
. | . |	. |*. |	12	0.062	0.082	5.7301	0.891

*Probabilities may not be valid for this equation specification.

19. Design Day - Throughput Model

Dependent Variable: NH
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/07/23 Time: 14:47
Sample: 11/01/2021 10/31/2022
Included observations: 365
Convergence achieved after 10 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NH_EDD	368.4487	20.53407	17.94329	0.0000
NH_EDD(-1)	102.0463	8.645163	11.80386	0.0000
NH_EDD*NOV	203.9453	23.17855	8.798880	0.0000
NH_EDD*DEC	228.9558	22.29822	10.26789	0.0000
NH_EDD*JAN	292.7508	21.00954	13.93418	0.0000
NH_EDD*FEB	293.4200	21.43986	13.68572	0.0000
NH_EDD*MAR	244.9859	22.64311	10.81944	0.0000
NH_EDD*APR	139.5325	25.39865	5.493696	0.0000
@WEEKDAY=1	11495.23	255.5063	44.98999	0.0000
@WEEKDAY=2	12187.84	258.0902	47.22319	0.0000
@WEEKDAY=3	11799.37	256.3309	46.03178	0.0000
@WEEKDAY=4	11533.67	252.4055	45.69499	0.0000
@WEEKDAY=5	10434.27	255.1180	40.89979	0.0000
@WEEKDAY=6	9052.847	262.3008	34.51322	0.0000
@WEEKDAY=7	9418.392	261.8009	35.97540	0.0000
AR(1)	0.415772	0.051170	8.125294	0.0000
AR(7)	0.105840	0.049166	2.152683	0.0320

R-squared	0.991125	Mean dependent var	23189.38
Adjusted R-squared	0.990717	S.D. dependent var	12298.16
S.E. of regression	1184.905	Akaike info criterion	17.03817
Sum squared resid	4.89E+08	Schwarz criterion	17.21981
Log likelihood	-3092.466	Hannan-Quinn criter.	17.11035
Durbin-Watson stat	1.959584		

Inverted AR Roots	.80	.52-.55i	.52+.55i	-.11-.70i
	-.11+.70i	-.61+.31i	-.61-.31i	

20. Design Day - Planning Load Model

Dependent Variable: NH_PL
Method: ARMA Conditional Least Squares (Gauss-Newton / Marquardt steps)
Date: 03/07/23 Time: 14:49
Sample: 11/01/2021 10/31/2022
Included observations: 365
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NH_EDD	321.2646	15.45785	20.78326	0.0000
NH_EDD(-1)	92.31004	7.806648	11.82454	0.0000
NH_EDD*NOV	182.7073	19.38970	9.422909	0.0000
NH_EDD*DEC	251.1275	17.95045	13.99004	0.0000
NH_EDD*JAN	299.1885	16.23630	18.42714	0.0000
NH_EDD*FEB	281.8939	16.81651	16.76293	0.0000
NH_EDD*MAR	223.9156	18.19069	12.30935	0.0000
@WEEKDAY=1	6197.783	230.1394	26.93057	0.0000
@WEEKDAY=2	6603.130	232.5413	28.39552	0.0000
@WEEKDAY=3	6423.367	230.9847	27.80862	0.0000
@WEEKDAY=4	6280.504	226.6640	27.70843	0.0000
@WEEKDAY=5	5583.160	229.2346	24.35566	0.0000
@WEEKDAY=6	4876.089	236.4445	20.62255	0.0000
@WEEKDAY=7	5365.038	235.9145	22.74145	0.0000
AR(1)	0.523165	0.047850	10.93341	0.0000

R-squared	0.990795	Mean dependent var	16951.13
Adjusted R-squared	0.990427	S.D. dependent var	11380.48
S.E. of regression	1113.507	Akaike info criterion	16.90864
Sum squared resid	4.34E+08	Schwarz criterion	17.06891
Log likelihood	-3070.828	Hannan-Quinn criter.	16.97234
Durbin-Watson stat	2.063164		

Inverted AR Roots	.52

Appendix 2, Current Portfolio Capacity Path Diagrams

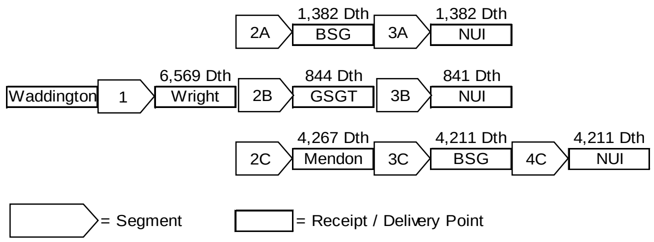
Northern Utilities, Inc.
Long-Term Portfolio Resources

November 1, 2023 Capacity Paths	Resource Type	Max Daily Quantity	Method of Assignment	Status
Iroquois Receipts Path	Pipeline	6,434	Company-managed	Existing
Tennessee Niagara Capacity	Pipeline	2,327	Capacity Release	Existing
Tennessee Long-haul Capacity	Pipeline	13,109	Capacity Release	Existing
Algonquin Receipts Path	Pipeline	1,251	Company-managed	Existing
Atlantic Bridge Capacity	Pipeline	7,500	Capacity Release	Existing
Tennessee Firm Storage Capacity	Storage	2,644	Capacity Release	Existing
Dawn Storage Path	Storage	59,793	Capacity Release	Existing
Lewiston On-System LNG Plant	Peaking	6,500	Company-managed	Existing
Long-Term Capacity		**99,558**		**Existing**

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Iroquois Receipts

Method of Assignment: Company-managed*

Capacity Path Diagram



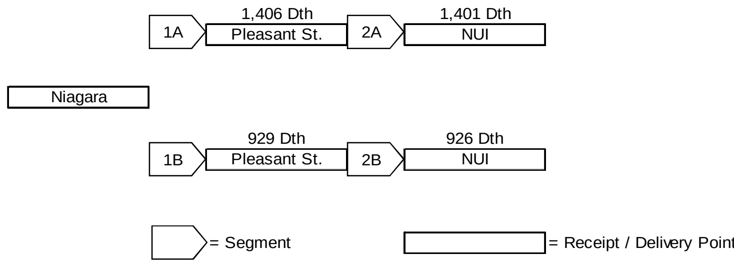
Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1	Transportation	Iroquois	181003	RTS-1	10/31/2024	6,569	Dth	Year-Round	Waddington	Wright	Tennessee
2A	Transportation	Tennessee	95196	FT-A	10/31/2027	1,382	Dth	Year-Round	Wright	Bay State City Gate	
3A	Exchange	Bay State Gas	NA	NA	Renewal Clause	1,382	Dth	Year-Round	Bay State City Gate	Northern City Gates	
2B	Transportation	Tennessee	95196	FT-A	10/31/2027	844	Dth	Year-Round	Wright	Pleasant St.	Granite
3B	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	841	Dth	Year-Round	Granite	Northern City Gates	
2C	Transportation	Tennessee	41099	FT-A	10/31/2027	4,267	Dth	Year-Round	Wright	Mendon	Algonquin
3C**	Transportation	Algonquin	93200F	AFT-1	10/31/2024	4,211	Dth	Year-Round	Mendon	Bay State City Gate	
4C	Exchange	Bay State Gas	NA	NA	Renewal Clause	4,211	Dth	Year-Round	Bay State City Gate	Northern City Gates	
Total Path Deliverable						6,434	Dth				

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Niagara (Interconnection of TransCanada and Tennessee Pipelines)

Method of Assignment: Capacity Release

Capacity Path Diagram



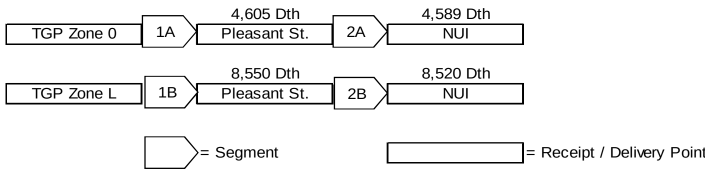
Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1A	Transportation	Tennessee	5292	FT-A	3/31/2025	1,406	Dth	Year-Round	Niagara	Pleasant St.	Granite
2A	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	1,401	Dth	Year-Round	Granite	Northern City Gates	
1B	Transportation	Tennessee	39735	FT-A	3/31/2025	929	Dth	Year-Round	Niagara	Pleasant St.	Granite
2B	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	926	Dth	Year-Round	Granite	Northern City Gates	
Total Path Deliverable						2,327	Dth				

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Tennessee Zone 0 100 Leg, Zone L 500 and 800 Leg Pools

Method of Assignment: Capacity Release

Capacity Path Diagram



Capacity Path Detail

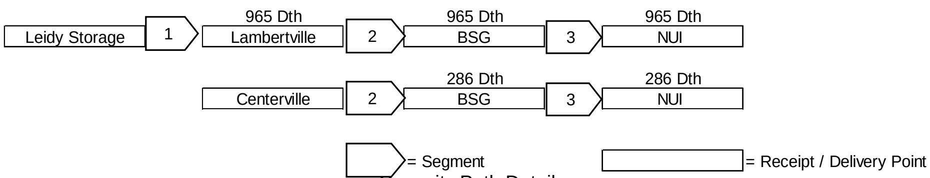
Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1A[1]	Transportation	Tennessee	5083	FT-A	10/31/2028	4,605	Dth	Year-Round	Zone 0, 100 Leg	Pleasant St.	Granite
2A	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	4,589	Dth	Year-Round	Granite	Northern City Gates	
1B[1]	Transportation	Tennessee	5083	FT-A	10/31/2028	8,550	Dth	Year-Round	Zone L, 500 & 800 Legs	Pleasant St.	Granite
2B	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	8,520	Dth	Year-Round	Granite	Northern City Gates	
Total Path Deliverable						13,109	Dth				

Note 1: Tennessee Contract No. 5083 also allows for firm delivery rights to Bay State Gas city gates. As such, Tennessee Production could also be delivered to Bay State City Gates and then exchanged with Bay State via the Base State Exchange for delivery to Northern.

Northern Utilities, Inc.
Capacity Path: Algonquin Receipts Path
Source of Supply: Leidy Storage, Centerville

Method of Assignment: Company-managed

Capacity Path Diagram



Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1*	Transportation	Texas Eastern	800384	FT-1	10/31/2028	965	Dth	Year-Round	Leidy Storage	Lambertville	Algonquin
2**	Transportation	Algonquin	93201A1C	AFT-1 (F-2/F-3)	10/31/2024	965	Dth	Year-Round	Lambertville (Texas Eastern)	Bay State City Gate	
2**	Transportation	Algonquin	93201A1C	AFT-1 (F-2/F-3)	10/31/2020	286	Dth	Year-Round	Centerville (Transco, Zone 6, non-NY)	Bay State City Gate	
3	Exchange	Bay State Gas	NA	NA	Renewal Clause	1,251	Dth	Year-Round	Bay State City Gate	Northern City Gates	
Total Path Deliverable						1,251	Dth				

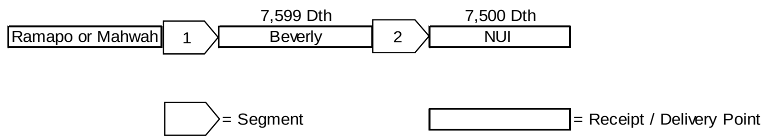
* Contract 800384 will extend to 10/31/2029 unless terminated by Northern on or before 10/31/2023. Northern intends to extend this contract.

** Contract 93201A1C will extend to 10/31/2025 unless terminated by Northern on or before 10/31/2023. Northern intends to extend this contract.

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Atlantic Bridge Ramapo

Method of Assignment: Capacity Release

Capacity Path Diagram



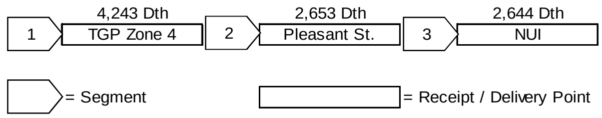
Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1	Transportation	Algonquin	510939	FT	2/11/2036	7,599	Dth	Year-Round	Ramapo or Mawhah	Beverly, MA	Maritimes
2	Transportation	Maritimes	210363	FT	2/11/2036	7,500	Dth	Year-Round	Beverly, MA	Northern City Gates	
Total Path Deliverable						7,500	Dth				

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Tennessee Firm Storage - Market Area

Method of Assignment: Capacity Release

Capacity Path Diagram



Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1[1]	Storage	Tennessee	5195	FS-MA	3/31/2025	4,243	Dth	Year-Round	NA	TGP Zone 4	Tennessee
2[2]	Transportation	Tennessee	5265	FT-A	3/31/2025	2,653	Dth	Year-Round	TGP Zone 4	Pleasant St.	Granite
3	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	2,644	Dth	Year-Round	Pleasant St.	Northern City Gates	
Total Path Deliverable						2,644	Dth				

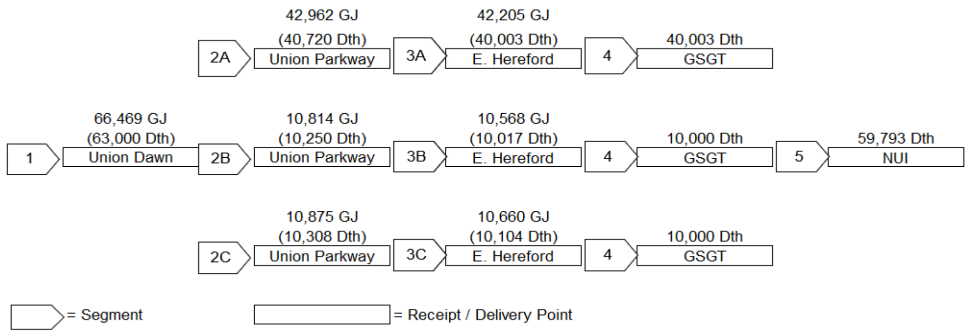
Note 1: Tennessee Contract No. 5195 has a maximum storage quantity of 259,337 Dth.

Note 2: Tennessee Contract No. 5265 also allows for firm delivery rights to Bay State Gas city gates. As such, Tennessee Firm Storage could also be delivered to Bay State City Gates and then exchanged with Bay State via the Base State Exchange for delivery to Northern.

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Union Dawn Storage

Method of Assignment: Capacity Release

Capacity Path Diagram



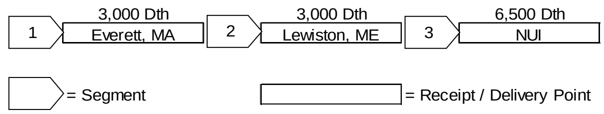
Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1	Storage	Union	LST155	Firm Storage (MDWD)	3/31/2028	66,469	GJ	Year-Round	NA	Dawn	Union
1	Storage	Union	LST155	Firm Storage (MSB)	3/31/2028	6,330,336	GJ	Year-Round	NA	Dawn	
1	Storage	Union	LST155	Firm Storage (MDID)	3/31/2028	47,478	GJ	Year-Round	NA	Dawn	
2A	Transportation	Union	M12256	M12	10/31/2033	42,962	GJ	Year-Round	Dawn	Parkway	TransCanada
2B	Transportation	Union	M12296	M12	10/31/2040	10,814	GJ	Year-Round	Dawn	Parkway	TransCanada
2C	Transportation	Union	M12279	M12	10/31/2037	10,875	GJ	Year-Round	Dawn	Parkway	TransCanada
3A-1	Transportation	TransCanada	57901	FT	3/31/2033	35,872	GJ	Year-Round	Parkway	East Hereford	PNGTS
3A-2	Transportation	TransCanada	57055	FT	10/31/2032	6,333	GJ	Year-Round	Parkway	East Hereford	PNGTS
3B	Transportation	TransCanada	63265	FT	10/31/2040	10,568	GJ	Year-Round	Parkway	East Hereford	PNGTS
3C	Transportation	TransCanada	67167	FT	10/31/2037	10,660	GJ	Year-Round	Parkway	East Hereford	PNGTS
4A	Transportation	PNGTS	208543	FT	11/30/2032	40,003	Dth	Year-Round	Pittsburg, NH	Newington, NH	Granite
4B	Transportation	PNGTS	233339	FT	10/31/2040	10,000	Dth	Year-Round	Pittsburg, NH	Newington, NH	Granite
4C	Transportation	PNGTS	240520	FT	10/31/2037	10,000	Dth	Year-Round	Pittsburg, NH	Newington, NH	Granite
5	Transportation	Granite	19-100-FT-NN	FT-NN	10/31/2023	59,793	Dth	Year-Round	Newington, NH	Northern City Gates	
Total Path Deliverable						59,793	Dth				

Northern Utilities, Inc.
Capacity Path Diagram and Detail
Source of Supply: Lewiston LNG Plant

Method of Assignment: Company-managed

Capacity Path Diagram



Capacity Path Detail

Segment	Product	Vendor	Contract ID	Rate Schedule	Contract Termination Date	Northern MDQ	Dth / GJ	Availability	Receipt Point	Delivery Point	Interconnecting Pipeline
1[1]	LNG Contract	Confidential	NA	NA	10/31/2024	3,000	Dth	Year-Round	NA		NA
2	LNG Trucking Contract	Confidential			10/31/2024	3,000	Dth	Year-Round		Lewiston, ME	NA
3	Lewiston LNG Plant	N/A	NA	NA	N/A	6,500	Dth	Year-Round	Lewiston, ME	Northern Distribution System	
Total Path Deliverable						6,500	Dth				

Note 1: The LNG Contract allows Northern to nominate up to 3,000 Dth per day (3 trucks) with an annual maximum take equal to 75,000 Dth.

Appendix 3, Capacity Path Maps and Pipeline Maps

OUTLINE OF APPENDIX 3

Capacity Path Maps and Pipeline Maps

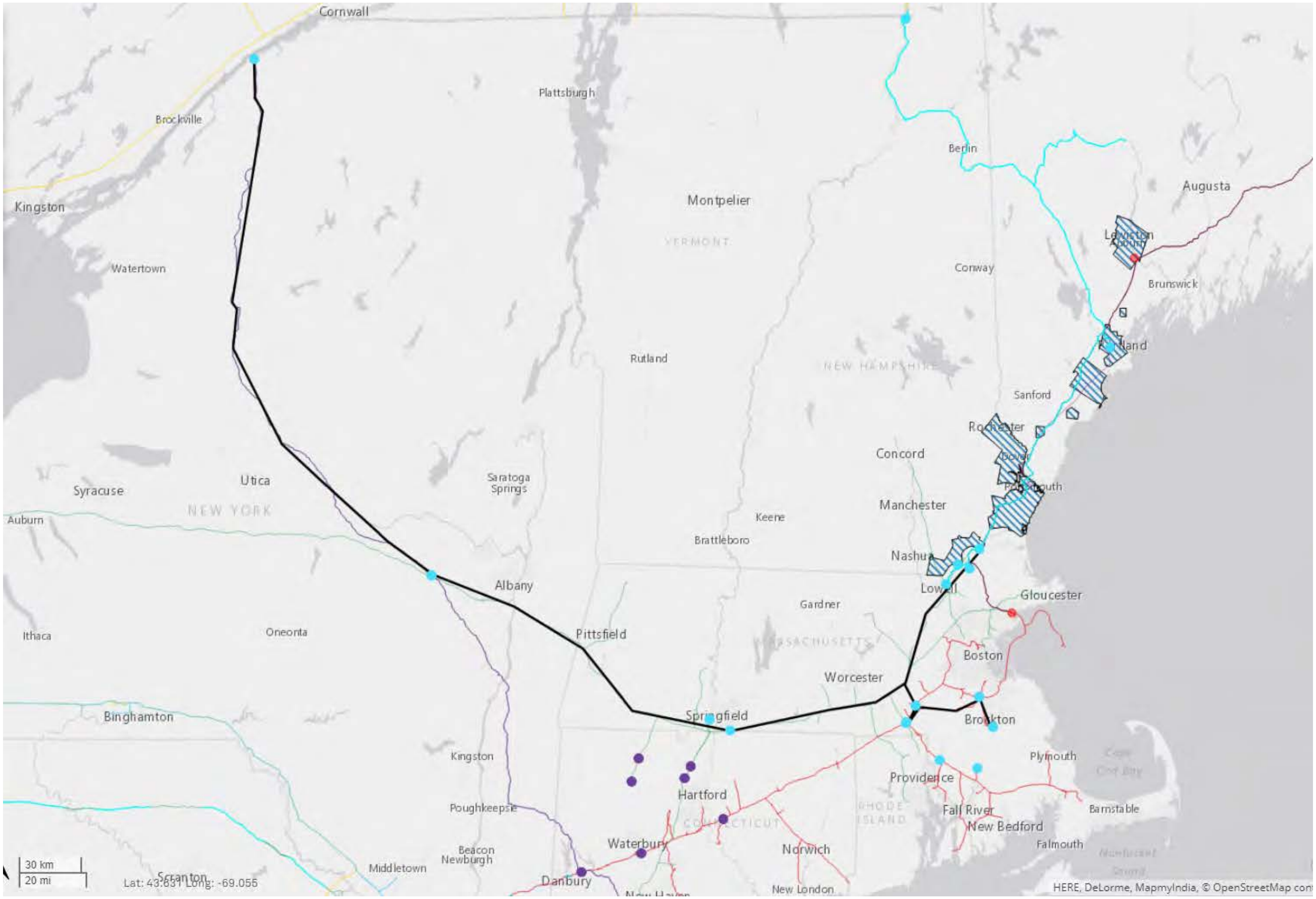
CAPACITY PATH MAPS

Iroquois Receipts Path 2
Tennessee Niagara Capacity 3
Tennessee Long-haul Capacity 4
Algonquin Receipts Path 5
Tennessee Firm Storage Capacity 6
Dawn Storage Path, Portland Xpress Project, Westbrook Xpress Project 7
Atlantic Bridge Capacity 8

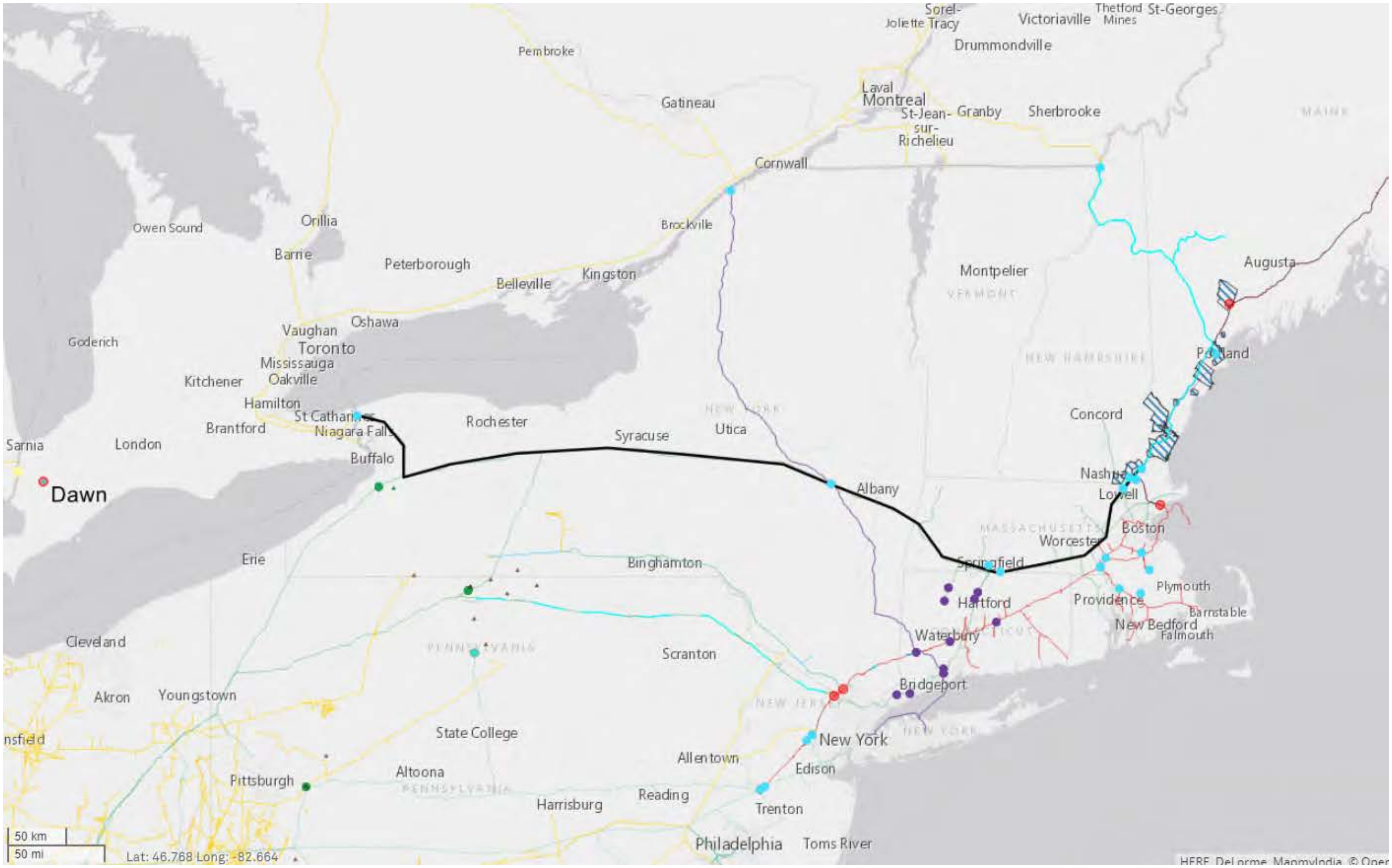
PIPELINE MAPS

Iroquois Gas Transmission (IGT) 9
Tennessee Gas Pipeline (TGP) System 10
Tennessee Gas Pipeline (TGP) Zone 5 11
Tennessee Gas Pipeline (TGP) Zone 6 12
Algonquin Gas Transmission (AGT) 13
Union Gas, an Enbridge Company 14
TransCanada – Canadian Mainline 15
TransCanada – Canadian Mainline Northeast 16
Trans Québec & Maritimes Pipeline (TQM) 17
Portland Natural Gas Transmission System (PNGTS) 18
Maritimes & Northeast Pipeline (M&NP) 19
Maritimes & Northeast Pipeline – US and Canada (M&NP) 20

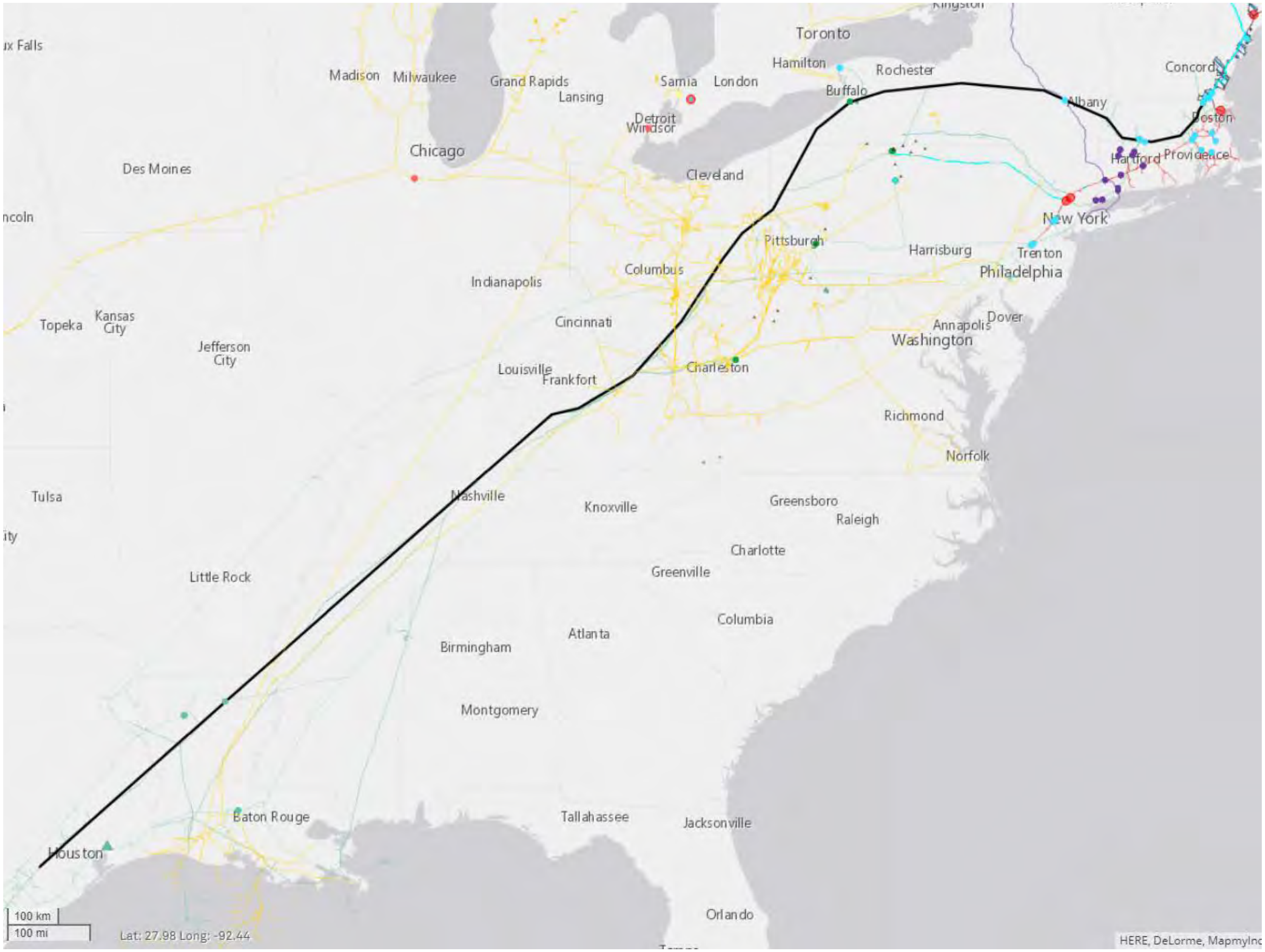
Iroquois Receipts Path



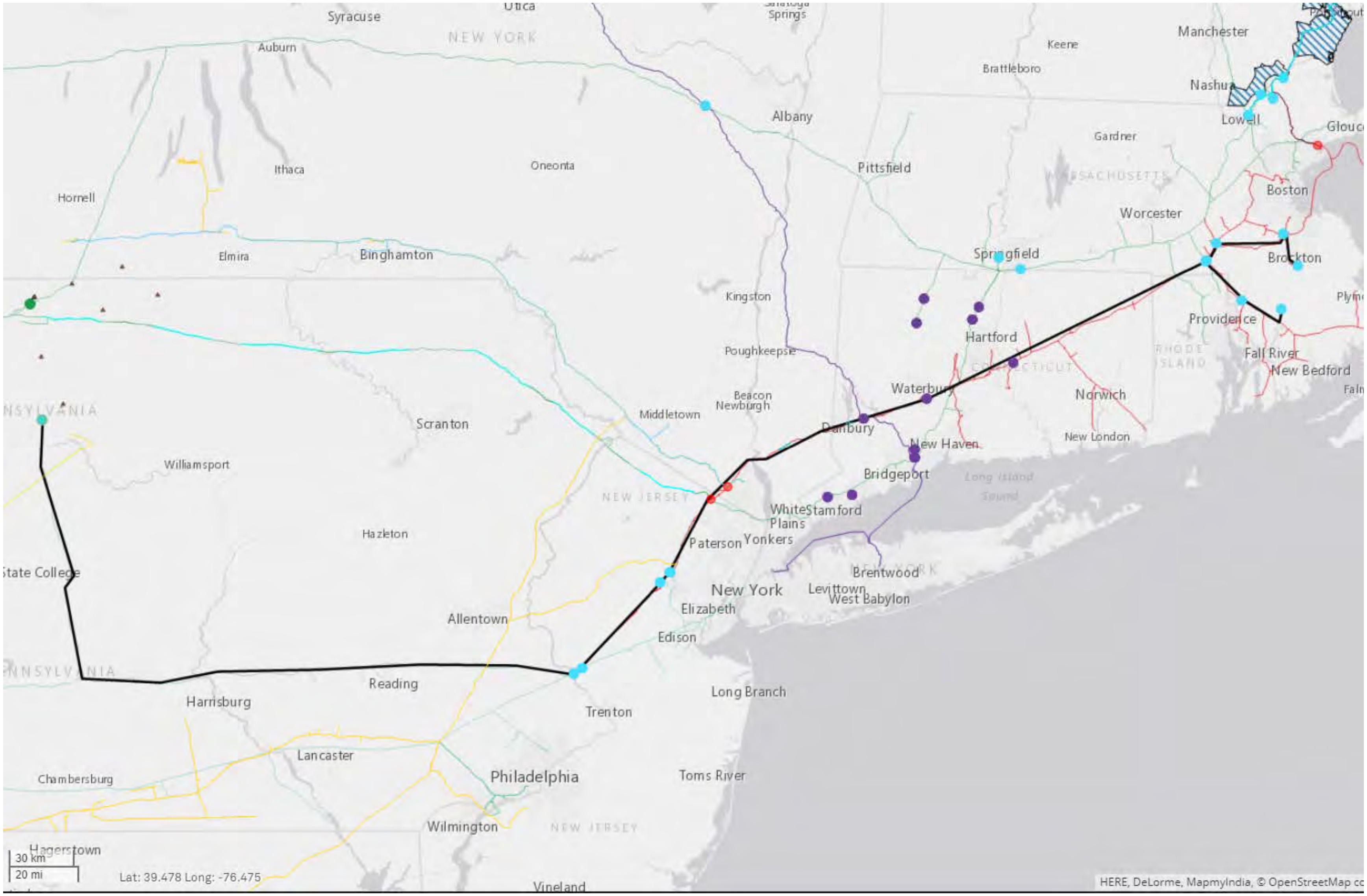
Tennessee Niagara Capacity



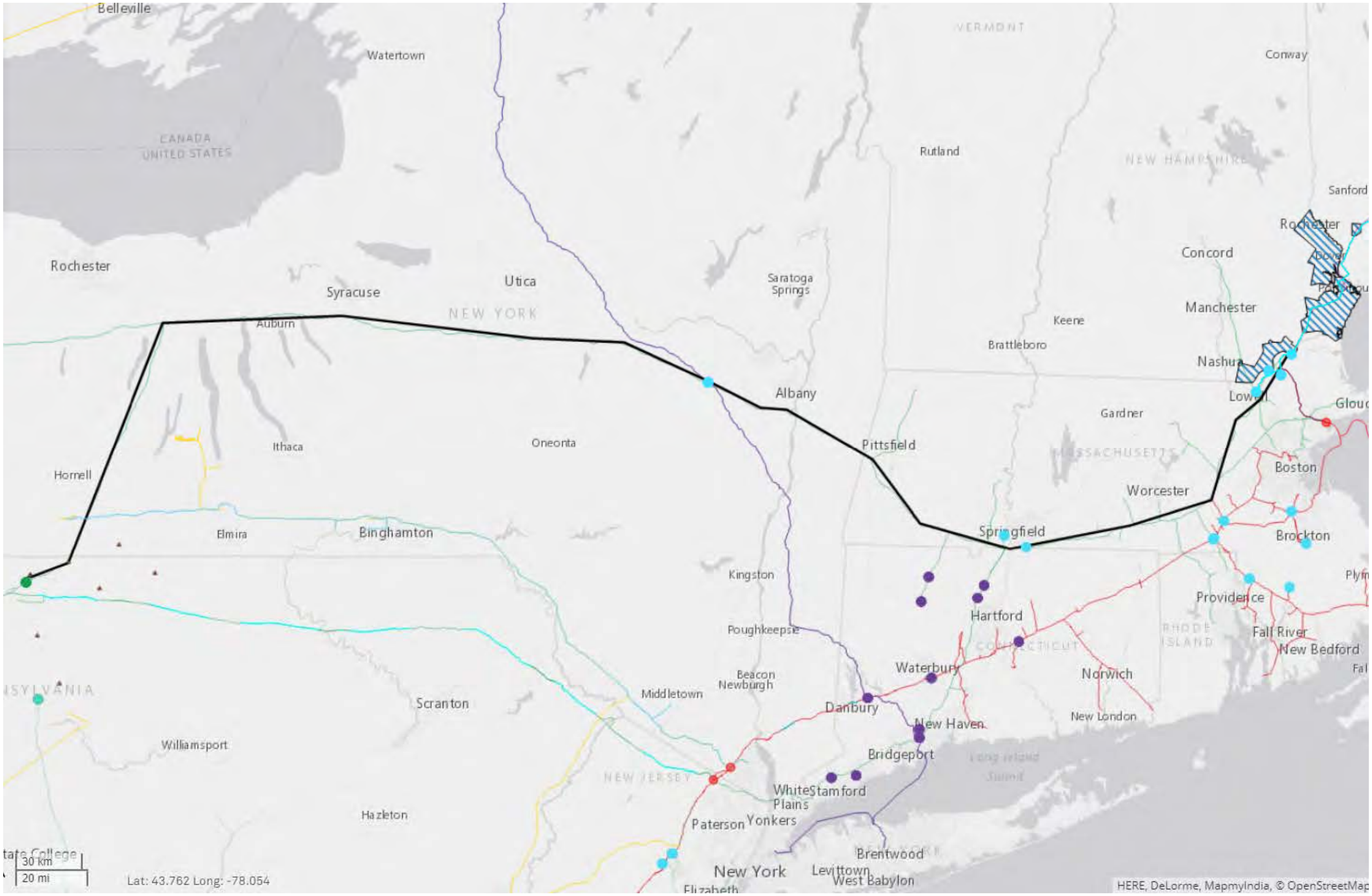
Tennessee Long-haul Capacity



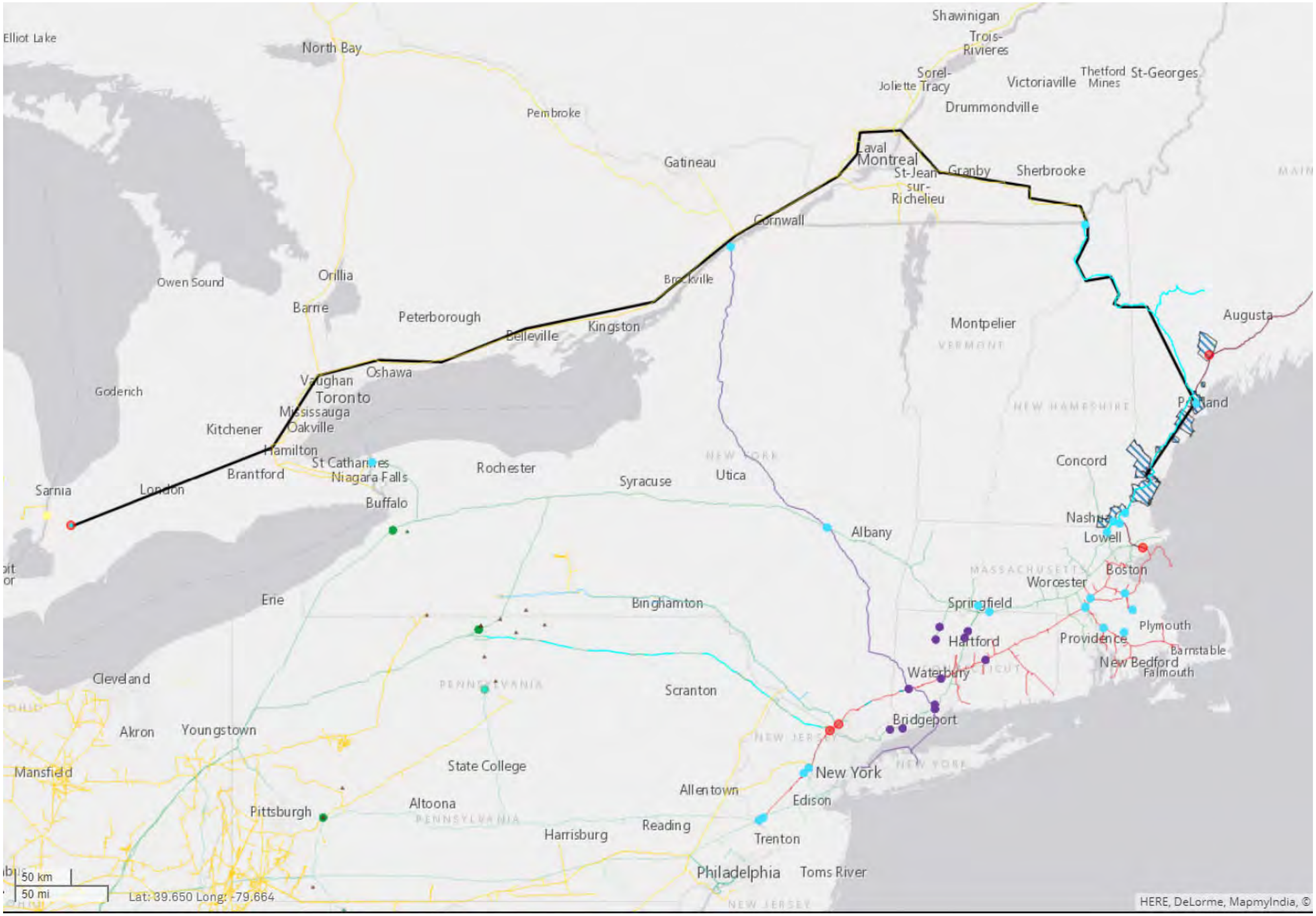
Algonquin Receipts Path



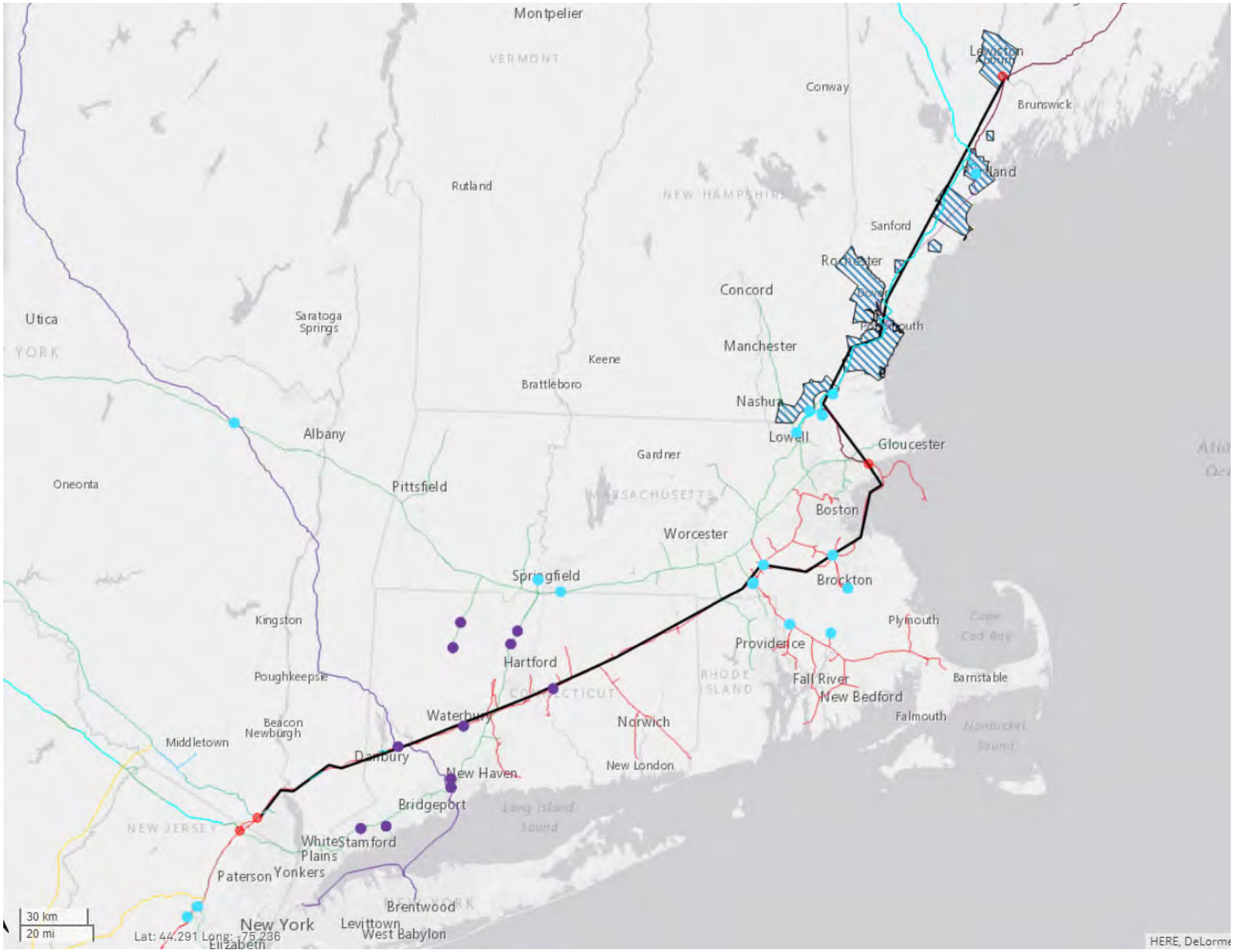
Tennessee Firm Storage Capacity

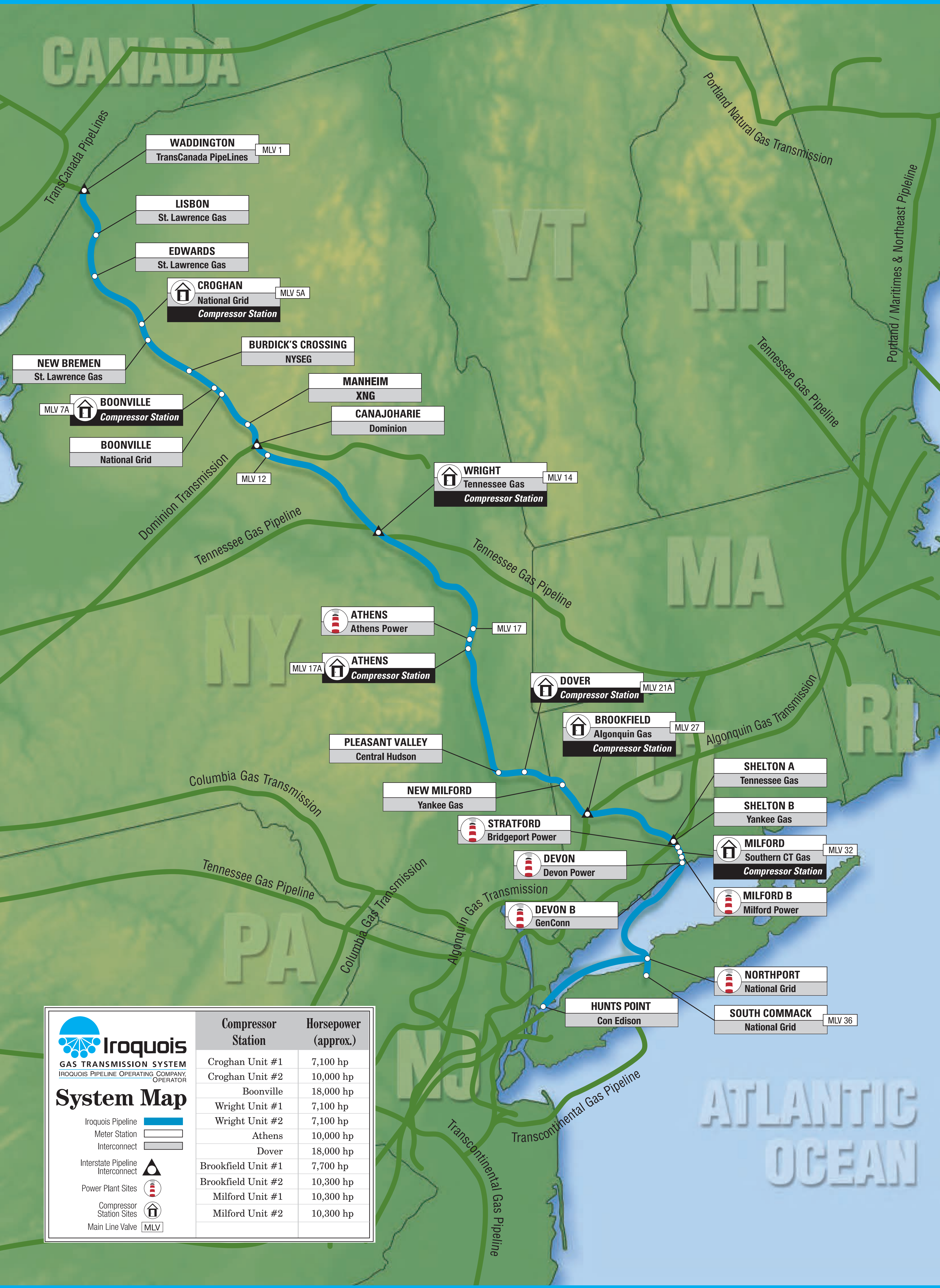


Dawn Storage Path, Portland Xpress Project, Westbrook Xpress Project

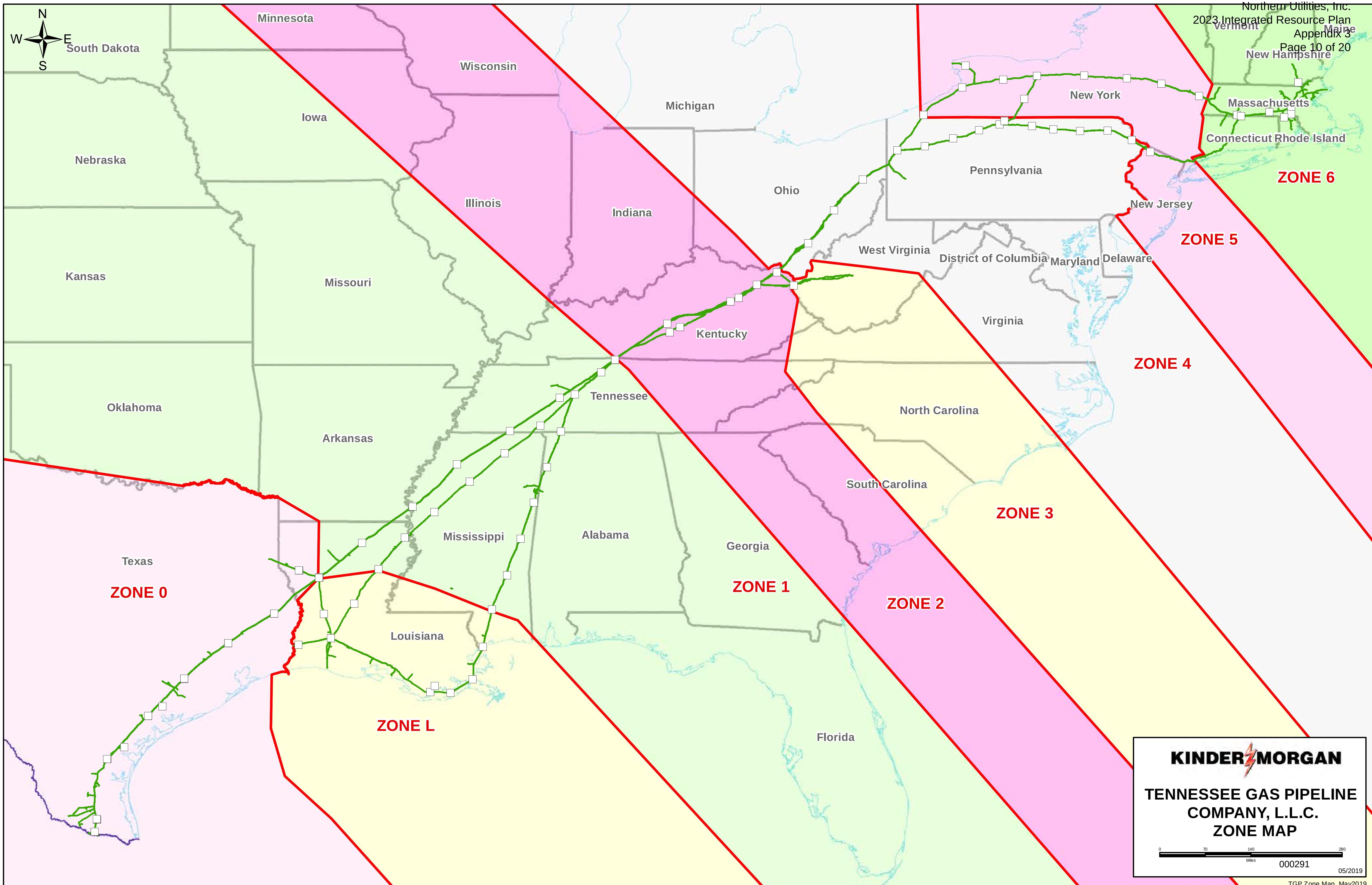


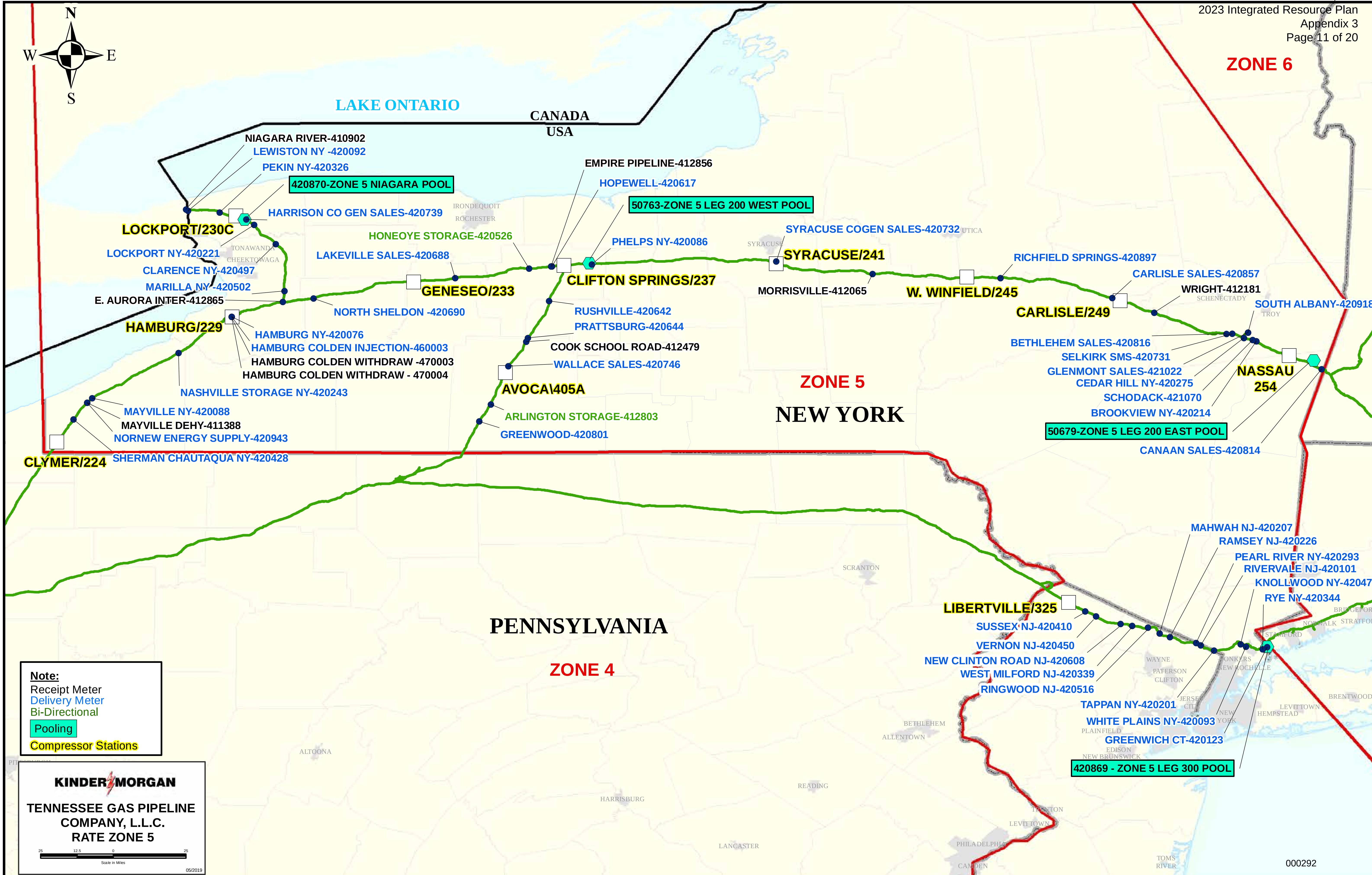
Atlantic Bridge Capacity





Compressor Station	Horsepower (approx.)
Croghan Unit #1	7,100 hp
Croghan Unit #2	10,000 hp
Boonville	18,000 hp
Wright Unit #1	7,100 hp
Wright Unit #2	7,100 hp
Athens	10,000 hp
Dover	18,000 hp
Brookfield Unit #1	7,700 hp
Brookfield Unit #2	10,300 hp
Milford Unit #1	10,300 hp
Milford Unit #2	10,300 hp


N
W
E
S
South Dakota
Minnesota
Wisconsin
Michigan
Vermont
Maine
New Hampshire
New York
Massachusetts
Connecticut
Rhode Island
Iowa
Nebraska
Illinois
Indiana
Ohio
Pennsylvania
New Jersey
Kansas
Missouri
West Virginia
District of Columbia
Maryland
Delaware
Kentucky
Virginia
Oklahoma
Arkansas
Tennessee
North Carolina
South Carolina
Mississippi
Alabama
Georgia
Texas
Louisiana
Florida
ZONE 0
ZONE L
ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 5
ZONE 6
KINDER MORGAN
TENNESSEE GAS PIPELINE COMPANY, L.L.C.
ZONE MAP
0
70
140
280
Miles
000291
05/2019
TGP Zone Map_May2019


N
W
E
S
LAKE ONTARIO
CANADA
USA
ZONE 6
ZONE 5
ZONE 4
NEW YORK
PENNSYLVANIA
NIAGARA RIVER-410902
LEWISTON NY -420092
PEKIN NY-420326
420870-ZONE 5 NIAGARA POOL
HARRISON CO GEN SALES-420739
LOCKPORT/230C
LOCKPORT NY-420221
CLARENCE NY-420497
MARILLA NY -420502
E. AURORA INTER-412865
HAMBURG/229
HAMBURG NY-420076
HAMBURG COLDEN INJECTION-460003
HAMBURG COLDEN WITHDRAW -470003
HAMBURG COLDEN WITHDRAW - 470004
NASHVILLE STORAGE NY-420243
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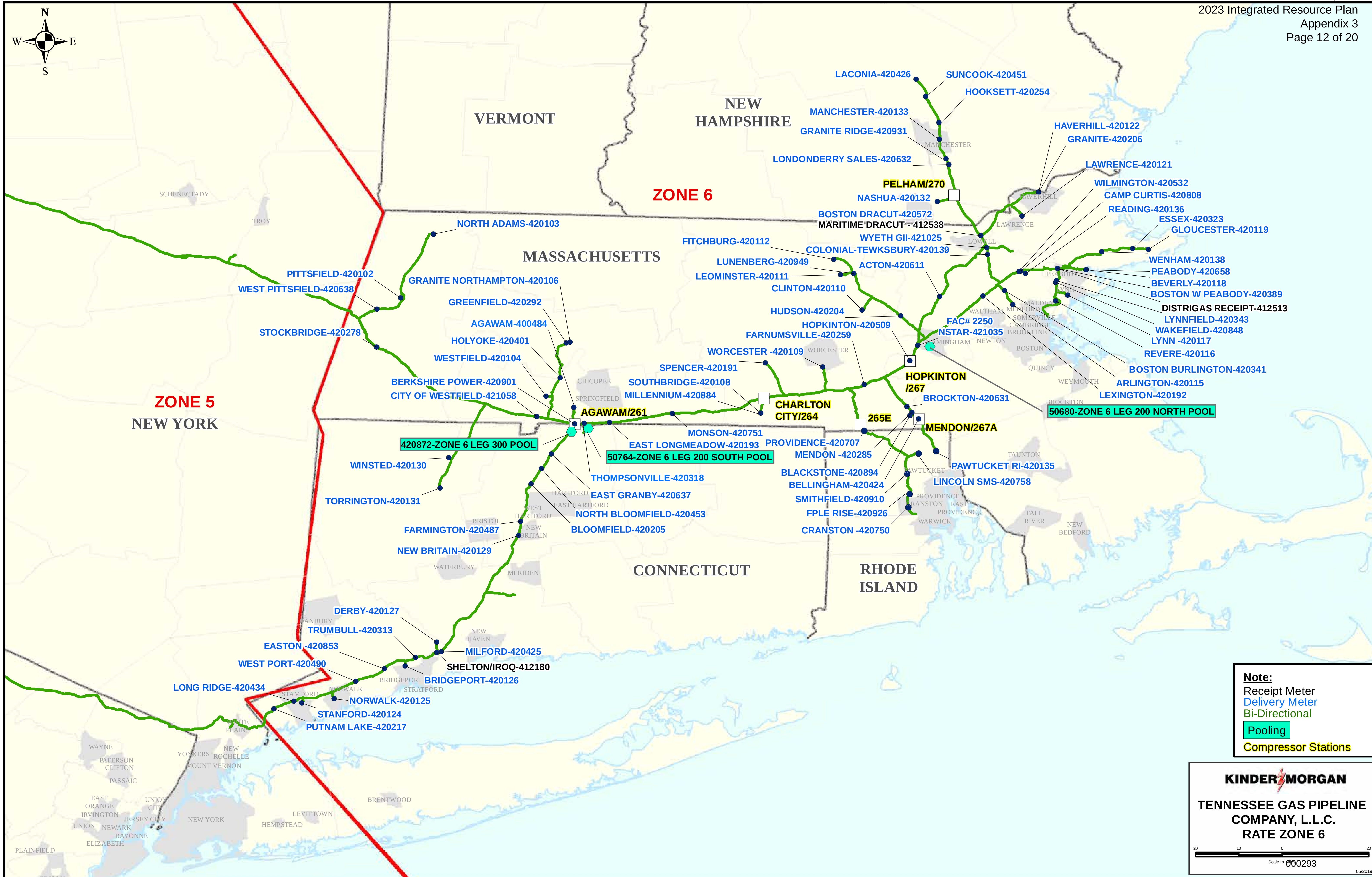
MAYVILLE DEHY-411388
NORNEW ENERGY SUPPLY-420943
SHERMAN CHAUTAQUA NY-420428
CLYMER/224
HONEOYE STORAGE-420526
LAKEVILLE SALES-420688
NORTH SHELDON -420690
GENESEO/233
EMPIRE PIPELINE-412856
HOPEWELL-420617
50763-ZONE 5 LEG 200 WEST POOL
PHELPS NY-420086
CLIFTON SPRINGS/237
RUSHVILLE-420642
PRATTSBURG-420644
COOK SCHOOL ROAD-412479
WALLACE SALES-420746
AVOCA\405A
ARLINGTON STORAGE-412803
GREENWOOD-420801
SYRACUSE COGEN SALES-420732
SYRACUSE/241
MORRISVILLE-412065
W. WINFIELD/245
RICHFIELD SPRINGS-420897
CARLISLE SALES-420857
WRIGHT-412181
CARLISLE/249
SOUTH ALBANY-420918
BETHLEHEM SALES-420816
SELKIRK SMS-420731
GLENMONT SALES-421022
CEDAR HILL NY-420275
SCHODACK-421070
BROOKVIEW NY-420214
NASSAU
254
50679-ZONE 5 LEG 200 EAST POOL
CANAAN SALES-420814
MAHWAH NJ-420207
RAMSEY NJ-420226
PEARL RIVER NY-420293
RIVERVALE NJ-420101
KNOLLWOOD NY-420477
RYE NY-420344
LIBERTVILLE/325
SUSSEX NJ-420410
VERNON NJ-420450
NEW CLINTON ROAD NJ-420608
WEST MILFORD NJ-420339
RINGWOOD NJ-420516
TAPPAN NY-420201
WHITE PLAINS NY-420093
GREENWICH CT-420123
420869 - ZONE 5 LEG 300 POOL
IRONDEQUOIT
ROCHESTER
TONAWANDA
CHEEKTOWAGA
SYRACUSE
UTICA
SCHENECTADY
TROY
SCRANTON
BETHLEHEM
ALLENTOWN
ALTOONA
READING
HARRISBURG
LANCASTER
TRENTON
LEVITTOWN
PHILADELPHIA
CAMDEN
WAYNE
PATERSON
CLIFTON
JERSEY CITY
YONKERS
NEW ROCHELLE
NEW YORK
PLAINFIELD
EDISON
NEW BRUNSWICK
BRIDGEPORT
NORWALK
STAMFORD
BRENTWOOD
LEVITTOWN
HEMPSTEAD
TOMS RIVER
Note:
Receipt Meter
Delivery Meter
Bi-Directional
Pooling
Compressor Stations
KINDER MORGAN
TENNESSEE GAS PIPELINE COMPANY, L.L.C.
RATE ZONE 5
Scale in Miles
05/2019
000292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ZONE 6
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
CONNECTICUT
RHODE ISLAND
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SUNCOOK-420451
HOOKSETT-420254
MANCHESTER-420133
GRANITE RIDGE-420931
LONDONDERRY SALES-420632
PELHAM/270
NASHUA-420132
HAVERHILL-420122
GRANITE-420206
LAWRENCE-420121
WILMINGTON-420532
CAMP CURTIS-420808
READING-420136
ESSEX-420323
GLOUCESTER-420119
BOSTON DRACUT-420572
MARITIME DRACUT - 412538
WYETH GII-421025
COLONIAL-TEWKSBURY-420139
FITCHBURG-420112
LUNENBERG-420949
ACTON-420611
LEOMINSTER-420111
CLINTON-420110
HUDSON-420204
HOPKINTON-420509
FARNUMSVILLE-420259
FAC# 2250
NSTAR-421035
WORCESTER -420109
SPENCER-420191
SOUTHBRIDGE-420108
MILLENNIUM-420884
CHARLTON CITY/264
HOPKINTON /267
BROCKTON-420631
265E
MENDON/267A
WENHAM-420138
PEABODY-420658
BEVERLY-420118
BOSTON W PEABODY-420389
DISTRIGAS RECEIPT-412513
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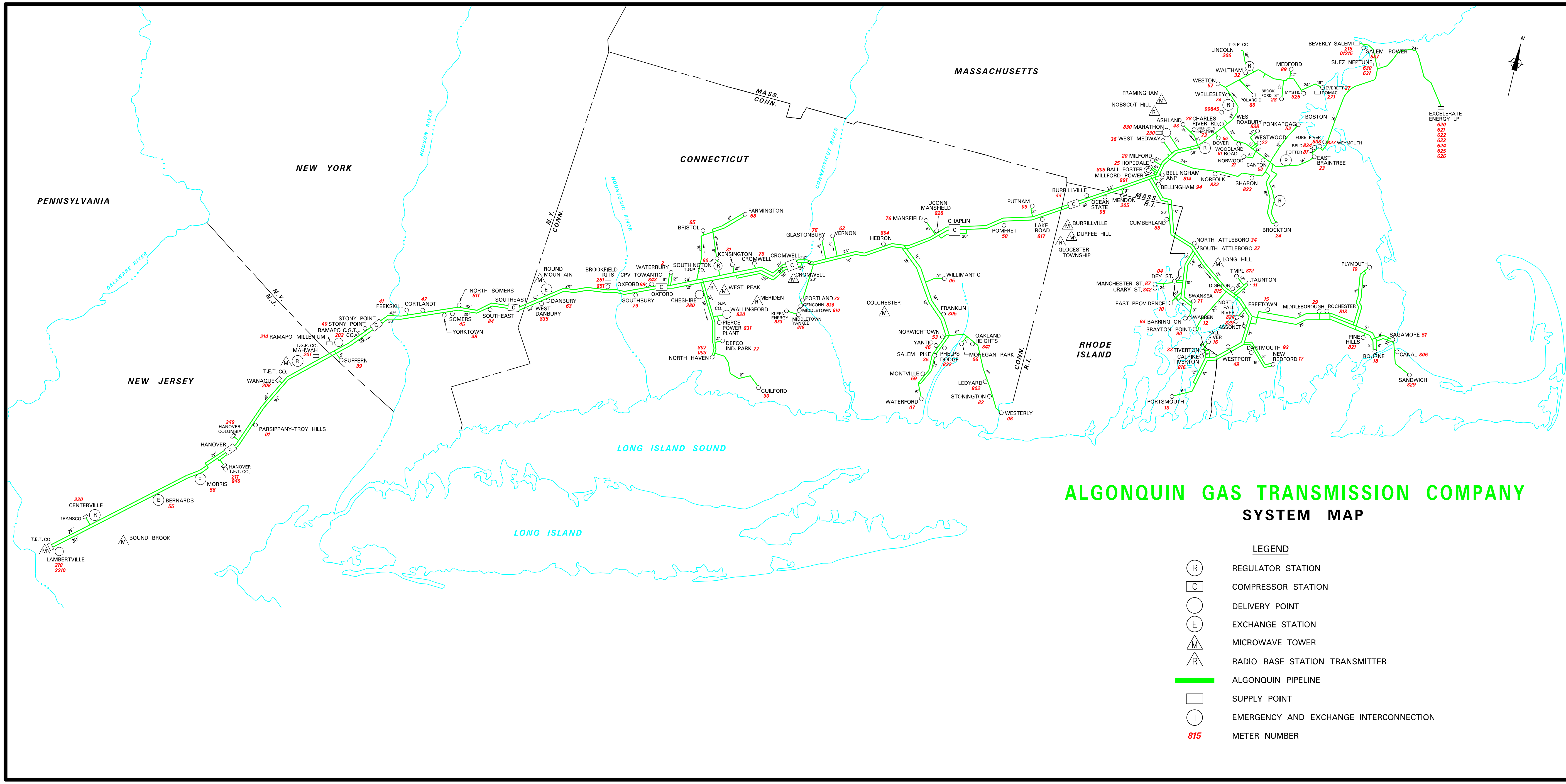
WAKEFIELD-420848
LYNN -420117
REVERE-420116
BOSTON BURLINGTON-420341
ARLINGTON-420115
LEXINGTON-420192
50680-ZONE 6 LEG 200 NORTH POOL
NORTH ADAMS-420103
PITTSFIELD-420102
WEST PITTSFIELD-420638
GRANITE NORTHAMPTON-420106
GREENFIELD-420292
AGAWAM-400484
STOCKBRIDGE-420278
HOLYOKE-420401
WESTFIELD-420104
BERKSHIRE POWER-420901
CITY OF WESTFIELD-421058
AGAWAM/261
420872-ZONE 6 LEG 300 POOL
MONSON-420751
EAST LONGMEADOW-420193
50764-ZONE 6 LEG 200 SOUTH POOL
PROVIDENCE-420707
MENDON -420285
BLACKSTONE-420894
BELLINGHAM-420424
SMITHFIELD-420910
FPLE RISE-420926
CRANSTON -420750
PAWTUCKET RI-420135
LINCOLN SMS-420758
WINSTED-420130
TORRINGTON-420131
THOMPSONVILLE-420318
EAST GRANBY-420637
NORTH BLOOMFIELD-420453
BLOOMFIELD-420205
FARMINGTON-420487
NEW BRITAIN-420129
DERBY-420127
TRUMBULL-420313
EASTON -420853
MILFORD-420425
SHELTON/IROQ-412180
WEST PORT-420490
BRIDGEPORT-420126
LONG RIDGE-420434
NORWALK-420125
STANFORD-420124
PUTNAM LAKE-420217
Note:
Receipt Meter
Delivery Meter
Bi-Directional
Pooling
Compressor Stations
KINDER MORGAN
TENNESSEE GAS PIPELINE COMPANY, L.L.C.
RATE ZONE 6
000293
05/2019
GISMS-4750_ Zone 6



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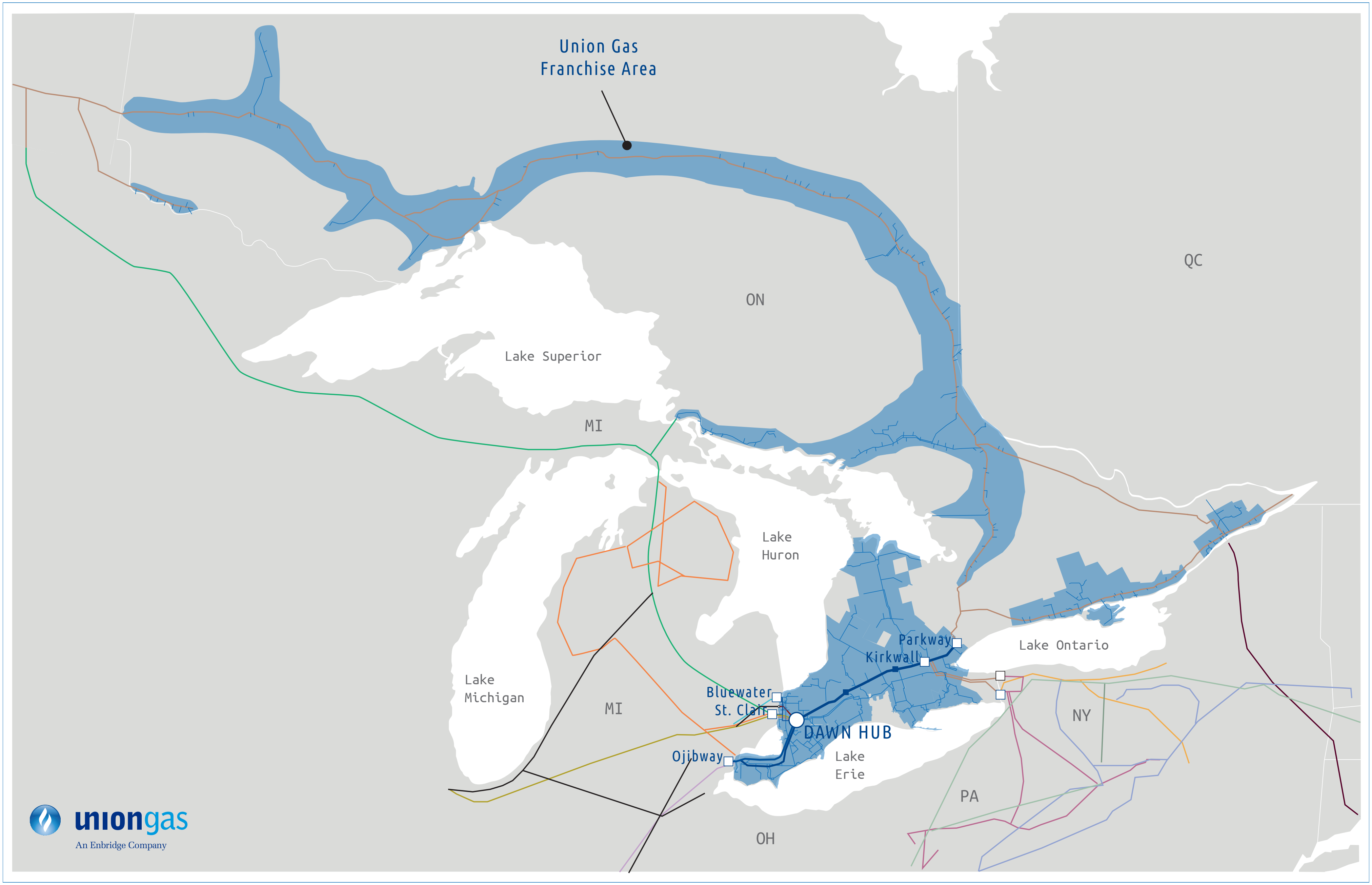
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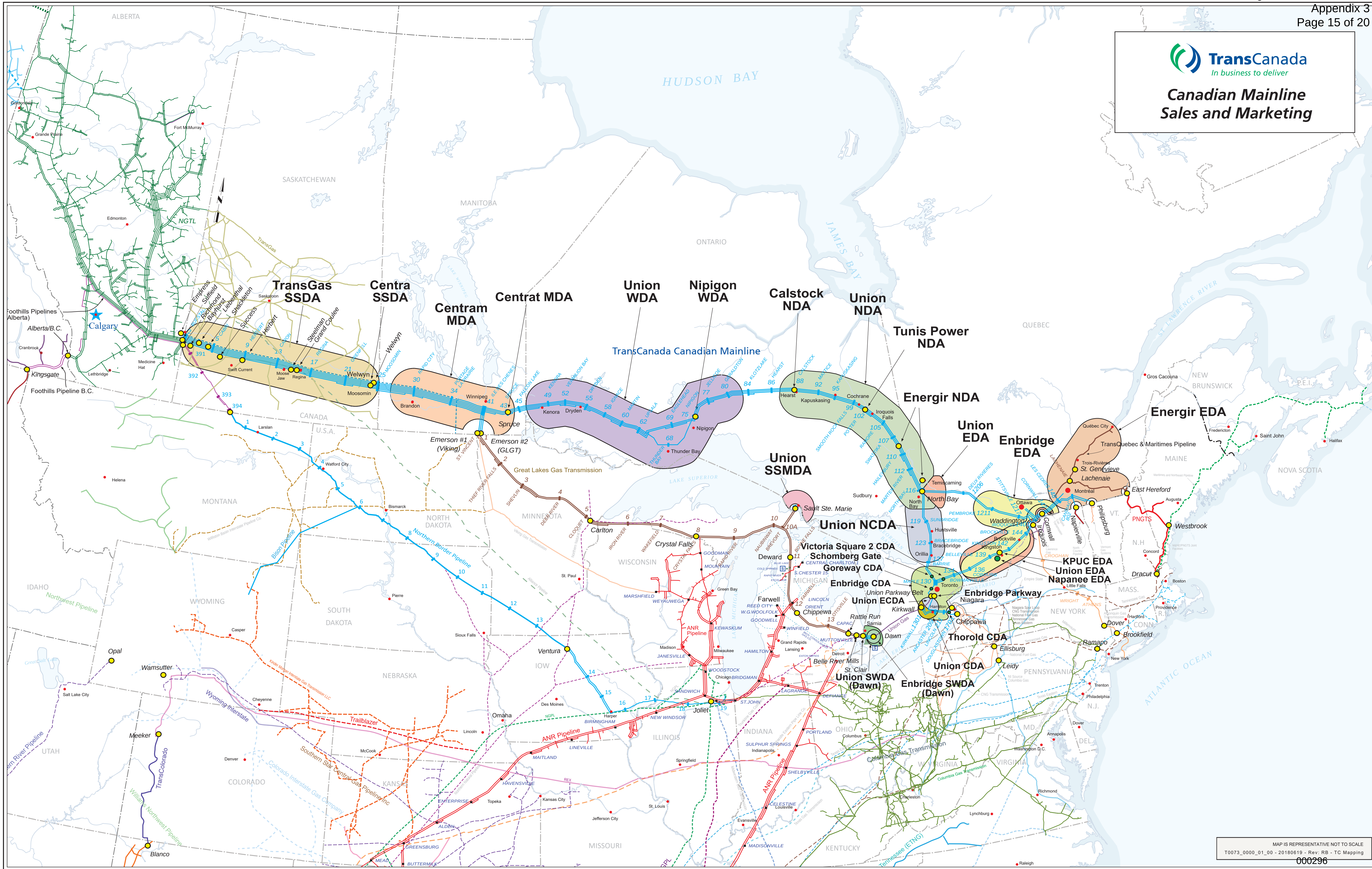
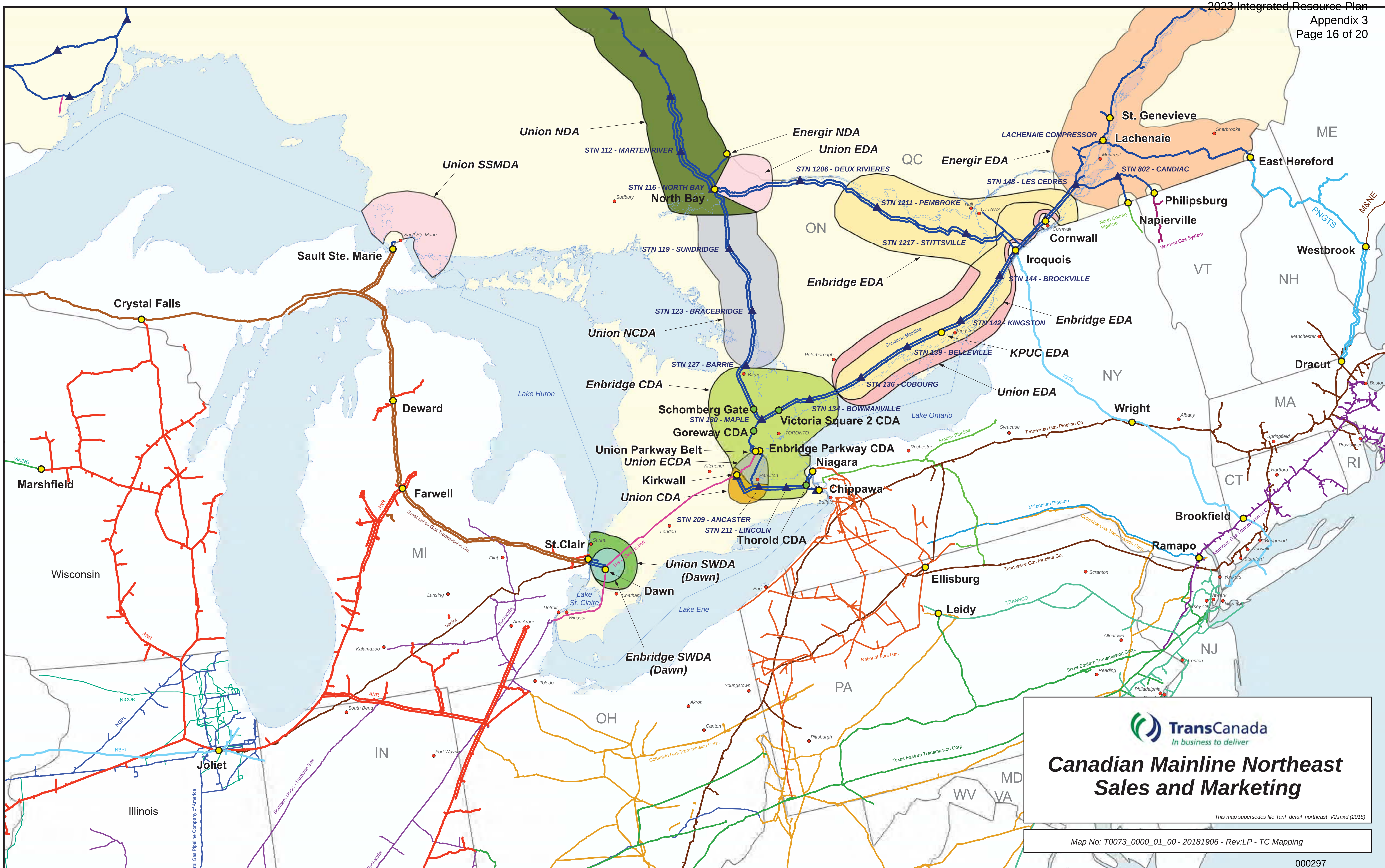
Franchise Area
ON
QC
Lake Superior
MI
Lake
Huron
Lake
Michigan
MI
Parkway
Kirkwall
Lake Ontario
Bluewater
St. Clair
DAWN HUB
NY
Ojibway
Lake
Erie
PA
OH
uniongas
An Enbridge Company


TransCanada
In business to deliver
Canadian Mainline
Sales and Marketing
TransCanada Canadian Mainline
TransGas SSDA
Centra SSDA
Centram MDA
Centrat MDA
Union WDA
Nipigon WDA
Calstock NDA
Union NDA
Tunis Power NDA
Energir NDA
Union EDA
Enbridge EDA
Energir EDA
Union SSMDA
Union NCDA
Victoria Square 2 CDA
Schomberg Gate
Goreway CDA
Enbridge CDA
Union Parkway Belt
Union ECDA
Enbridge Parkway
KPUC EDA
Union EDA
Napanee EDA
Thorold CDA
Union CDA
Union SWDA (Dawn)
Enbridge SWDA (Dawn)
HUDSON BAY
JAMES BAY
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEW BRUNSWICK
NOVA SCOTIA
MAINE
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
WISCONSIN
MICHIGAN
IDAHO
WYOMING
NEBRASKA
IOWA
ILLINOIS
INDIANA
OHIO
PENNSYLVANIA
NEW YORK
UTAH
COLORADO
KANSAS
MISSOURI
KENTUCKY
CANADA
U.S.A.
ATLANTIC OCEAN
Calgary
NGTL
Foothills Pipelines (Alberta)
Foothills Pipeline B.C.
Kingsgate
Empress
Welwyn
Emerson #1 (Viking)
Emerson #2 (GLGT)
Great Lakes Gas Transmission
Northern Border Pipeline
ANR Pipeline
Trailblazer
TransQuebec & Maritimes Pipeline
PNGTS
Sault Ste. Marie
Thunder Bay
Winnipeg
Regina
Kenora
Dryden
Nipigon
Hearst
Kapuskasing
Cochrane
Iroquois Falls
North Bay
Sudbury
Toronto
Ottawa
Montréal
Québec City
Dawn
Chippawa
Niagara
Kirkwall
Parkway
Waddington
Cornwall
Iroquois
Philipsburg
Napierville
East Hereford
Westbrook
Dracut
Carlton
Crystal Falls
Farwell
Deward
Chippewa
Rattle Run
Belle River Mills
St. Clair
Ellisburg
Leidy
Dover
Ramapo
Brookfield
Joliet
Ventura
Opal
Wamsutter
Meeker
Blanco
MAP IS REPRESENTATIVE NOT TO SCALE
T0073_0000_01_00 - 20180619 - Rev: RB - TC Mapping


Union NDA
STN 112 - MARTEN RIVER
Energir NDA
Union EDA
Union SSMDA
STN 1206 - DEUX RIVIERES
QC
Energir EDA
LACHENAIE COMPRESSOR
St. Genevieve
Lachenaie
East Hereford
STN 802 - CANDIAC
STN 148 - LES CEDRES
ME
STN 116 - NORTH BAY
North Bay
Sudbury
STN 1211 - PEMBROKE
Philipsburg
Napierville
ON
Cornwall
Sault Ste. Marie
STN 119 - SUNDRIDGE
STN 1217 - STITTSVILLE
Iroquois
Westbrook
VT
NH
Enbridge EDA
STN 144 - BROCKVILLE
Crystal Falls
STN 123 - BRACEBRIDGE
Enbridge EDA
STN 142 - KINGSTON
Union NCDA
STN 139 - BELLEVILLE
KPUC EDA
STN 127 - BARRIE
Dracut
NY
Enbridge CDA
STN 136 - COBOURG
Union EDA
Lake Huron
Deward
Schomberg Gate
STN 134 - BOWMANVILLE
STN 130 - MAPLE
Victoria Square 2 CDA
Lake Ontario
Wright
MA
Goreway CDA
Union Parkway Belt
Enbridge Parkway CDA
Union ECDA
Niagara
Marshfield
Kirkwall
Chippawa
RI
CT
Farwell
Union CDA
STN 209 - ANCASTER
STN 211 - LINCOLN
Brookfield
Thorold CDA
St.Clair
MI
Ramapo
Union SWDA (Dawn)
Wisconsin
Dawn
Ellisburg
Lake St. Claire
Lake Erie
Leidy
NJ
Enbridge SWDA (Dawn)
PA
OH
Joliet
IN
MD
WV
VA
Illinois
Tennessee Gas Pipeline Co.
Millennium Pipeline
Empire Pipeline
Columbia Gas Transmission Corp.
Texas Eastern Transmission Corp.
National Fuel Gas
Great Lakes Gas Transmission Co.
ANR
Vector
Panhandle
NICOR
NGPL
VIKING
TRANSCO
PNGTS
M&NE
IGTS
Vermont Gas System
North Country Pipeline
Algonquin Gas Transmission LLC
Union Gas Limited
Southern Union - Trunkline Gas
Natural Gas Pipeline Company of America
TransCanada
In business to deliver
Canadian Mainline Northeast Sales and Marketing
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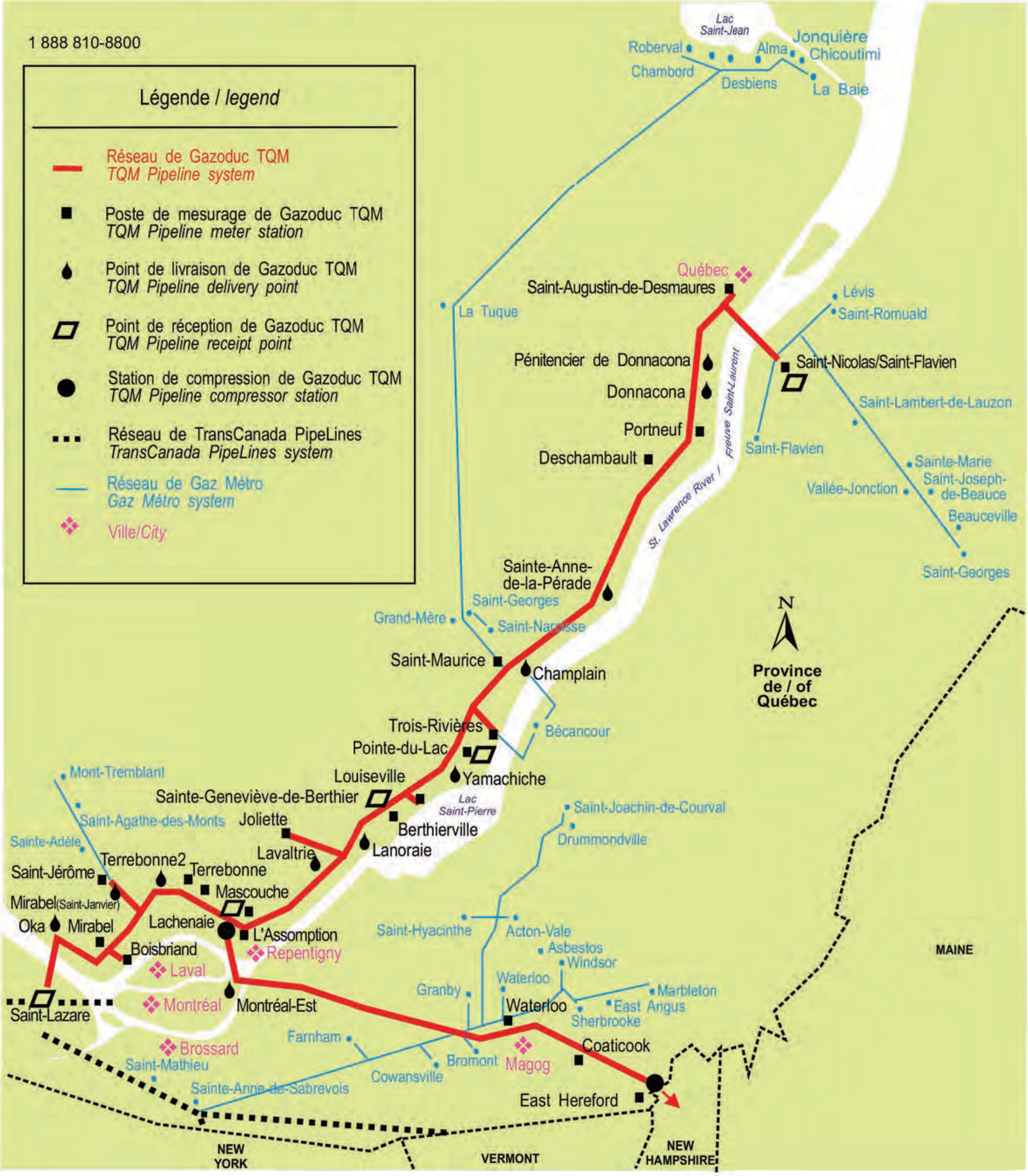
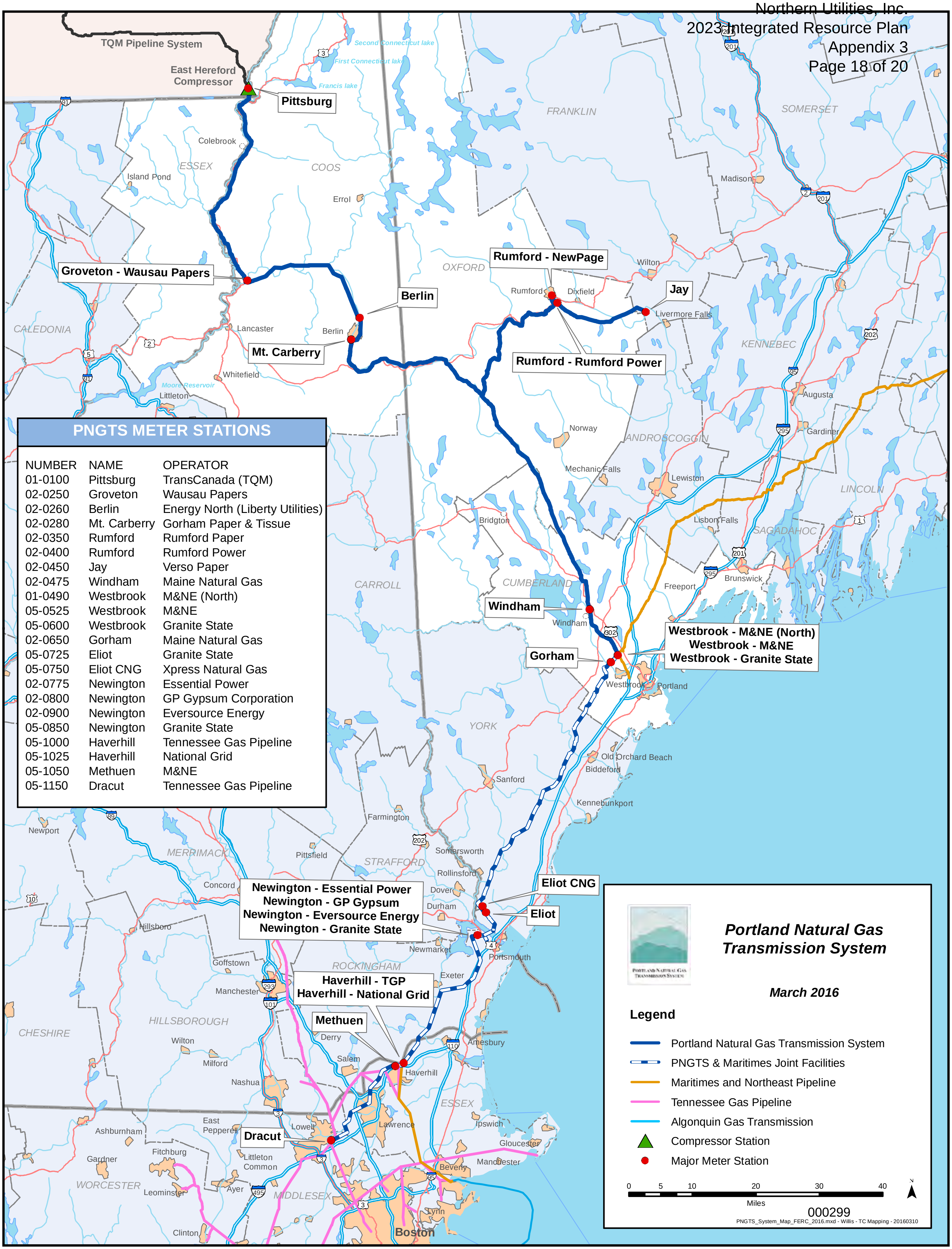
Map No: T0073_0000_01_00 - 20181906 - Rev:LP - TC Mapping

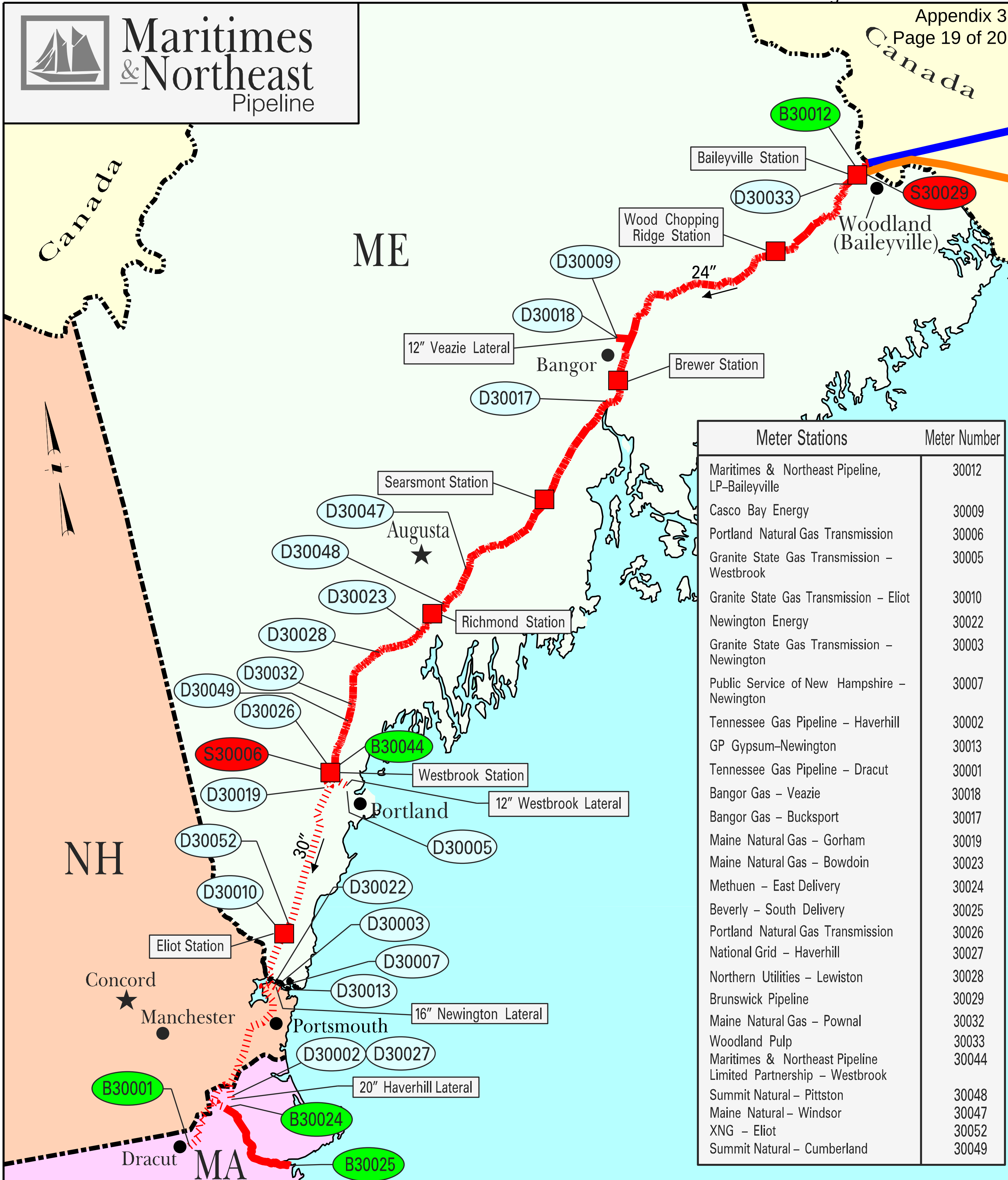
Gazoduc TQM


1 888 810-8800
Légende / legend
Réseau de Gazoduc TQM
TQM Pipeline system
Poste de mesurage de Gazoduc TQM
TQM Pipeline meter station
Point de livraison de Gazoduc TQM
TQM Pipeline delivery point
Point de réception de Gazoduc TQM
TQM Pipeline receipt point
Station de compression de Gazoduc TQM
TQM Pipeline compressor station
Réseau de TransCanada PipeLines
TransCanada PipeLines system
Réseau de Gaz Métro
Gaz Métro system
Ville/City
Lac Saint-Jean
Roberval
Chambord
Desbiens
Alma
Jonquière
Chicoutimi
La Baie
La Tuque
Québec
Saint-Augustin-de-Desmaures
Lévis
Saint-Romuald
Pénitencier de Donnacona
Saint-Nicolas/Saint-Flavien
Donnacona
Fleuve Saint-Laurent / St. Lawrence River
Saint-Lambert-de-Lauzon
Portneuf
Saint-Flavien
Deschambault
Sainte-Marie
Saint-Joseph-de-Beauce
Vallée-Jonction
Beauceville
Saint-Georges
Sainte-Anne-de-la-Pérade
Saint-Georges
Grand-Mère
Saint-Narcisse
Saint-Maurice
Champlain
N
Province de / of Québec
Trois-Rivières
Pointe-du-Lac
Bécancour
Louiseville
Yamachiche
Mont-Tremblant
Sainte-Geneviève-de-Berthier
Lac Saint-Pierre
Saint-Joachin-de-Courval
Saint-Agathe-des-Monts
Joliette
Berthierville
Drummondville
Sainte-Adèle
Lavaltrie
Lanoraie
Terrebonne2
Terrebonne
Saint-Jérôme
Mascouche
Mirabel(Saint-Janvier)
Lachenaie
L'Assomption
Saint-Hyacinthe
Acton-Vale
Oka
Mirabel
Repentigny
Asbestos
Boisbriand
Laval
Windsor
Waterloo
Marbleton
Granby
Waterloo
East Angus
Saint-Lazare
Montréal
Montréal-Est
Sherbrooke
MAINE
Farnham
Coaticook
Brossard
Bromont
Magog
Saint-Mathieu
Cowansville
Sainte-Anne-de-Sabrevois
East Hereford
NEW YORK
VERMONT
NEW HAMPSHIRE



PNGTS METER STATIONS

NUMBER	NAME	OPERATOR
01-0100	Pittsburg	TransCanada (TQM)
02-0250	Groveton	Wausau Papers
02-0260	Berlin	Energy North (Liberty Utilities)
02-0280	Mt. Carberry	Gorham Paper & Tissue
02-0350	Rumford	Rumford Paper
02-0400	Rumford	Rumford Power
02-0450	Jay	Verso Paper
02-0475	Windham	Maine Natural Gas
01-0490	Westbrook	M&NE (North)
05-0525	Westbrook	M&NE
05-0600	Westbrook	Granite State
02-0650	Gorham	Maine Natural Gas
05-0725	Eliot	Granite State
05-0750	Eliot CNG	Xpress Natural Gas
02-0775	Newington	Essential Power
02-0800	Newington	GP Gypsum Corporation
02-0900	Newington	Eversource Energy
05-0850	Newington	Granite State
05-1000	Haverhill	Tennessee Gas Pipeline
05-1025	Haverhill	National Grid
05-1050	Methuen	M&NE
05-1150	Dracut	Tennessee Gas Pipeline



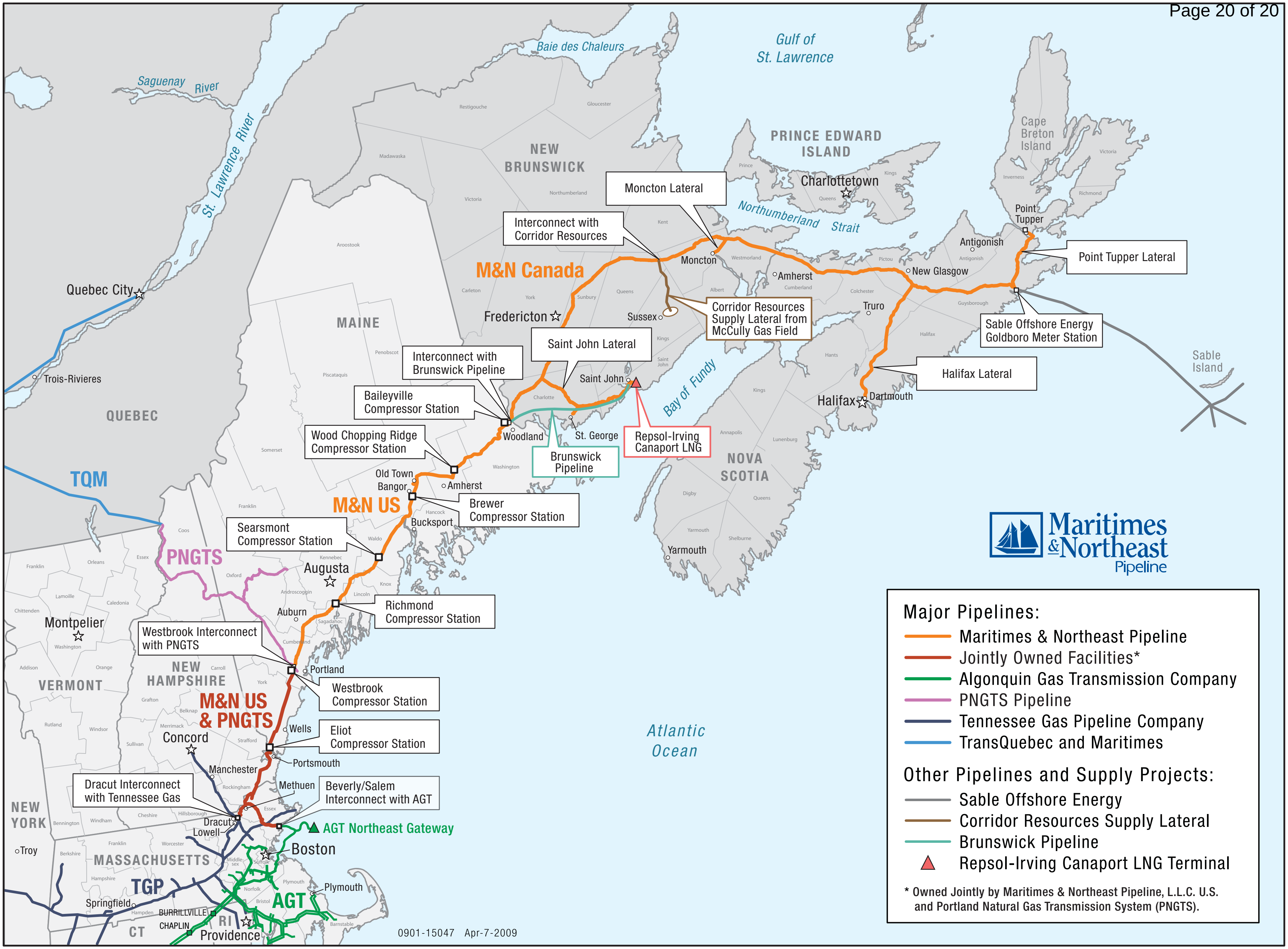
Meter Stations	Meter Number
Maritimes & Northeast Pipeline, LP–Baileyville	30012
Casco Bay Energy	30009
Portland Natural Gas Transmission	30006
Granite State Gas Transmission – Westbrook	30005
Granite State Gas Transmission – Eliot	30010
Newington Energy	30022
Granite State Gas Transmission – Newington	30003
Public Service of New Hampshire – Newington	30007
Tennessee Gas Pipeline – Haverhill	30002
GP Gypsum–Newington	30013
Tennessee Gas Pipeline – Dracut	30001
Bangor Gas – Veazie	30018
Bangor Gas – Bucksport	30017
Maine Natural Gas – Gorham	30019
Maine Natural Gas – Bowdoin	30023
Methuen – East Delivery	30024
Beverly – South Delivery	30025
Portland Natural Gas Transmission	30026
National Grid – Haverhill	30027
Northern Utilities – Lewiston	30028
Brunswick Pipeline	30029
Maine Natural Gas – Pownal	30032
Woodland Pulp	30033
Maritimes & Northeast Pipeline Limited Partnership – Westbrook	30044
Summit Natural – Pittston	30048
Maine Natural – Windsor	30047
XNG – Eliot	30052
Summit Natural – Cumberland	30049

Maritimes & Northeast Pipeline, LLC
M&N / PNGTS Joint Facilities
Maritimes & Northeast Pipeline, LP
Brunswick Pipeline

S Supply Meter Station
D Delivery Meter Station
B Bidirectional Check Meter Station
Centrifugal Compressor Station

0 25 50
GRAPHIC SCALE–MILES

000300


Baie des Chaleurs
Gulf of St. Lawrence
Saguenay River
St. Lawrence River
Quebec City
Trois-Rivieres
QUEBEC
TQM
NEW BRUNSWICK
PRINCE EDWARD ISLAND
Charlottetown
Cape Breton Island
Northumberland Strait
Moncton Lateral
Interconnect with Corridor Resources
M&N Canada
Moncton
Amherst
New Glasgow
Antigonish
Point Tupper
Point Tupper Lateral
Fredericton
Sussex
Corridor Resources Supply Lateral from McCully Gas Field
Truro
Sable Offshore Energy Goldboro Meter Station
Sable Island
Saint John Lateral
Saint John
Halifax Lateral
Halifax
Dartmouth
Bay of Fundy
Repsol-Irving Canaport LNG
St. George
Brunswick Pipeline
Woodland
Interconnect with Brunswick Pipeline
Baileyville Compressor Station
Wood Chopping Ridge Compressor Station
MAINE
NOVA SCOTIA
Yarmouth
Old Town
Bangor
Amherst
Brewer Compressor Station
M&N US
Bucksport
Searsmont Compressor Station
PNGTS
Augusta
Richmond Compressor Station
Auburn
Montpelier
VERMONT
Westbrook Interconnect with PNGTS
Portland
Westbrook Compressor Station
NEW HAMPSHIRE
M&N US & PNGTS
Wells
Eliot Compressor Station
Concord
Portsmouth
Manchester
Methuen
Beverly/Salem Interconnect with AGT
Dracut Interconnect with Tennessee Gas
Dracut
Lowell
NEW YORK
Troy
AGT Northeast Gateway
Boston
MASSACHUSETTS
TGP
Springfield
BURRILLVILLE
CHAPLIN
RI
CT
Providence
AGT
Plymouth
Atlantic Ocean
0901-15047 Apr-7-2009
Maritimes & Northeast Pipeline
Major Pipelines:
Maritimes & Northeast Pipeline
Jointly Owned Facilities*
Algonquin Gas Transmission Company
PNGTS Pipeline
Tennessee Gas Pipeline Company
TransQuebec and Maritimes
Other Pipelines and Supply Projects:
Sable Offshore Energy
Corridor Resources Supply Lateral
Brunswick Pipeline
Repsol-Irving Canaport LNG Terminal
* Owned Jointly by Maritimes & Northeast Pipeline, L.L.C. U.S. and Portland Natural Gas Transmission System (PNGTS).

Appendix 4, Energy Efficiency Program Tables

OUTLINE OF APPENDIX 4

Energy Efficiency Program Reports

Efficiency Maine Trust Triennial Plan, FY 2023 Forecast (as of February 21, 2023).......................... 2

Efficiency Maine Trust Triennial Plan, FY 2024 Forecast (as of February 21, 2023).......................... 3

Efficiency Maine Trust Triennial Plan, FY 2025 Forecast (as of February 21, 2023).......................... 4

Efficiency Maine Trust Natural Gas LDC Assessment Shares 5

Northern Utilities, Inc., March 1, 2022 Plan Filing, 2023 Plan - REVISED 6

Efficiency Maine Trust Triennial Plan
Summary of Program Funding
FY 2023 Forecast (as of February 21, 2023)

Source:
2021-00380 Annual Update 2023 Budget and Performance Metrics 3.1.23.xls
Truncated for Natural Gas

Line	Programs	Natural Gas Efficiency Procurement	Natural Gas (MMBtu)	Annualized Natural Gas Savings (Million cf)	Benefit / Cost Ratio	Job-Years Created	Lifetime Benefit	Participant Cost
	(1)	(3)	(15)	(21)	(24)	(25)	(26)	(27)
1b	Custom Natural Gas Measures	931,182	80,987	79.01	3.35	8.7	11,146,000	2,397,000
2b	Prescriptive Natural Gas Measures	799,521	41,107	40.10	5.41	7.44	6,276,000	360,000
3b	Distributor Natural Gas Measures	143,382	4,914	4.79	1.82	1.33	569,000	169,000
4b	Retail Initiatives Natural Gas Measures	-	-	-	-	-	-	-
5b	HESP Natural Gas Measures	585,481	7,611	7.43	1.81	5.44	1,315,000	142,000
6b	Low Income Natural Gas Measures	17,264	770	0.75	3.40	0.16	69,000	3,000
12	Programs Subtotal	$2,476,830	135,389	132.09	1.83	1,255.56	$662,761,619	$220,504,000
13	Innovation	15,278						
14	Public Information	7,639						
15	Administration	106,949						
16	EM&V	38,196						
17	Inter-Agency Transfers	15,278						
18	All Programs Total	**$ 2,660,172**	**135,389**	**132.09**	**1.83**	**1,255.56**	**$ 662,761,619**	**$ 220,504,000**
	Residential Gas Program Subtotal	$ 602,746	8,381	8.18		5.61	1,384,000	145,000
	C&I Gas Program Subtotal	$ 1,874,084	127,008	123.91		17.43	17,991,000	2,926,000
	check	2,476,830	135,389	132.09		23.03	19,375,000	3,071,000
	Residential Gas Program Total	$ 647,363						
	C&I Gas Program Total	$ 2,012,809						
	check	$ 2,660,172						

Efficiency Maine Trust Triennial Plan
Summary of Program Funding
FY 2024 Forecast (as of February 21, 2023)

Source:
2021-00380 Annual Update 2023 Budget and Performance Metrics 3.1.23.xls
Truncated for Natural Gas

Line	Programs	Natural Gas Efficiency Procurement	Natural Gas (MMBtu)	Annualized Natural Gas Savings (Million cf)	Benefit / Cost Ratio	Job-Years Created	Lifetime Benefit	Participant Cost
	(1)	(3)	(15)	(21)	(24)	(25)	(26)	(27)
1b	Custom Natural Gas Measures	635,833	55,300	53.95	3.35	5.9	7,611,000	1,637,000
2b	Prescriptive Natural Gas Measures	229,329	11,791	11.50	5.42	2.13	1,800,000	103,000
3b	Distributor Natural Gas Measures	102,041	3,497	3.41	1.82	0.95	405,000	120,000
4b	Retail Initiatives Natural Gas Measures	-	-	-	-	-	-	-
5b	HESP Natural Gas Measures	576,340	7,492	7.31	1.81	5.36	1,295,000	140,000
6b	Low Income Natural Gas Measures	15,591	695	0.68	3.33	0.14	62,000	3,000
12	Programs Subtotal	$1,559,134	78,776	76.85	1.99	728.12	$403,669,507	$118,129,000
13	Innovation	15,591						
14	Public Information	7,796						
15	Administration	109,139						
16	EM&V	38,978						
17	Inter-Agency Transfers	15,591						
18	**All Programs Total**	**$ 1,746,231**	**78,776**	**76.85**	**1.99**	**728.12**	**$ 403,669,507**	**$ 118,129,000**
	Residential Gas Program Subtotal	$ 591,932	8,188	7.99		5.50	1,357,000	143,000
	C&I Gas Program Subtotal	$ 967,203	70,588	68.87		8.99	9,816,000	1,860,000
	check	1,559,134	78,776	76.85		14.50	11,173,000	2,003,000
	Residential Gas Program Total	$ 662,963						
	C&I Gas Program Total	$ 1,083,267						
	check	$ 1,746,231						

Efficiency Maine Trust Triennial Plan
Summary of Program Funding
FY 2025 Forecast (as of February 21, 2023)

Source:
2021-00380 Annual Update 2023 Budget and Performance Metrics 3.1.23.xls
Truncated for Natural Gas

Line	Programs	Natural Gas Efficiency Procurement	Natural Gas (MMBtu)	Annualized Natural Gas Savings (Million cf)	Benefit / Cost Ratio	Job-Years Created	Lifetime Benefit	Participant Cost
	(1)	(3)	(15)	(21)	(24)	(25)	(26)	(27)
1b	Custom Natural Gas Measures	635,833	55,300	53.95	3.35	5.9	7,611,000	1,637,000
2b	Prescriptive Natural Gas Measures	229,329	11,791	11.50	5.42	2.13	1,800,000	103,000
3b	Distributor Natural Gas Measures	77,037	2,640	2.58	1.82	0.72	306,000	91,000
4b	Retail Initiatives Natural Gas Measures	-	-	-	-	-	-	-
5b	HESP Natural Gas Measures	576,340	7,492	7.31	1.81	5.36	1,295,000	140,000
6b	Low Income Natural Gas Measures	15,339	684	0.67	3.52	0.14	61,000	2,000
12	Programs Subtotal	$1,533,878	77,907	76.01	1.96	718.76	$413,032,463	$126,412,000
13	Innovation	15,339						
14	Public Information	7,669						
15	Administration	107,371						
16	EM&V	38,347						
17	Inter-Agency Transfers	15,339						
18	**All Programs Total**	**$ 1,717,943**	**77,907**	**76.01**	**1.96**	**718.76**	**$ 413,032,463**	**$ 126,412,000**
	Residential Gas Program Subtotal	$ 591,679	8,176	7.98		5.50	1,356,000	142,000
	C&I Gas Program Subtotal	$ 942,199	69,731	68.03		8.76	9,717,000	1,831,000
	check	1,533,878	77,907	76.01		14.27	11,073,000	1,973,000
	Residential Gas Program Total	$ 662,681						
	C&I Gas Program Total	$ 1,055,263						
	check	$ 1,717,943						

Efficiency Maine Trust Natural Gas LDC Assessment Shares

Natural Gas Efficiency Procurement					
	FY21 ACT	**FY22 ACT**	**FY23 BUD**	**3 Year Total**	**3 Year Shares**
Name					
Northern Utilities - Unitil	$ 688,422	$ 65,522	$ 667,060	$ 1,421,004	**57.5%**
Bangor Natural Gas	224,423	7,947	277,297	509,667	20.6%
Maine Natural Gas	147,120	84,009	176,749	407,878	16.5%
Summit Natural Gas	69,035	12,007	51,825	132,867	5.4%
Totals	**$ 1,129,000**	**$ 169,485**	**$ 1,172,931**	**$ 2,471,416**	**100.0%**

Source: Table D-1: Public Utilities Commission Assessments and Revenue Collections, FY2021 Annual Report, FY 2022 Annual Report

Reprinted 4/18/2020:
Colum *Total Resource Cost Test* was not displayed in Attachment J1, Page 2 of 6, of the March 1, 2022 Compliance Filing. No changes were made to program budgets or goals.

Program Cost-Effectiveness - 2023 PLAN

	Benefit/Cost Ratios												
	Total Resource Cost Test (Net)	**Granite State Test (Net)**	**Total Resource Cost Test (Net)**	**Granite State Test (Net)**	**Utility Costs ($000 - 2022$)[2]**	**Customer Costs ($000 - 2022$)[2]**	**Annual Net MWh Savings**	**Lifetime Net MWh Savings**	**Winter kW Savings**	**Summer kW Savings**	**Number of Customers Served**	**Annual Net MMBtu Savings**	**Lifetime Net MMBtu Savings**
Residential Programs													
B1 - Home Energy Assistance	1.01	1.01	484.1	484.1	479.3	-	10.9	232.4	0.0	-	56	2,208.4	47,567.5
A1 - Energy Star Homes	1.57	1.93	698.3	620.9	321.2	124.8	-	-	-	-	106	2,637.0	63,425.0
A2 - Home Performance with Energy Star	1.02	1.11	434.8	386.0	347.3	79.6	5.0	74.7	1.5	0.1	6	1,798.6	38,254.5
A3 - Energy Star Products	1.18	1.83	347.5	308.0	168.2	127.5	7.9	132.4	(0.0)	0.1	182	1,835.6	32,492.1
A4 - Residential Behavior	1.48	1.30	63.8	56.2	43.3	-	-	-	-	-	11,200	5,847.4	5,847.4
A6c - Res Education	-	-	-	-	20.0	-	-	-	-	-	-	-	-
Sub-Total Residential	**1.19**	**1.35**	**2,028.6**	**1,855.1**	**1,379.2**	**331.9**	**23.8**	**439.5**	**1.6**	**0.2**	**11,550**	**14,327.0**	**187,586.5**
Commercial, Industrial & Municipal													
C1 - Large Business Energy Solutions	2.12	3.83	2,163.0	1,922.1	502.0	520.3	-	-	-	-	108	14,307.9	220,365.6
C2 - Small Business Energy Solutions	2.54	3.10	1,718.2	1,540.6	497.4	179.1	-	-	-	-	140	10,830.0	156,347.9
C6c - C&I Education	-	-	-	-	17.9	-	-	-	-	-	-	-	-
Sub-Total Commercial & Industrial	**2.26**	**3.40**	**3,881.3**	**3,462.6**	**1,017.4**	**699.4**	**-**	**-**	**-**	**-**	**248**	**25,137.8**	**376,713.5**
Total	**1.72**	**2.22**	**5,909.9**	**5,317.7**	**2,396.6**	**1,031.4**	**23.8**	**439.5**	**1.6**	**0.2**	**11,798**	**39,464.8**	**564,300.0**

Notes:

(1) The Granite State Test is used as the primary cost test, as approved in Order No. 26,322, and includes an annual NEI adder of $405.71 per weatherization project in the Home Energy Assistance program. For the Secondary Granite State Test, NEI adders of 25% for Residential and 10% for C&I

(2) Utility and Customer Costs and Benefits are expressed in 2022 Dollars.

(3) Per past precedent, discount and inflation rates have been updated for the year in which measures will be installed, and were updated as of June 2021 for program year 2022.

Annual Savings as a % of 2019 Sales	0.52%

Spending per Customer	$ 378.61
	$ 35.38
	$ 145.07

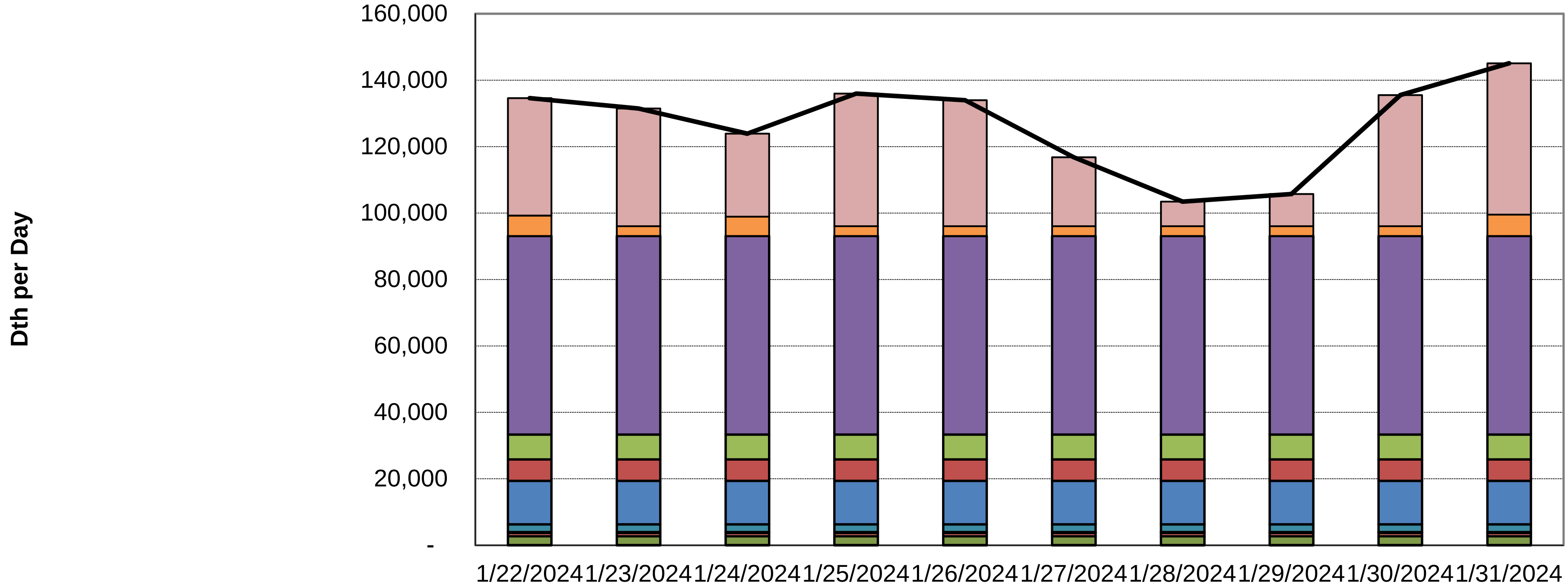
Appendix 5, Supplemental Materials for the Preferred Portfolio Section

OUTLINE OF APPENDIX 5

Supplemental Materials for the Preferred Portfolio Section

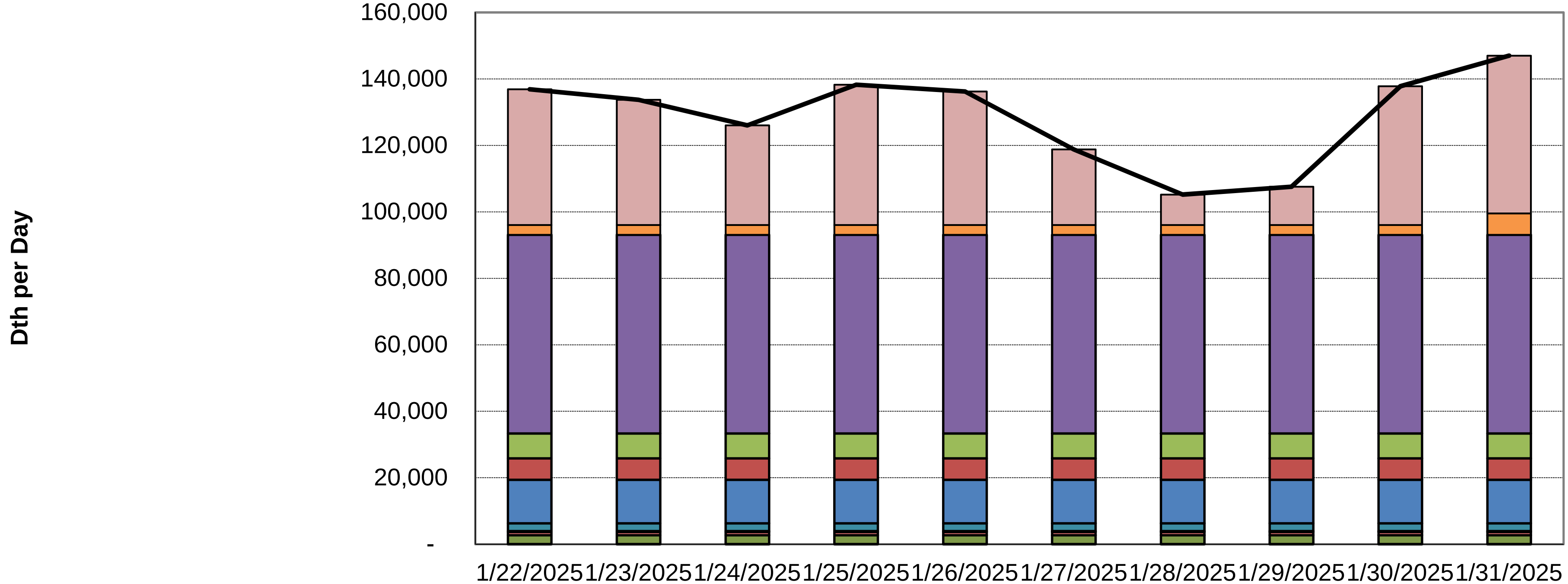
2023-2024 Design Winter Cold Snap 2
2024-2025 Design Winter Cold Snap 3
2025-2026 Design Winter Cold Snap 4
2026-2027 Design Winter Cold Snap 5
2027-2028 Design Winter Cold Snap 6
2023-2024 Nov-Mar Design Winter Planning Load Duration Curve 7
2024-2025 Nov-Mar Design Winter Planning Load Duration Curve 8
2025-2026 Nov-Mar Design Winter Planning Load Duration Curve 9
2026-2027 Nov-Mar Design Winter Planning Load Duration Curve 10
2027-2028 Nov-Mar Design Winter Planning Load Duration Curve 11
2023-2024 Nov-Mar Normal Winter Planning Load Duration Curve 12
2024-2025 Nov-Mar Normal Winter Planning Load Duration Curve 13
2025-2026 Nov-Mar Normal Winter Planning Load Duration Curve 14
2026-2027 Nov-Mar Normal Winter Planning Load Duration Curve 15
2027-2028 Nov-Mar Normal Winter Planning Load Duration Curve 16
2023 Apr-Oct Normal Summer Planning Load Duration Curve 17
2024 Apr-Oct Normal Summer Planning Load Duration Curve 18
2025 Apr-Oct Normal Summer Planning Load Duration Curve 19
2026 Apr-Oct Normal Summer Planning Load Duration Curve 20
2027 Apr-Oct Normal Summer Planning Load Duration Curve 21
2023-2024 Annual City Gate Cost, Delivered Volumes and Unit Cost - DESIGN YEAR 22
2024-2025 Annual City Gate Cost, Delivered Volumes and Unit Cost - DESIGN YEAR 23
2025-2026 Annual City Gate Cost, Delivered Volumes and Unit Cost - DESIGN YEAR 24
2026-2027 Annual City Gate Cost, Delivered Volumes and Unit Cost - DESIGN YEAR 25
2027-2028 Annual City Gate Cost, Delivered Volumes and Unit Cost - DESIGN YEAR 26
2023-2024 Annual City Gate Cost, Delivered Volumes and Unit Cost - NORMAL YEAR 27
2024-2025 Annual City Gate Cost, Delivered Volumes and Unit Cost - NORMAL YEAR 28
2025-2026 Annual City Gate Cost, Delivered Volumes and Unit Cost - NORMAL YEAR 29
2026-2027 Annual City Gate Cost, Delivered Volumes and Unit Cost - NORMAL YEAR 30
2027-2028 Annual City Gate Cost, Delivered Volumes and Unit Cost - NORMAL YEAR 31

2023-2024 Design Winter Cold Snap



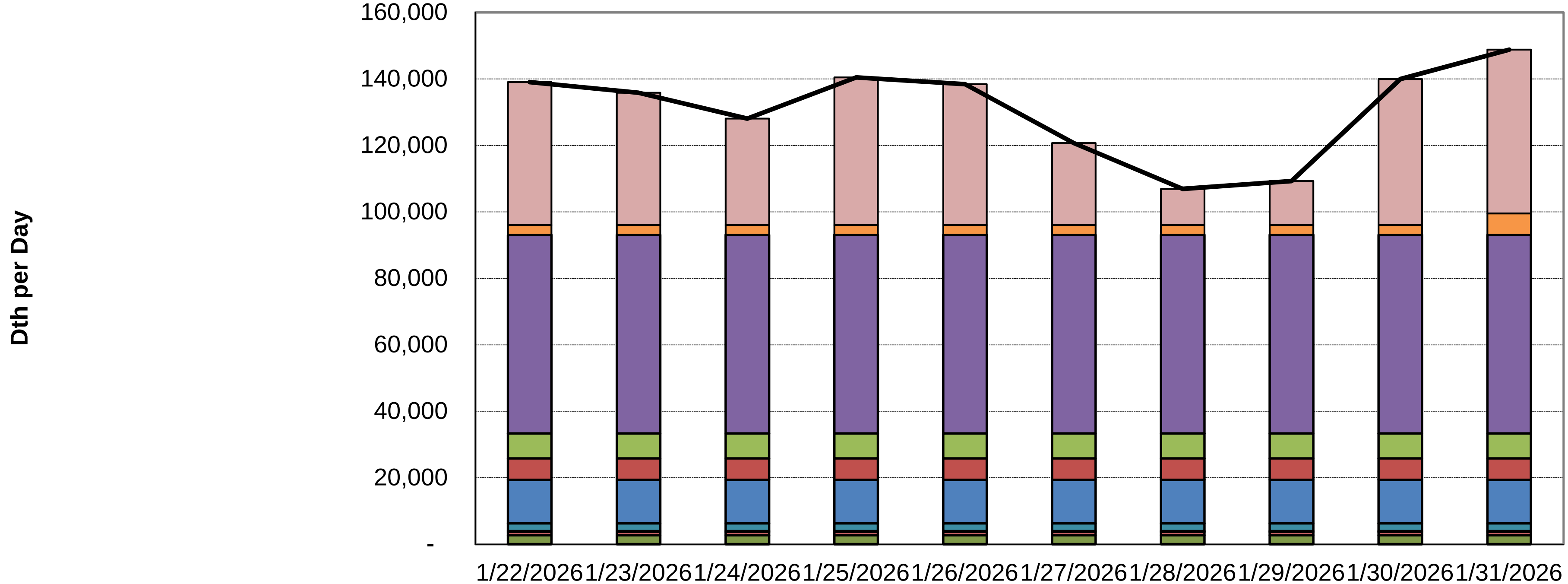
	01/22/24	01/23/24	01/24/24	01/25/24	01/26/24	01/27/24	01/28/24	01/29/24	01/30/24	01/31/24
Incremental Supply	35,359	35,453	25,000	39,934	37,924	20,758	7,408	9,728	39,471	45,559
LNG	6,155	2,940	5,825	2,940	2,940	2,940	2,940	2,940	2,940	6,440
Dawn Hub Storage	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751
AB Ramapo Supply	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Iroquois Receipts	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434
Tennessee Zone 0 and Zone L Pools	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109
Tennessee Niagara	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
Transco Zone 6, non-NY Supply	286	286	286	286	286	286	286	286	286	286
Leidy Hub Supply	965	965	965	965	965	965	965	965	965	965
Tennessee Storage	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644
LNG Boiloff	60	60	60	60	60	60	60	60	60	60
Cold Snap Loads	134,590	131,468	123,900	135,949	133,940	116,774	103,424	105,743	135,487	145,074

2024-2025 Design Winter Cold Snap



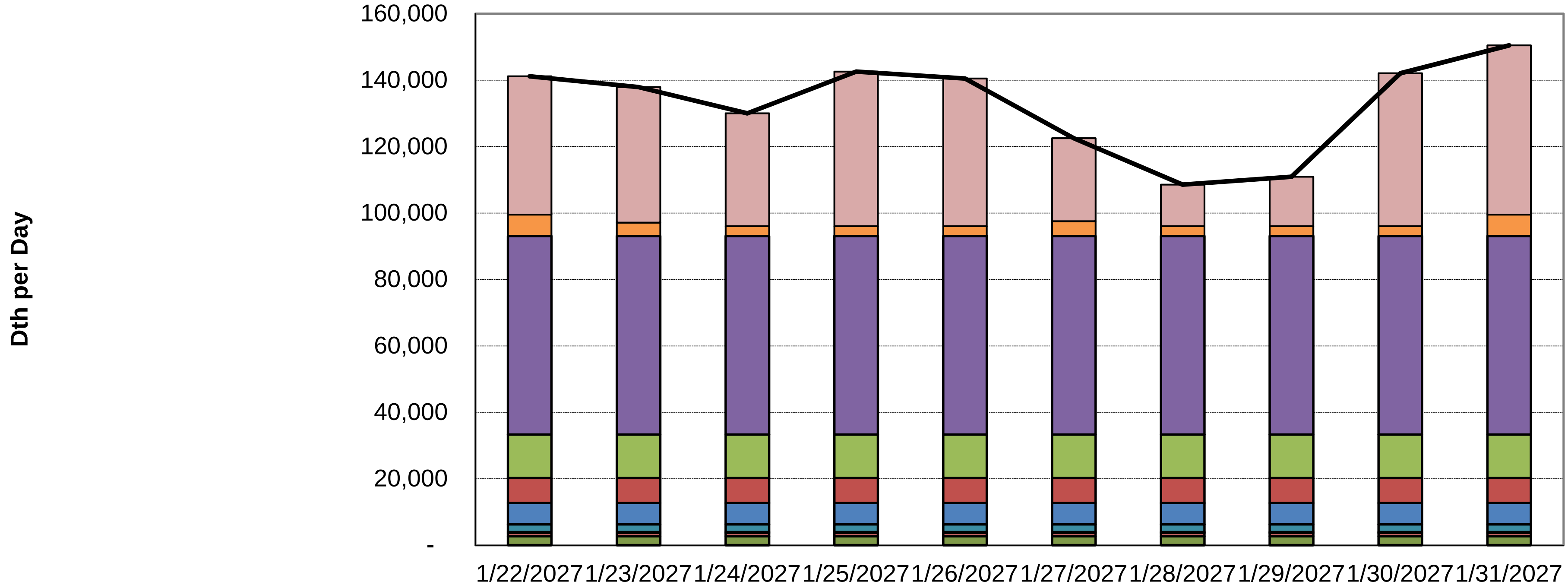
	01/22/25	01/23/25	01/24/25	01/25/25	01/26/25	01/27/25	01/28/25	01/29/25	01/30/25	01/31/25
Incremental Supply	40,846	37,687	30,004	42,234	40,201	22,751	9,186	11,525	41,753	47,474
LNG	2,940	2,940	2,940	2,940	2,940	2,940	2,940	2,940	2,940	6,440
Dawn Hub Storage	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751
AB Ramapo Supply	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Iroquois Receipts	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434
Tennessee Zone 0 and Zone L Pools	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109
Tennessee Niagara	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
Transco Zone 6, non-NY Supply	286	286	286	286	286	286	286	286	286	286
Leidy Hub Supply	965	965	965	965	965	965	965	965	965	965
Tennessee Storage	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644
LNG Boiloff	60	60	60	60	60	60	60	60	60	60
Cold Snap Loads	136,861	133,703	126,020	138,250	136,216	118,766	105,201	107,541	137,769	146,989

2025-2026 Design Winter Cold Snap



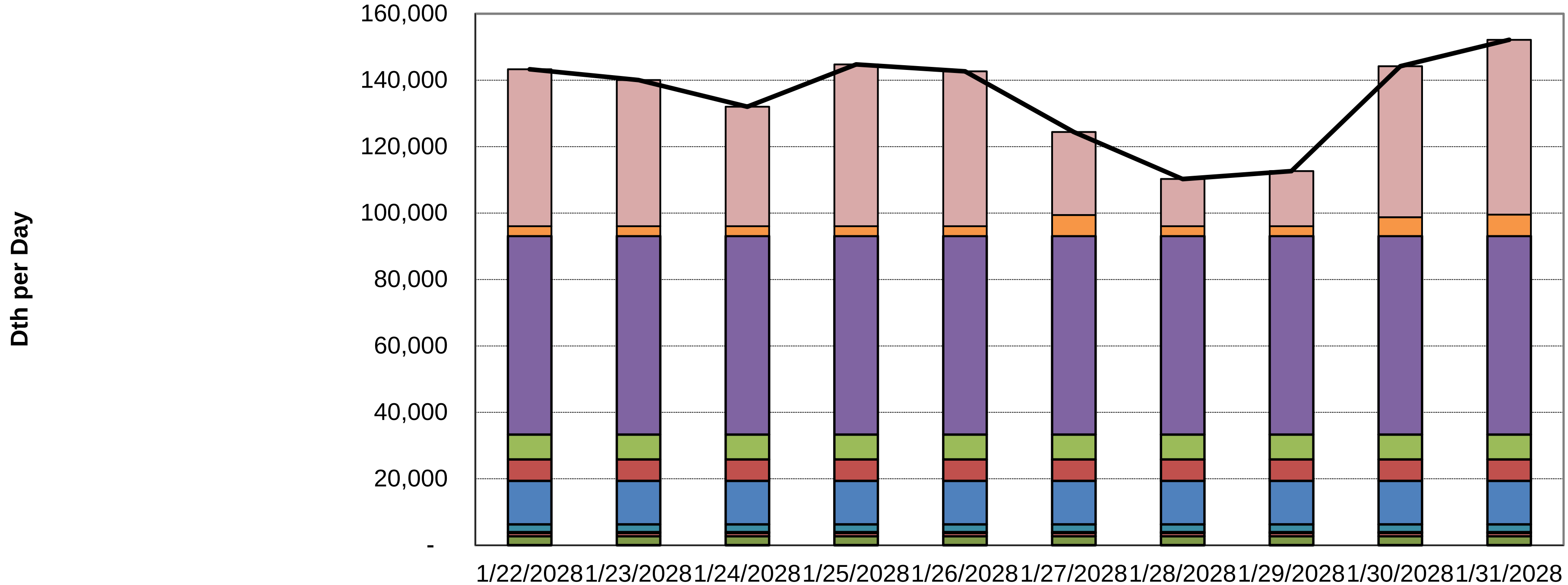
	01/22/26	01/23/26	01/24/26	01/25/26	01/26/26	01/27/26	01/28/26	01/29/26	01/30/26	01/31/26
Incremental Supply	43,023	39,830	32,038	44,439	42,384	24,662	10,892	13,249	43,940	49,268
LNG	2,940	2,940	2,940	2,940	2,940	2,940	2,940	2,940	2,940	6,440
Dawn Hub Storage	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751
AB Ramapo Supply	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Iroquois Receipts	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434
Tennessee Zone 0 and Zone L Pools	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109
Tennessee Niagara	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
Transco Zone 6, non-NY Supply	286	286	286	286	286	286	286	286	286	286
Leidy Hub Supply	965	965	965	965	965	965	965	965	965	965
Tennessee Storage	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644
LNG Boiloff	60	60	60	60	60	60	60	60	60	60
Cold Snap Loads	139,039	135,846	128,054	140,455	138,400	120,677	106,908	109,265	139,956	148,784

2026-2027 Design Winter Cold Snap



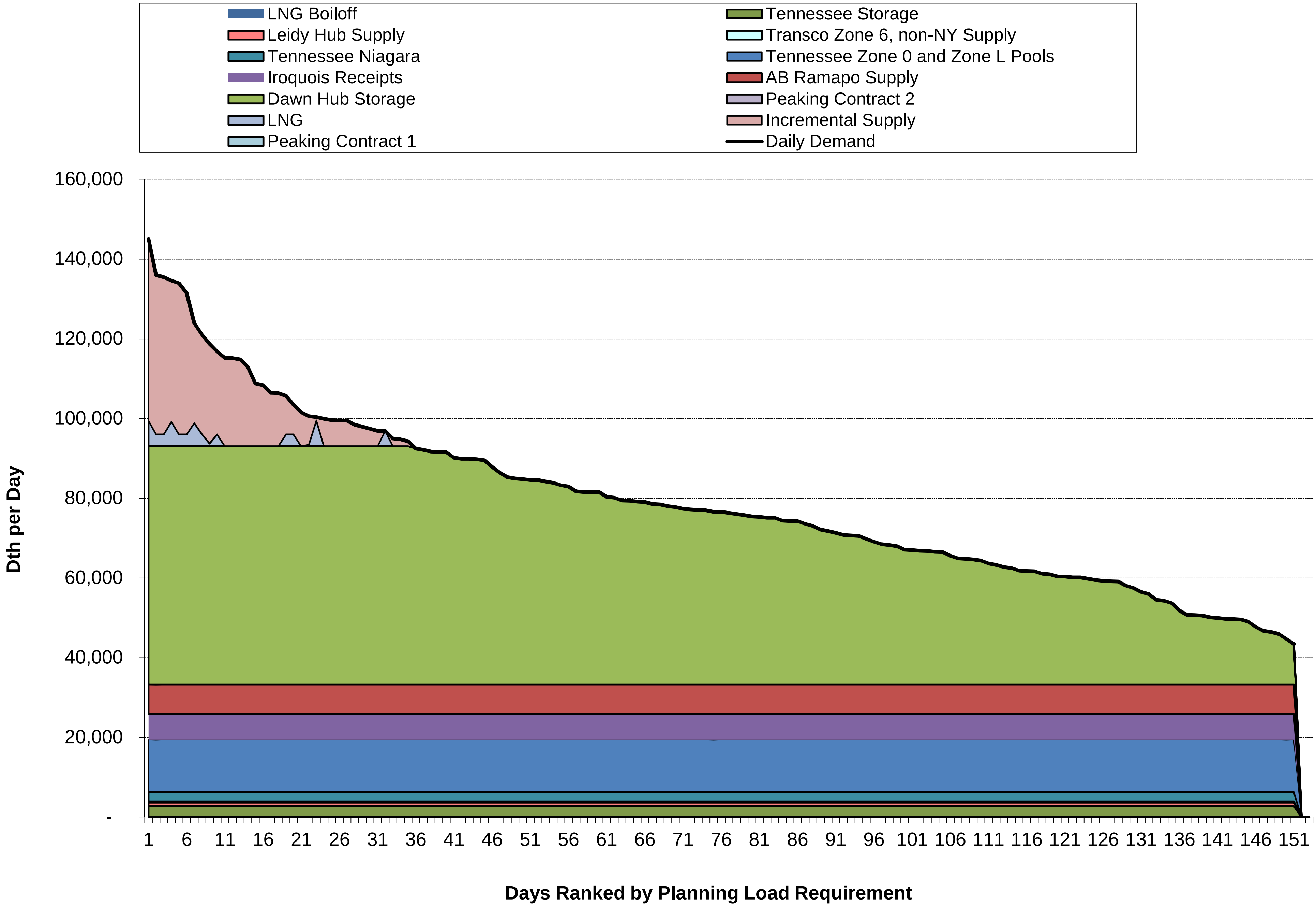
	01/22/27	01/23/27	01/24/27	01/25/27	01/26/27	01/27/27	01/28/27	01/29/27	01/30/27	01/31/27
Incremental Supply	41,620	40,800	34,000	46,564	44,489	25,000	12,539	14,911	46,046	50,951
LNG	6,440	4,036	2,940	2,940	2,940	4,444	2,940	2,940	2,940	6,440
Dawn Hub Storage	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751
Tennessee Zone 0 and Zone L Pools	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109
AB Ramapo Supply	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Iroquois Receipts	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434
Tennessee Niagara	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
Transco Zone 6, non-NY Supply	286	286	286	286	286	286	286	286	286	286
Leidy Hub Supply	965	965	965	965	965	965	965	965	965	965
Tennessee Storage	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644
LNG Boiloff	60	60	60	60	60	60	60	60	60	60
Cold Snap Loads	141,136	137,911	130,015	142,579	140,504	122,520	108,554	110,926	142,061	150,466

2027-2028 Design Winter Cold Snap

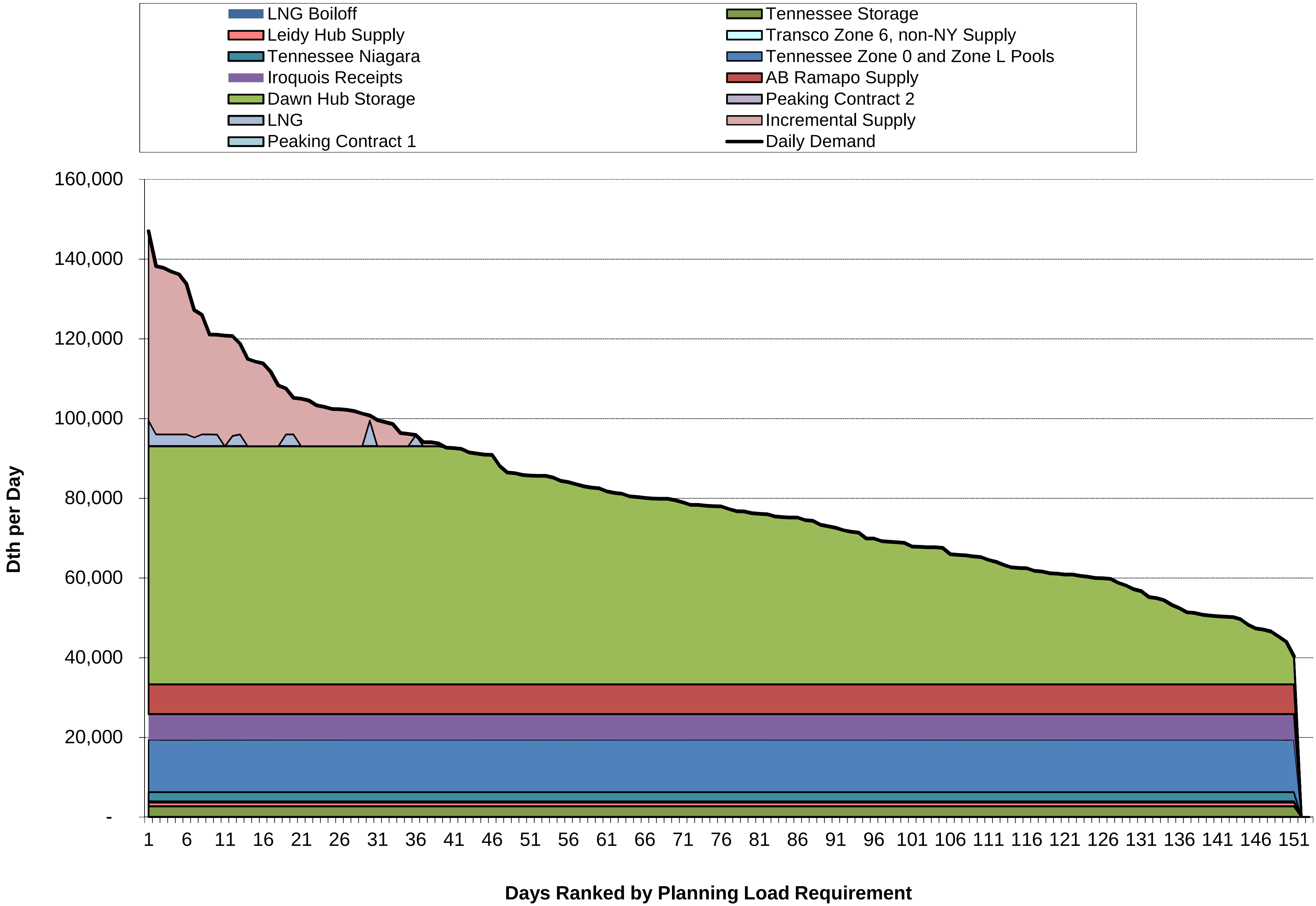


	01/22/28	01/23/28	01/24/28	01/25/28	01/26/28	01/27/28	01/28/28	01/29/28	01/30/28	01/31/28
Incremental Supply	47,259	44,003	36,003	48,731	46,636	25,000	14,220	16,606	45,479	52,633
LNG	2,940	2,940	2,940	2,940	2,940	6,326	2,940	2,940	5,654	6,440
Dawn Hub Storage	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751	59,751
AB Ramapo Supply	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Iroquois Receipts	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434	6,434
Tennessee Zone 0 and Zone L Pools	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109	13,109
Tennessee Niagara	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
Transco Zone 6, non-NY Supply	286	286	286	286	286	286	286	286	286	286
Leidy Hub Supply	965	965	965	965	965	965	965	965	965	965
Tennessee Storage	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644
LNG Boiloff	60	60	60	60	60	60	60	60	60	60
Cold Snap Loads	143,274	140,019	132,018	144,747	142,652	124,401	110,236	112,622	144,209	152,149

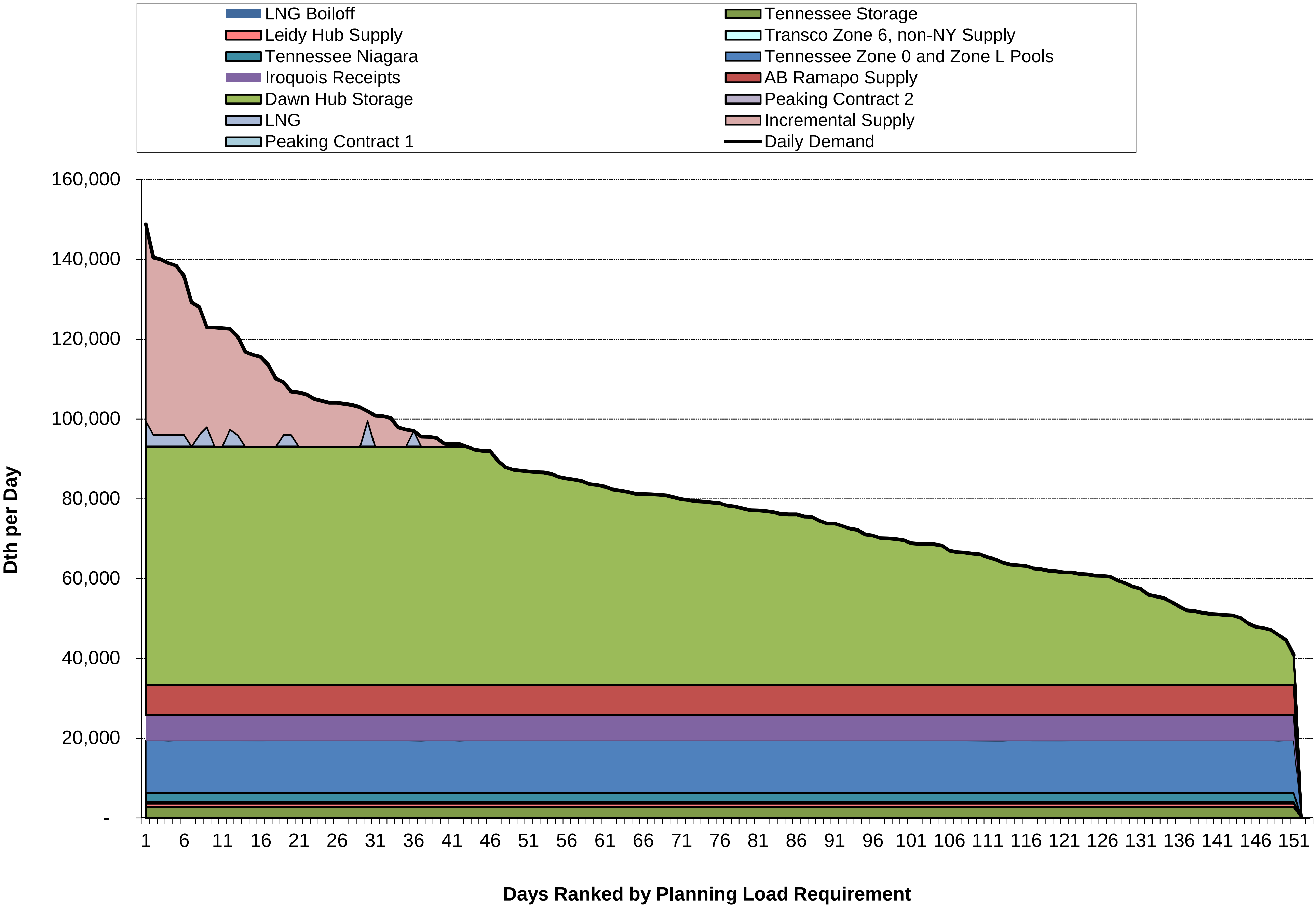
2023-2024 Nov-Mar Design Winter Planning Load Duration Curve



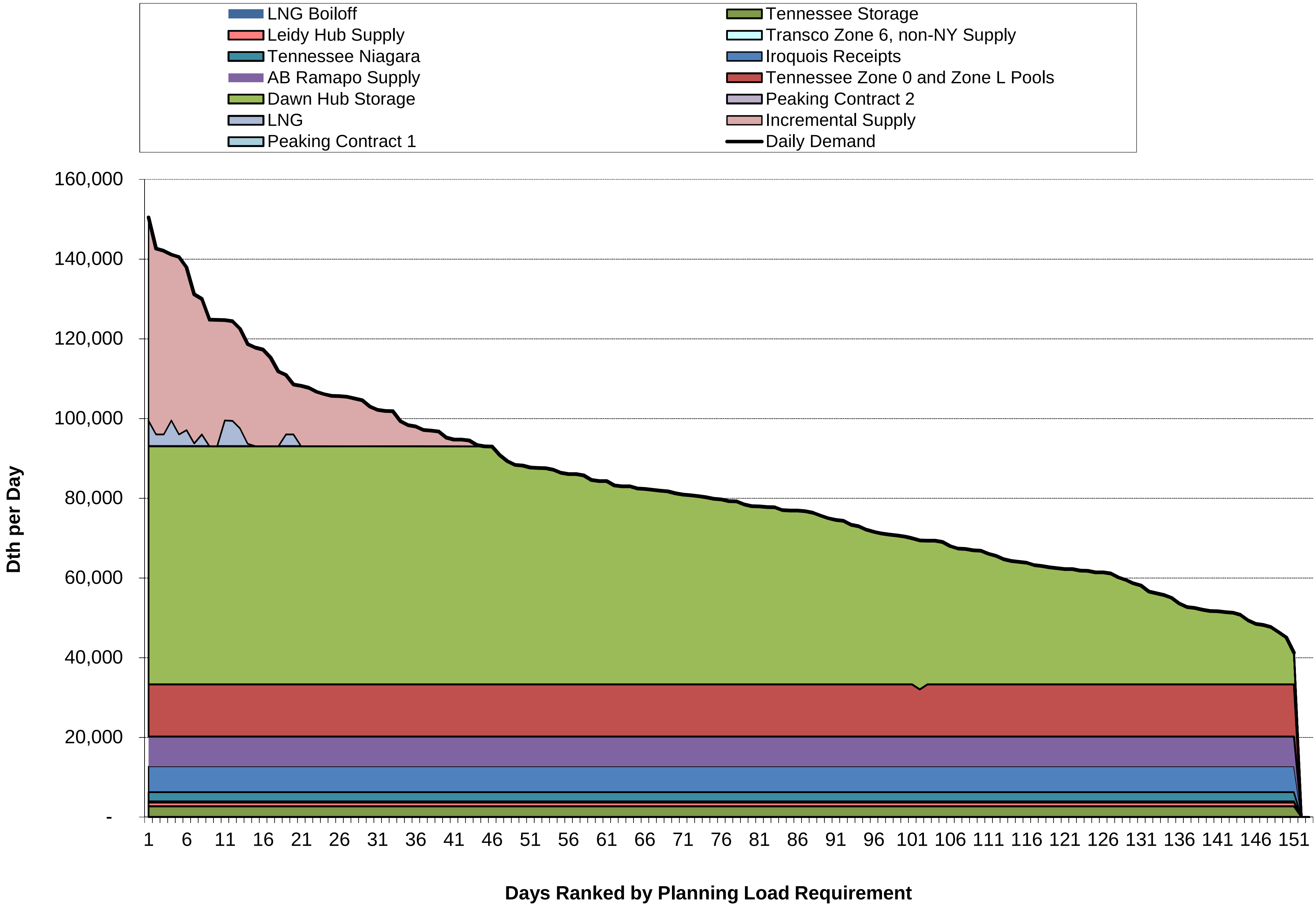
2024-2025 Nov-Mar Design Winter Planning Load Duration Curve



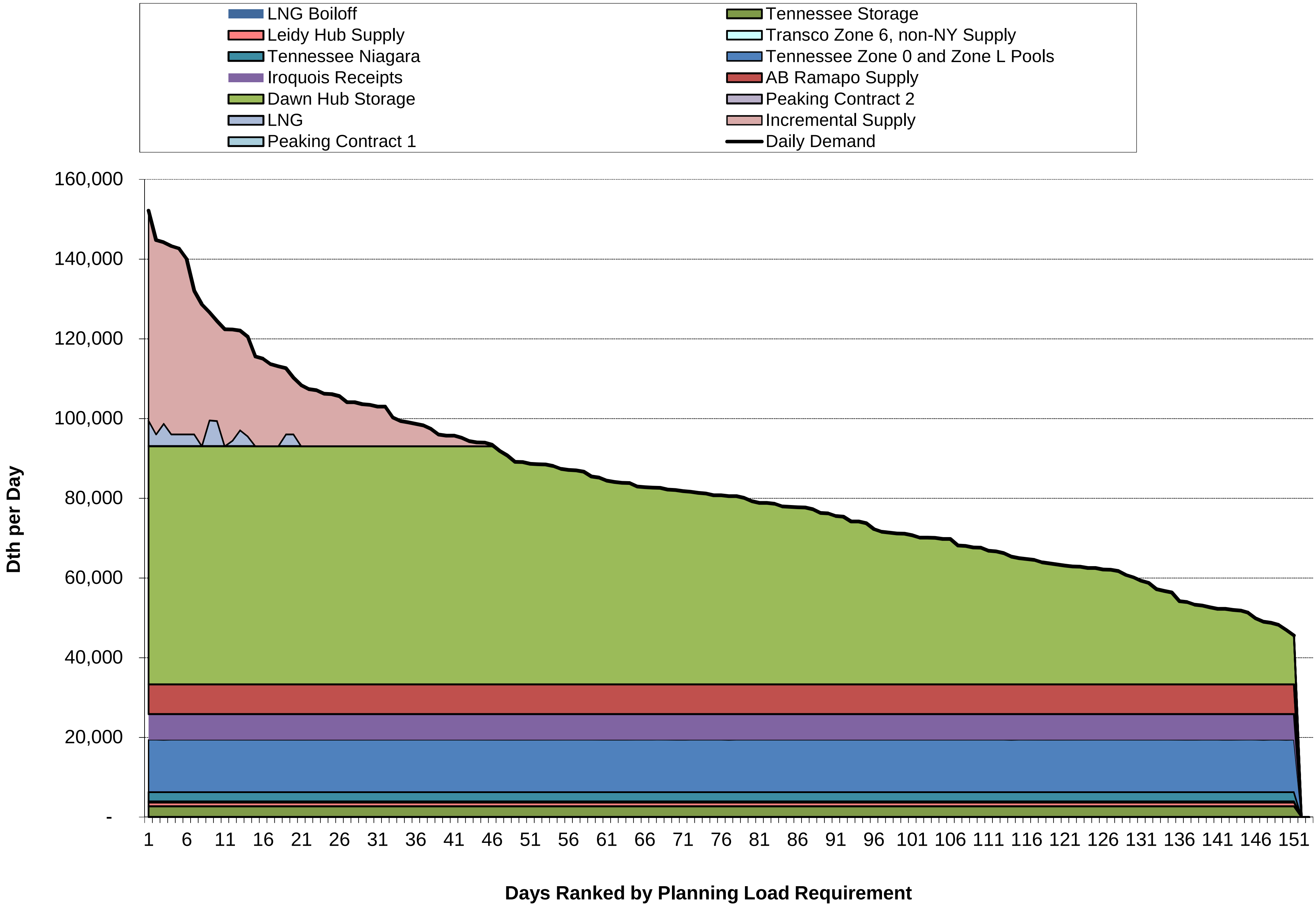
2025-2026 Nov-Mar Design Winter Planning Load Duration Curve



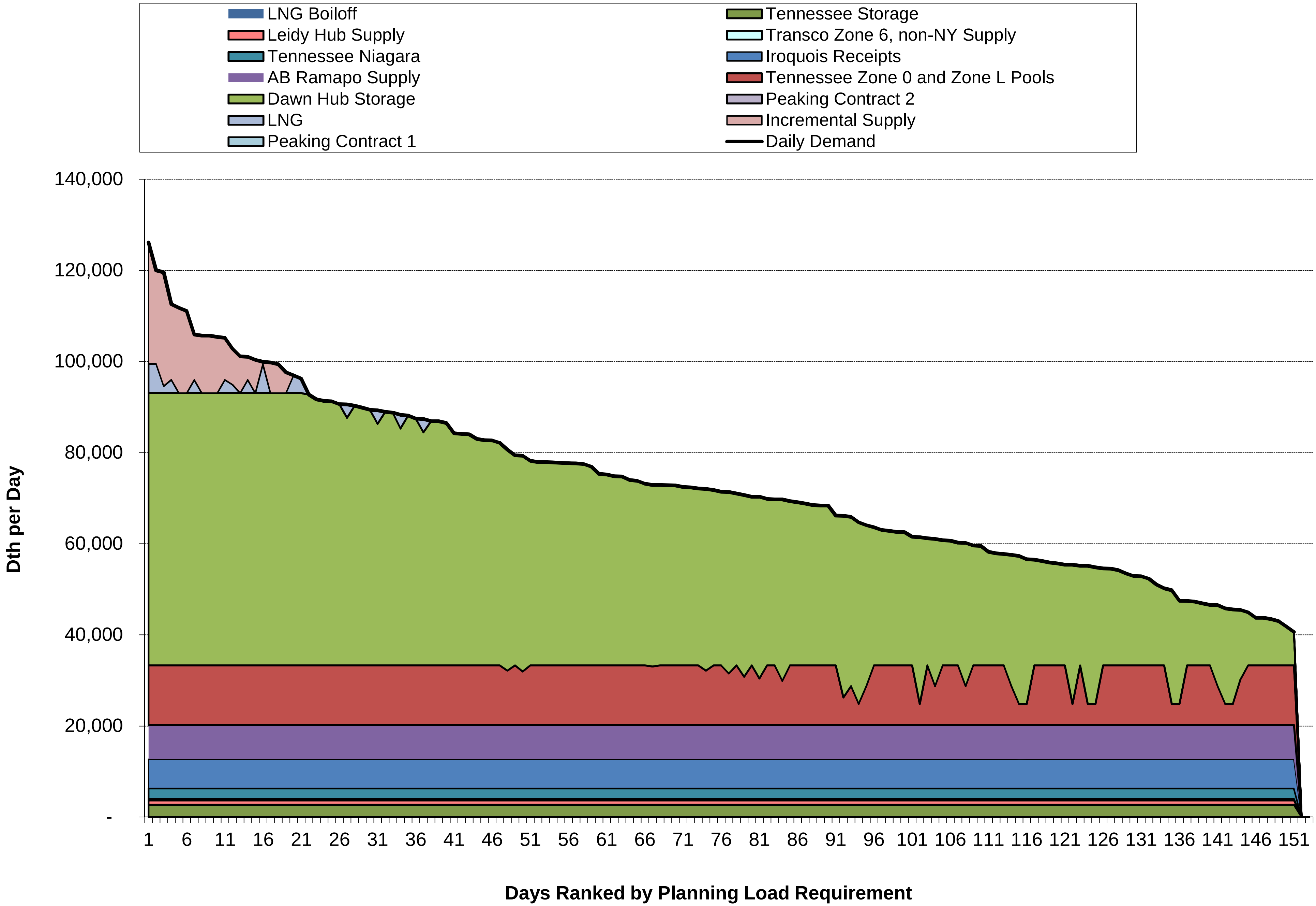
2026-2027 Nov-Mar Design Winter Planning Load Duration Curve



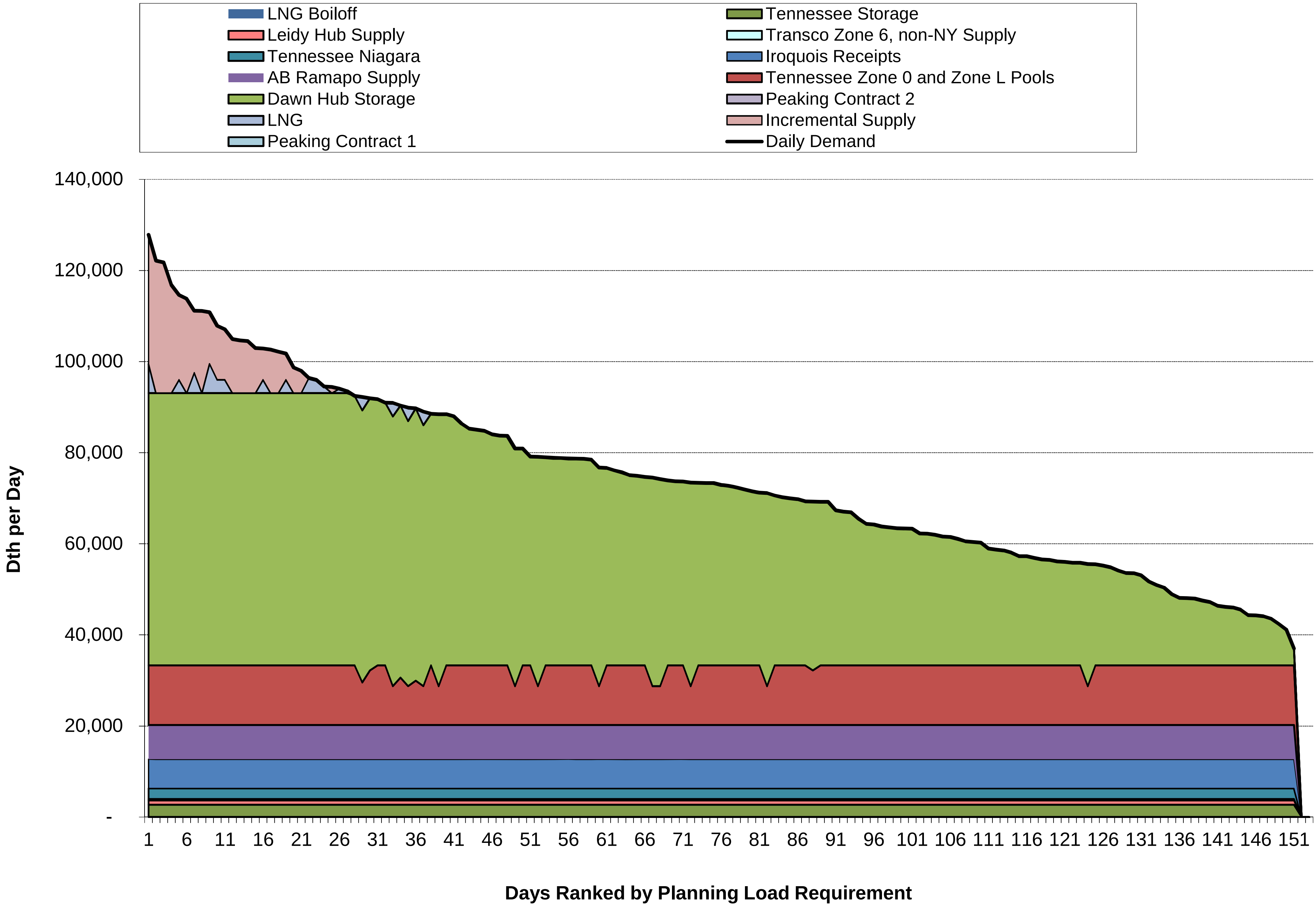
2027-2028 Nov-Mar Design Winter Planning Load Duration Curve



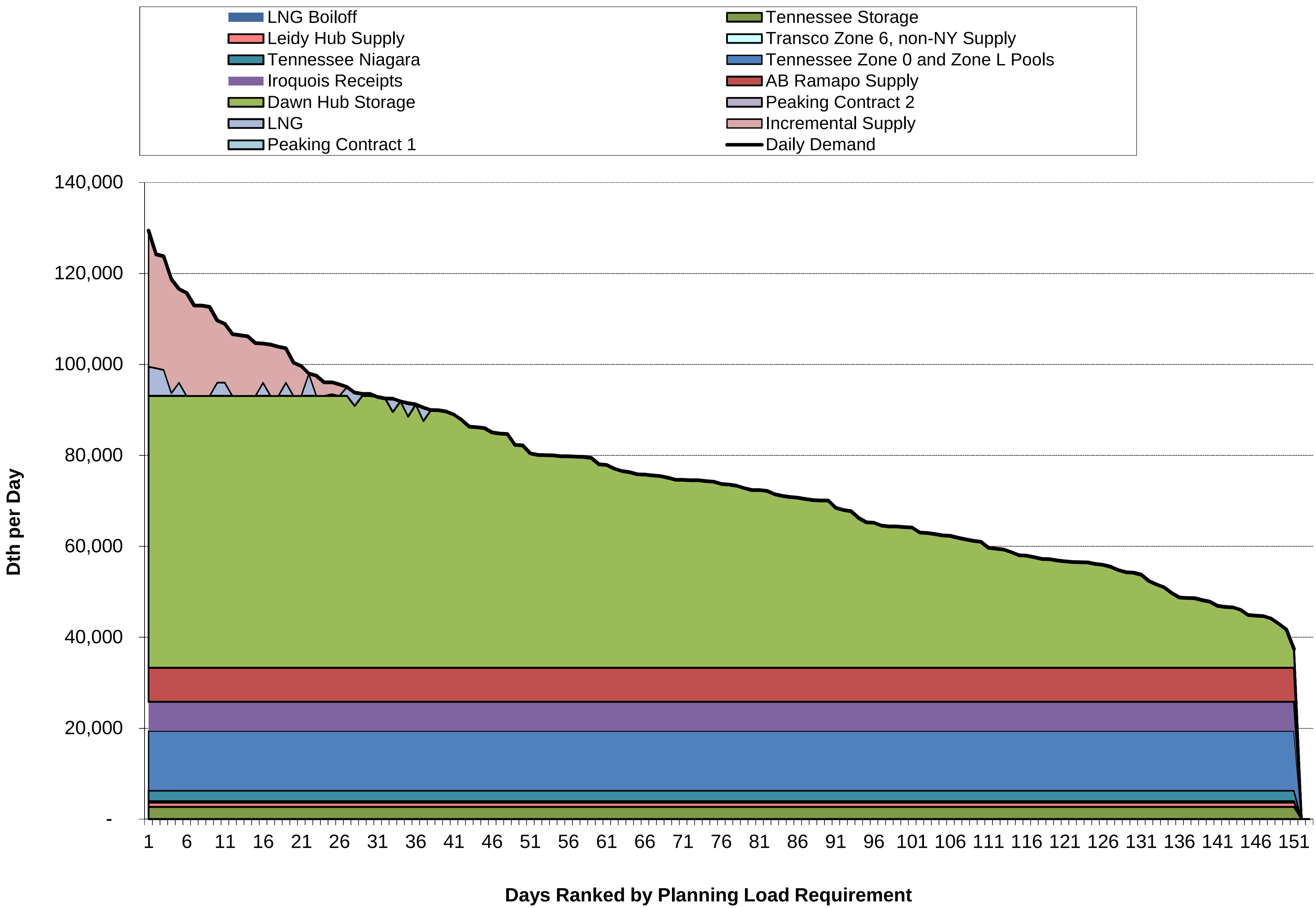
2023-2024 Nov-Mar Normal Winter Planning Load Duration Curve



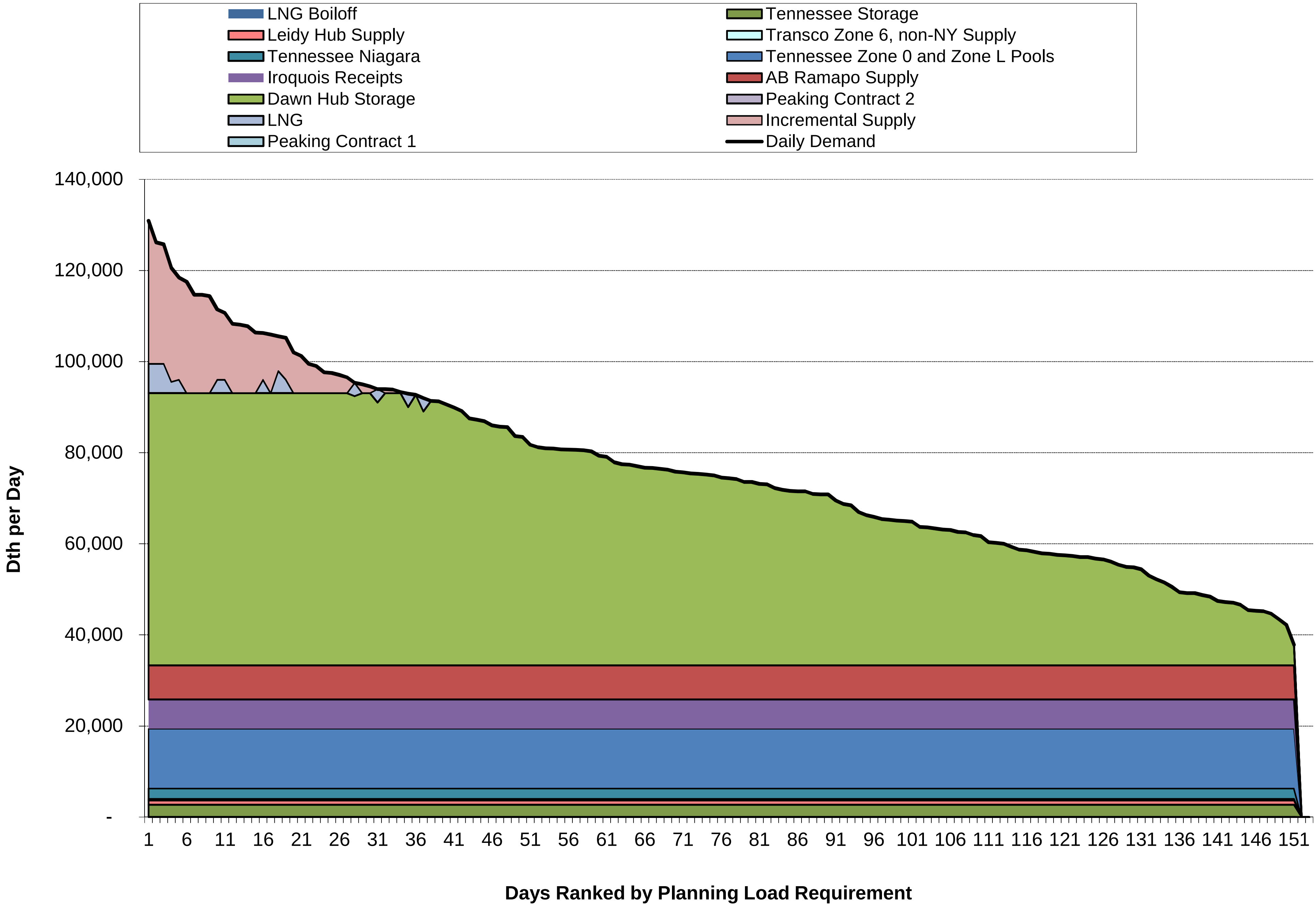
2024-2025 Nov-Mar Normal Winter Planning Load Duration Curve



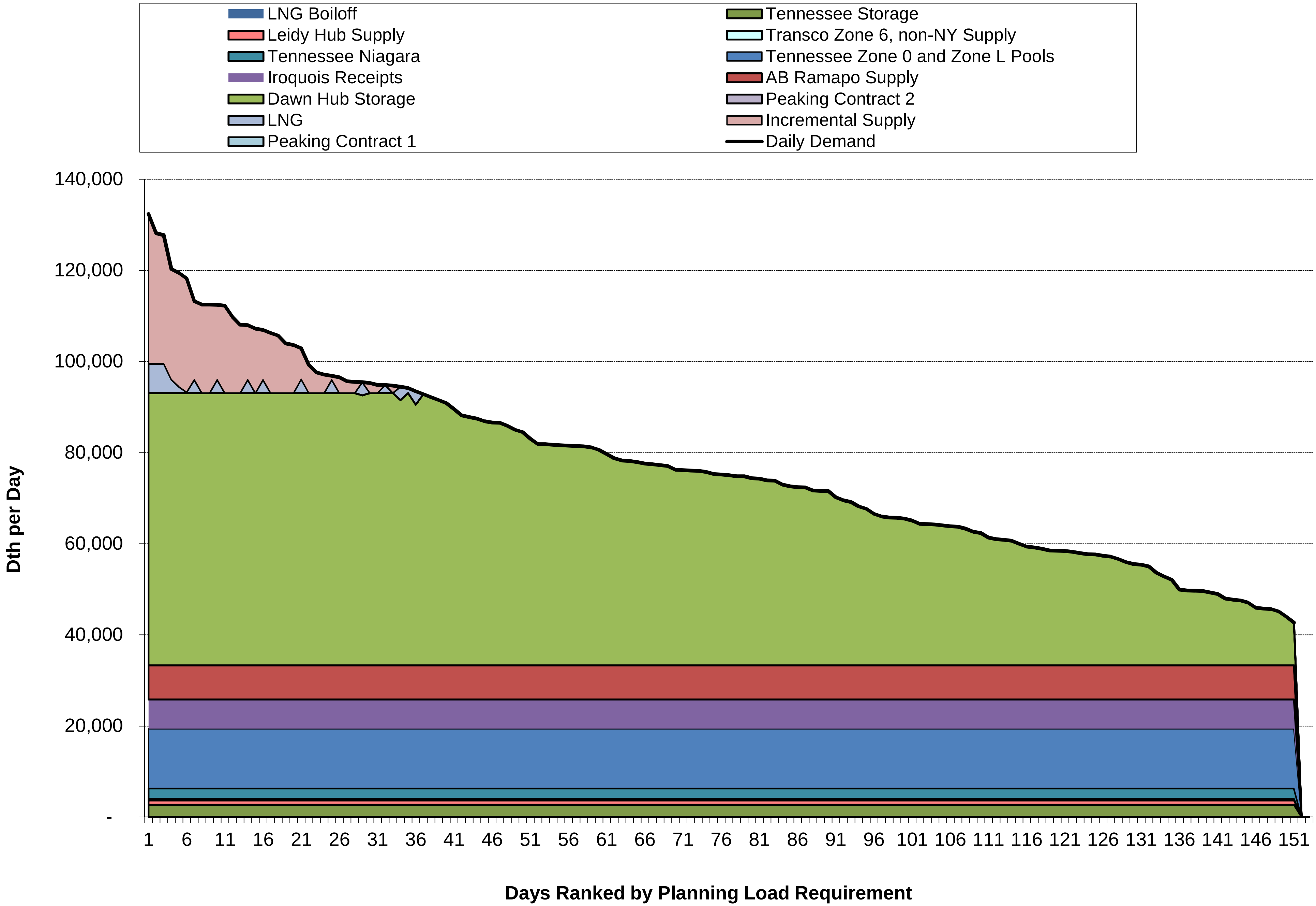
2025-2026 Nov-Mar Normal Winter Planning Load Duration Curve



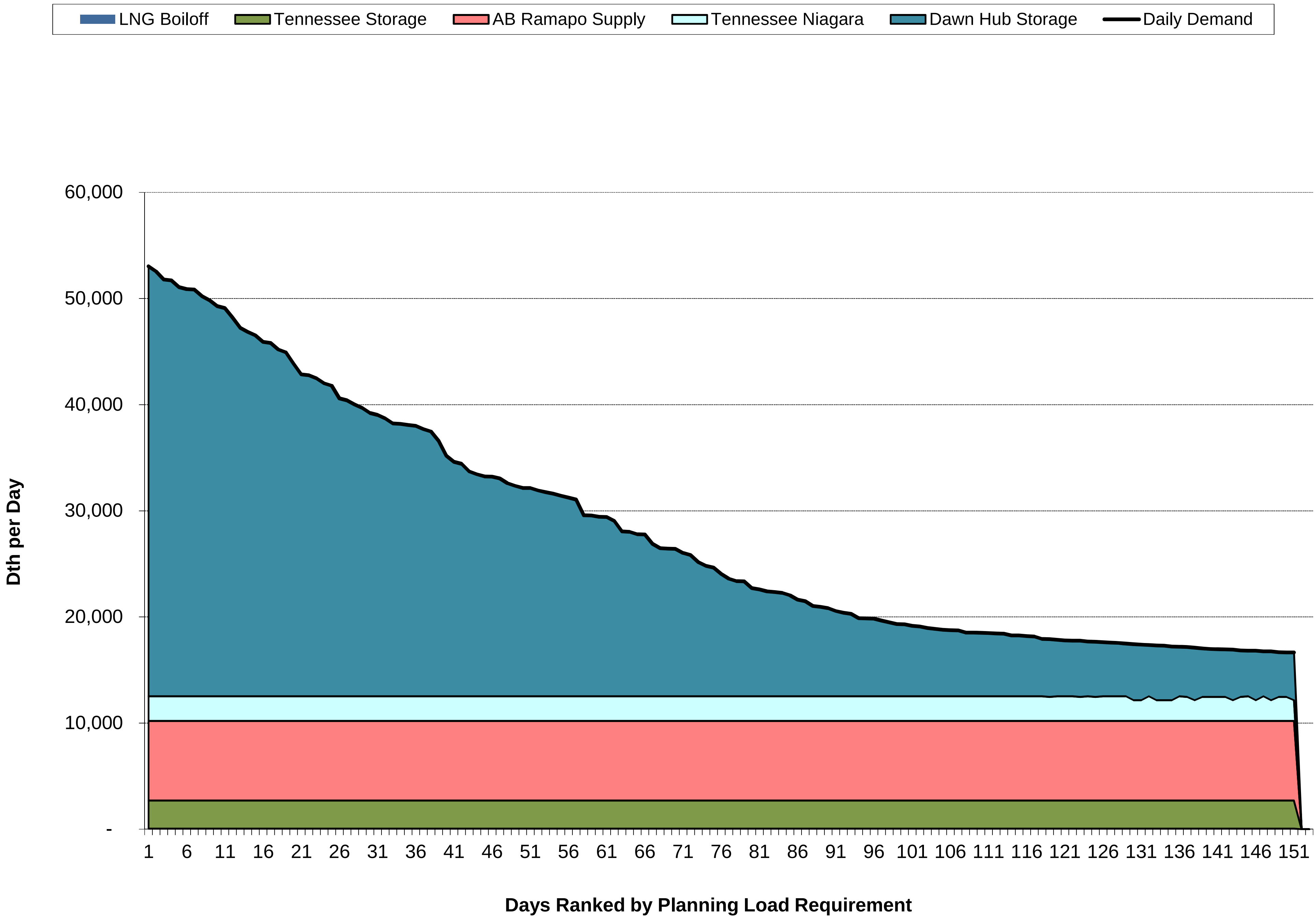
2026-2027 Nov-Mar Normal Winter Planning Load Duration Curve

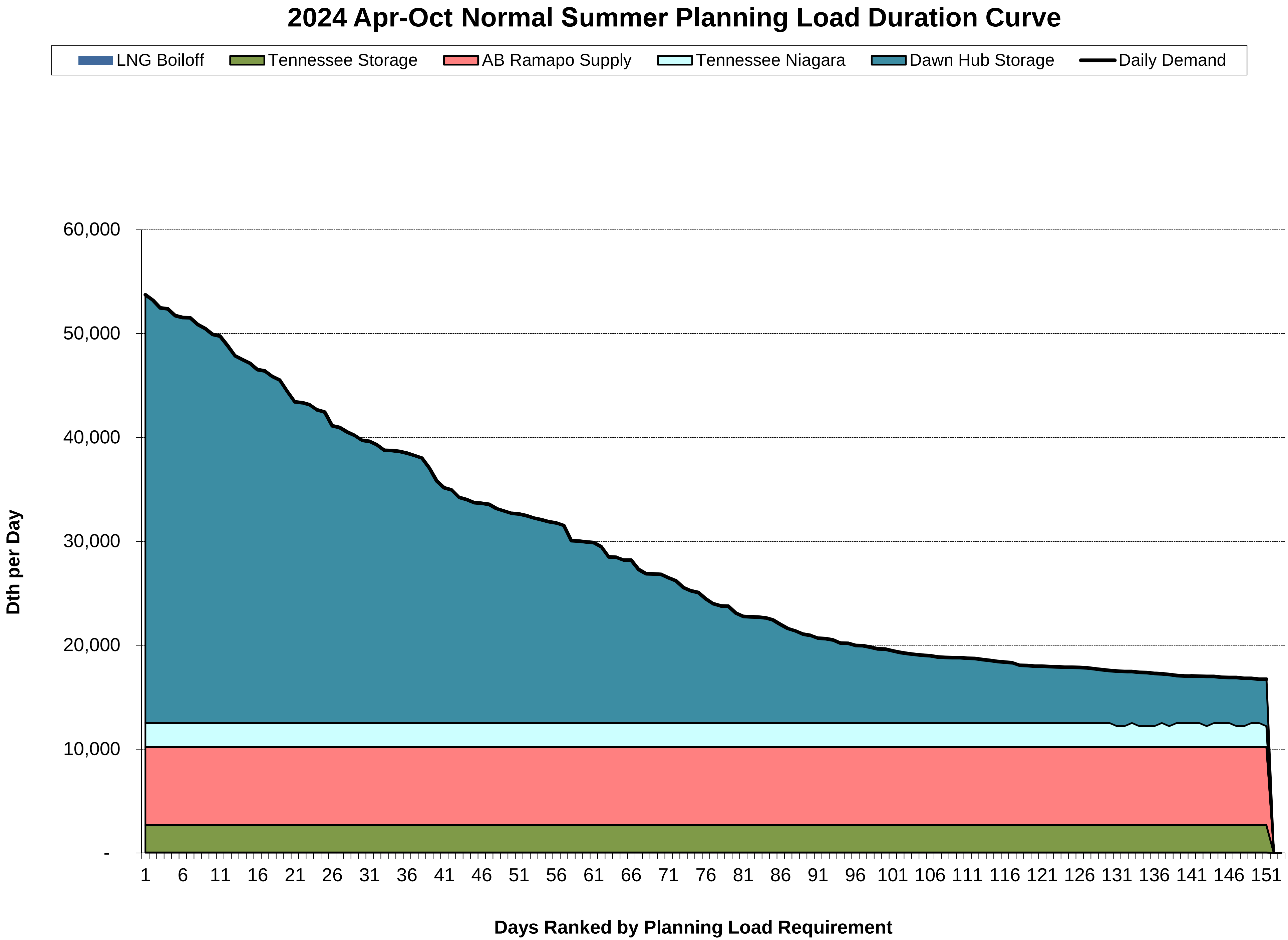


2027-2028 Nov-Mar Normal Winter Planning Load Duration Curve

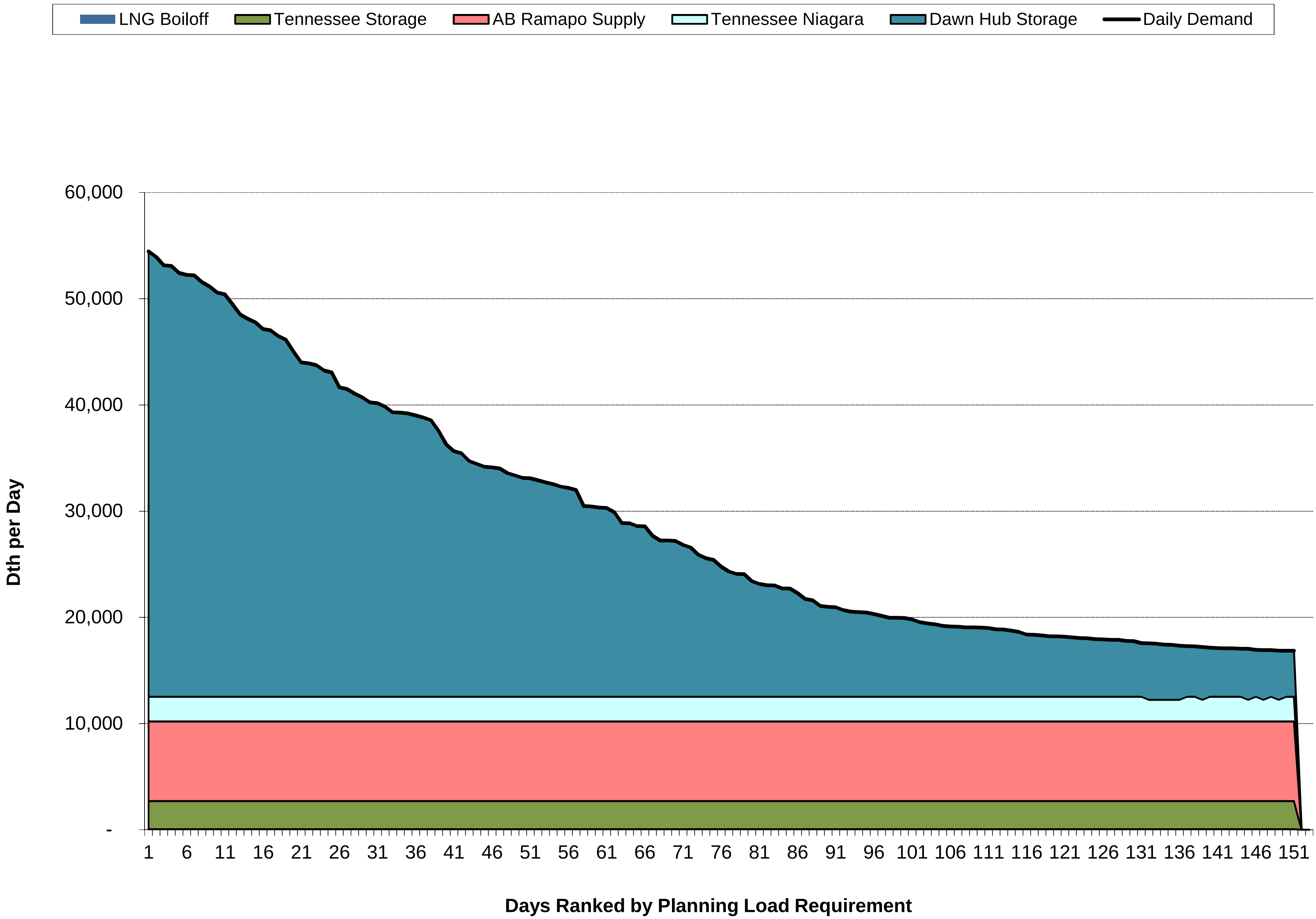


2023 Apr-Oct Normal Summer Planning Load Duration Curve

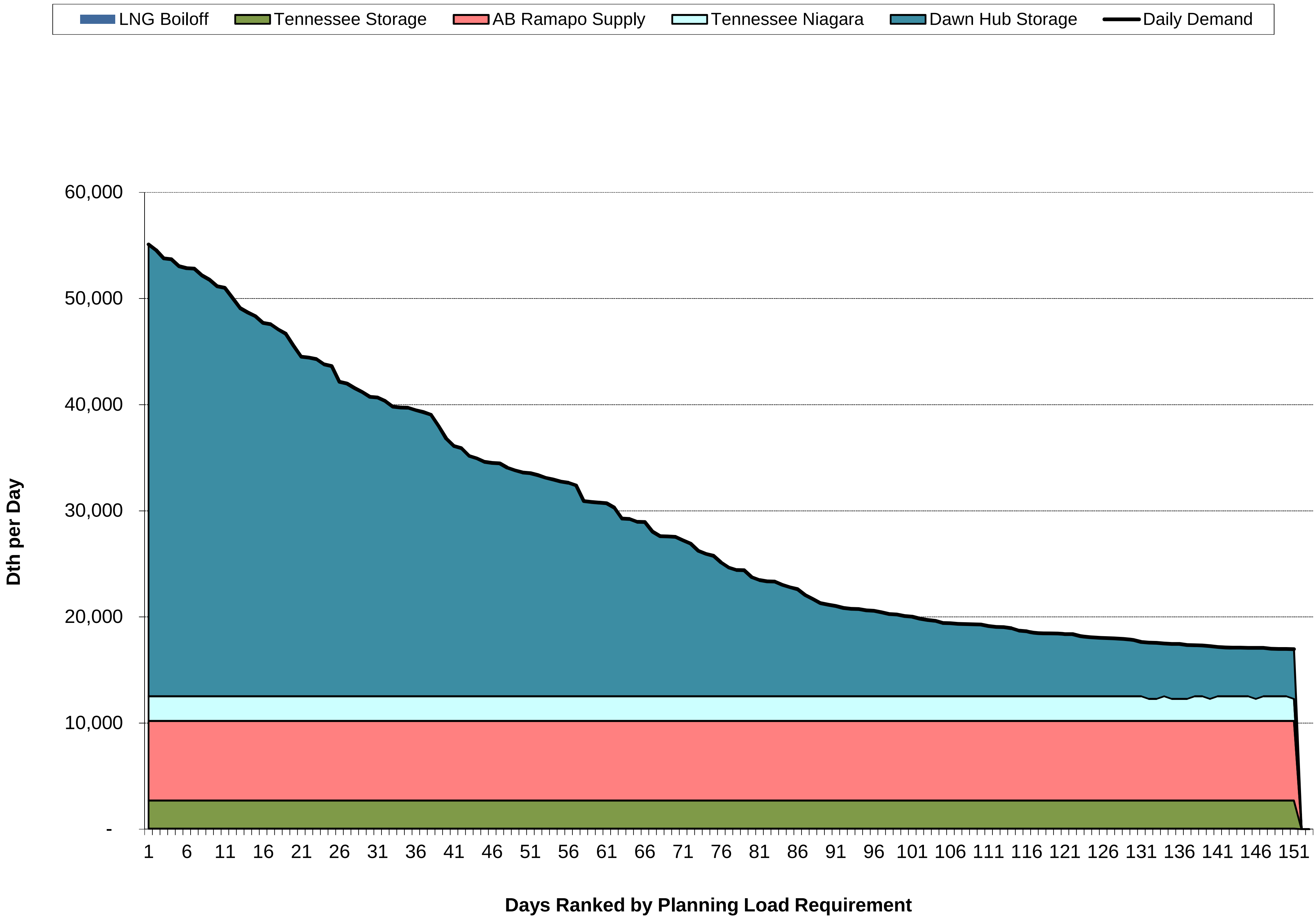



2024 Apr-Oct Normal Summer Planning Load Duration Curve
LNG Boiloff
Tennessee Storage
AB Ramapo Supply
Tennessee Niagara
Dawn Hub Storage
Daily Demand
Dth per Day
60,000
50,000
40,000
30,000
20,000
10,000
-
1
6
11
16
21
26
31
36
41
46
51
56
61
66
71
76
81
86
91
96
101
106
111
116
121
126
131
136
141
146
151
Days Ranked by Planning Load Requirement

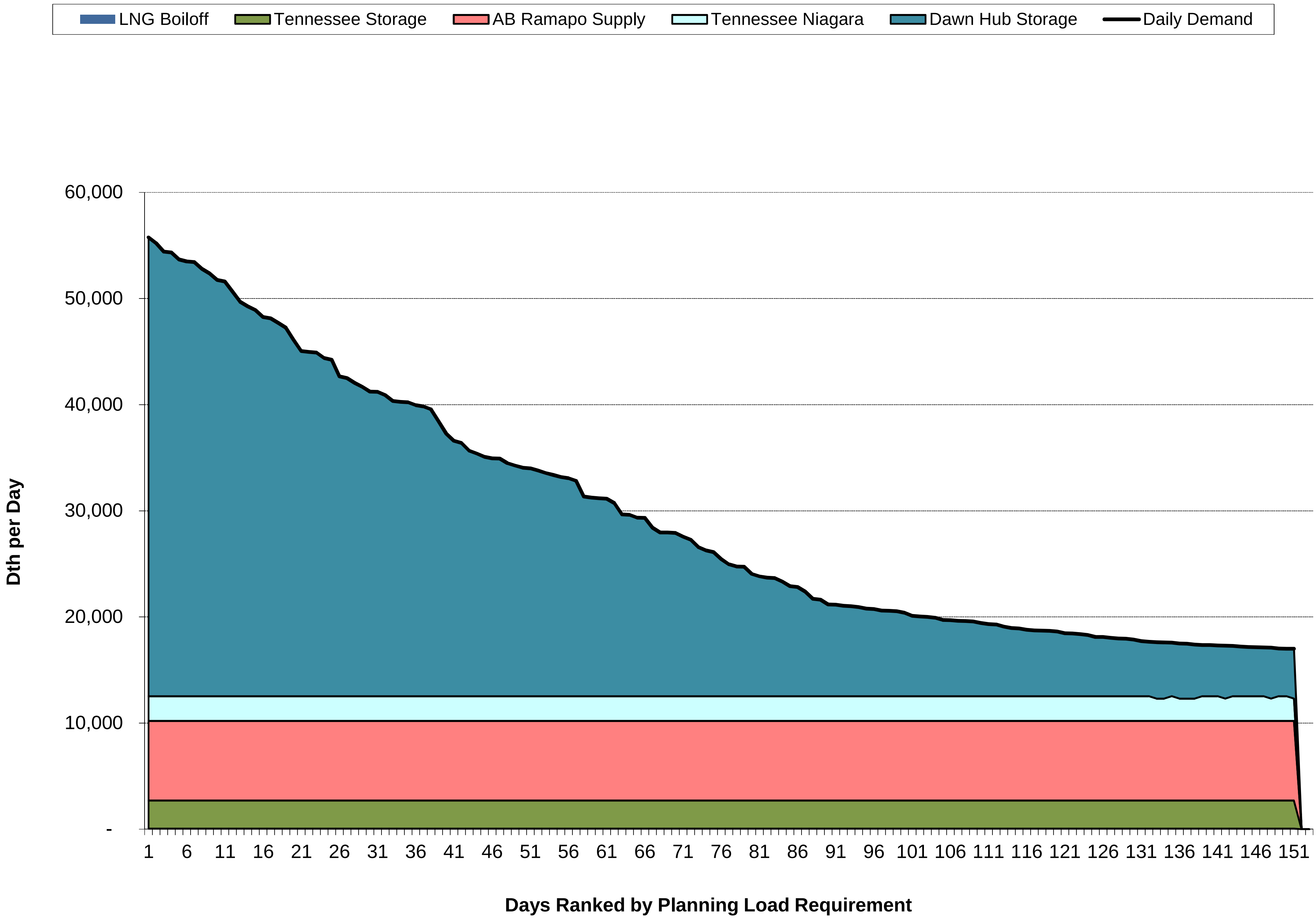
2025 Apr-Oct Normal Summer Planning Load Duration Curve



2026 Apr-Oct Normal Summer Planning Load Duration Curve



2027 Apr-Oct Normal Summer Planning Load Duration Curve



REDACTED

2023-2024 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD DESIGN YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	967,600	967,600	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	838,524	851,619	98%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	190,152	457,866	42%	[redacted]	[redacted]	[redacted]
4	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,992,562	4,797,878	42%	[redacted]	[redacted]	[redacted]
5	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,745,000	2,745,000	100%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,825,681	21,884,234	40%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	977,975	2,354,861	42%	[redacted]	[redacted]	[redacted]
8	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	556,233	NA	NA	[redacted]	[redacted]	[redacted]
9	Lewiston LNG	[redacted]	[redacted]	75,240	75,000	100%	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,612,733	34,059,058	49%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	17,168,966	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2024-2025 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD DESIGN YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	964,956	964,956	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	839,589	849,292	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	188,901	456,615	41%	[redacted]	[redacted]	[redacted]
4	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,979,453	4,784,769	41%	[redacted]	[redacted]	[redacted]
5	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,737,500	2,737,500	100%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,974,397	21,824,441	41%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	971,541	2,348,427	41%	[redacted]	[redacted]	[redacted]
8	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	672,537	NA	NA	[redacted]	[redacted]	[redacted]
9	Lewiston LNG	[redacted]	[redacted]	74,760	75,000	100%	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,731,097	33,966,000	49%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	17,403,633	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2025-2026 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD DESIGN YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	964,956	964,956	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	840,549	849,292	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	188,901	456,615	41%	[redacted]	[redacted]	[redacted]
4	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,737,500	2,737,500	100%	[redacted]	[redacted]	[redacted]
5	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,979,453	4,784,769	41%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	9,128,228	21,824,441	42%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	971,541	2,348,427	41%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,000	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	742,051	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,886,128	34,041,000	50%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	17,628,179	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2026-2027 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD DESIGN YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	964,956	964,956	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	841,336	849,292	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	188,901	456,615	41%	[redacted]	[redacted]	[redacted]
4	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,737,500	2,737,500	100%	[redacted]	[redacted]	[redacted]
5	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,978,154	4,784,769	41%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	9,271,564	21,824,441	42%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	971,541	2,348,427	41%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,000	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	811,899	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	17,028,952	34,041,000	50%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	17,840,851	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2027-2028 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD DESIGN YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	967,600	967,600	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	844,407	851,619	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	190,152	457,866	42%	[redacted]	[redacted]	[redacted]
4	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,745,000	2,745,000	100%	[redacted]	[redacted]	[redacted]
5	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,992,562	4,797,878	42%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	9,436,887	21,884,234	43%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	977,975	2,354,861	42%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,240	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	824,692	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	17,229,821	34,134,058	50%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	18,054,513	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2023-2024 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD NORMAL YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	967,600	967,600	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	838,560	851,619	98%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	190,152	457,866	42%	[redacted]	[redacted]	[redacted]
4	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,838,138	4,797,878	38%	[redacted]	[redacted]	[redacted]
5	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,745,000	2,745,000	100%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,362,483	21,884,234	38%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	977,975	2,354,861	42%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,240	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	228,515	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	15,995,148	34,134,058	47%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	16,223,663	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2024-2025 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD NORMAL YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	964,956	964,956	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	839,625	849,292	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	188,901	456,615	41%	[redacted]	[redacted]	[redacted]
4	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,912,306	4,784,769	40%	[redacted]	[redacted]	[redacted]
5	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,737,500	2,737,500	100%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,457,328	21,824,441	39%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	971,541	2,348,427	41%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	74,760	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	302,953	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,146,917	34,041,000	47%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	16,449,870	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2025-2026 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD NORMAL YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	964,956	964,956	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	840,565	849,292	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	188,901	456,615	41%	[redacted]	[redacted]	[redacted]
4	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,737,500	2,737,500	100%	[redacted]	[redacted]	[redacted]
5	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,979,453	4,784,769	41%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,556,910	21,824,441	39%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	971,541	2,348,427	41%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,000	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	350,629	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,314,826	34,041,000	48%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	16,665,455	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2026-2027 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD NORMAL YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	964,956	964,956	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	841,352	849,292	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	188,901	456,615	41%	[redacted]	[redacted]	[redacted]
4	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,737,500	2,737,500	100%	[redacted]	[redacted]	[redacted]
5	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,979,453	4,784,769	41%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,710,491	21,824,441	40%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	971,541	2,348,427	41%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,000	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	400,206	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,469,193	34,041,000	48%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	16,869,399	NA	NA	[redacted]	[redacted]	[redacted]

REDACTED

2027-2028 Annual City Gate Cost, Delivered Volumes and Unit Cost - PLANNING LOAD NORMAL YEAR
CURRENT Long-Term Portfolio

Total Unit Cost Rank	Supply Source	City-Gate Commodity Costs ($)	City-Gate Unit Commodity Cost ($/Dth)	City-Gate Volumes (Dth)	Maximum City-Gate Volumes (Dth)	Capacity Factor (City-Gate / Maximum Volumes)	Demand Cost ($)	Total Cost ($)	City-Gate Total Unit Cost ($/Dth)
1	Tennessee FS-MA Storage Path	[redacted]	[redacted]	967,600	967,600	100%	[redacted]	[redacted]	[redacted]
2	Tennessee Niagara Pipeline Path	[redacted]	[redacted]	844,422	851,619	99%	[redacted]	[redacted]	[redacted]
3	Algonquin Receipts Pipeline Path	[redacted]	[redacted]	190,152	457,866	42%	[redacted]	[redacted]	[redacted]
4	Atlantic Bridge Ramapo Pipeline Path	[redacted]	[redacted]	2,745,000	2,745,000	100%	[redacted]	[redacted]	[redacted]
5	Tennessee Long-Haul Pipeline Path	[redacted]	[redacted]	1,992,562	4,797,878	42%	[redacted]	[redacted]	[redacted]
6	Union Dawn Storage Path	[redacted]	[redacted]	8,872,713	21,884,234	41%	[redacted]	[redacted]	[redacted]
7	Iroquois Receipts Pipeline Path	[redacted]	[redacted]	977,975	2,354,861	42%	[redacted]	[redacted]	[redacted]
8	Lewiston LNG	[redacted]	[redacted]	75,240	75,000	100%	[redacted]	[redacted]	[redacted]
9	Off-System Peaking / Incremental Supply	[redacted]	[redacted]	408,742	NA	NA	[redacted]	[redacted]	[redacted]
	Long-Term Portfolio Supplies	[redacted]	[redacted]	16,665,664	34,134,058	49%	[redacted]	[redacted]	[redacted]
	Total Supplies - Including Off-System / Incremental Supply	[redacted]	[redacted]	17,074,405	NA	NA	[redacted]	[redacted]	[redacted]

Appendix 6, New Hampshire RSA 378:37-40

TITLE XXXIV
PUBLIC UTILITIES

CHAPTER 378
RATES AND CHARGES

Least Cost Energy Planning

Section 378:37

378:37 New Hampshire Energy Policy. – The general court declares that it shall be the energy policy of this state to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; to maximize the use of cost effective energy efficiency and other demand side resources; and to protect the safety and health of the citizens, the physical environment of the state, and the future supplies of resources, with consideration of the financial stability of the state's utilities.

Source. 1990, 226:1, eff. Jan. 1, 1991. 2014, 129:1, eff. Aug. 15, 2014.

TITLE XXXIV
PUBLIC UTILITIES

CHAPTER 378
RATES AND CHARGES

Least Cost Energy Planning

Section 378:38

378:38 Submission of Plans to the Commission. –
Pursuant to the policy established under RSA 378:37, each electric and natural gas utility, under RSA 362:2, shall file a least cost integrated resource plan with the commission within 2 years of the commission's final order regarding the utility's prior plan, and in all cases within 5 years of the filing date of the prior plan. Each such plan shall include, but not be limited to, the following, as applicable:
I. A forecast of future demand for the utility's service area.
II. An assessment of demand-side energy management programs, including conservation, efficiency, and load management programs.
III. An assessment of supply options including owned capacity, market procurements, renewable energy, and distributed energy resources.
IV. An assessment of distribution and transmission requirements, including an assessment of the benefits and costs of "smart grid" technologies, and the institution or extension of electric utility programs designed to ensure a more reliable and resilient grid to prevent or minimize power outages, including but not limited to, infrastructure automation and technologies.
V. An assessment of plan integration and impact on state compliance with the Clean Air Act of 1990, as amended, and other environmental laws that may impact a utility's assets or customers.
VI. An assessment of the plan's long- and short-term environmental, economic, and energy price and supply impact on the state.
VII. An assessment of plan integration and consistency with the state energy strategy under RSA 12-P.

Source. 1990, 226:1. 1994, 362:4, eff. June 8, 1994. 2014, 129:1, eff. Aug. 15, 2014. 2015, 89:3, eff. Aug. 4, 2015. 2021, 91:202, eff. July 1, 2021.

TITLE XXXIV
PUBLIC UTILITIES

CHAPTER 378
RATES AND CHARGES

Least Cost Energy Planning

Section 378:38-a

378:38-a Waiver by Commission. – The commission, by order, may waive for good cause any requirement under RSA 378:38, upon written request by a utility.

Source. 1997, 298:14, eff. June 20, 1997. 2014, 129:1, eff. Aug. 15, 2014.

TITLE XXXIV
PUBLIC UTILITIES

CHAPTER 378
RATES AND CHARGES

Least Cost Energy Planning

Section 378:39

378:39 Commission Evaluation of Plans. –
The commission shall review integrated least-cost resource plans in order to evaluate the consistency of each utility's plan with this subdivision, in an adjudicative proceeding. In deciding whether or not to approve the utility's plan, the commission shall consider potential environmental, economic, and health-related impacts of each proposed option. The commission is encouraged to consult with appropriate state and federal agencies, alternative and renewable fuel industries, and other organizations in evaluating such impacts. The commission's approval of a utility's plan shall not be deemed a pre-approval of any actions taken or proposed by the utility in implementing the plan. Where the commission determines the options have equivalent financial costs, equivalent reliability, and equivalent environmental, economic, and health-related impacts, the following order of energy policy priorities shall guide the commission's evaluation:
I. Energy efficiency and other demand-side management resources;
II. Renewable energy sources, including renewable natural gas as defined in RSA 362-I;
III. All other energy sources.

Source. 1990, 226:1. 1994, 362:5, eff. June 8, 1994. 2014, 129:1, eff. Aug. 15, 2014. 2022, 279:3, eff. June 24, 2022.

TITLE XXXIV
PUBLIC UTILITIES

CHAPTER 378
RATES AND CHARGES

Least Cost Energy Planning

Section 378:40

378:40 Plans Required. – No rate change shall be approved or ordered with respect to any utility that does not have on file with the commission a plan that has been filed and approved in accordance with the provisions of RSA 378:38 and RSA 378:39. However, nothing contained in this subdivision shall prevent the commission from approving a change, otherwise permitted by statute or agreement, where the utility has made the required plan filing in compliance with RSA 378:38 and the process of review is proceeding in the ordinary course but has not been completed.

Source. 1994, 362:6, eff. June 8, 1994. 2014, 129:1, eff. Aug. 15, 2014.