Northern Indiana Public Service Company LLC

Cause No. 45621

VERIFIED DIRECT TESTIMONY OF MELISSA BARTOS

Q1. Please state your name, business address and title.

A1. My name is Melissa Bartos. My business address is 293 Boston Post Road West, Suite 500, Marlborough, Massachusetts 01752. I am a Vice President at Concentric Energy Advisors ("Concentric").

Q2. On whose behalf are you submitting this direct testimony?

A2. I am submitting this testimony on behalf of Northern Indiana Public Service Company LLC ("NIPSCO" or the "Company").

Q3. Please describe your educational and employment background.

A3. I received a Bachelor of Arts in Mathematics and Psychology with a concentration in Computer Science in 1998 from the College of the Holy Cross in Worcester, Massachusetts. I received a Master of Science degree in Mathematics with a concentration in Statistics in 2003 from the University of Massachusetts at Lowell. My entire career has been in energy consulting. I began my career with Reed Consulting Group, which was later purchased and merged into Navigant Consulting, Inc. I joined what is now Concentric Energy Advisors in 2002. Both firms specialize in consulting for the energy industry.

Q4. What are your responsibilities as a Vice President at Concentric?

A4. In my current position as a Vice President at Concentric, I am responsible for the execution of numerous projects related to the energy industry. I specialize in demand forecasting, rates and regulatory issues and market analysis. My resume is attached as Attachment 16-A.

Q5. Have you previously testified before the Indiana Utility Regulatory Commission (the "Commission") or any other regulatory commission?

A5. I have not previously testified before the Commission, but I have testified before several other state, federal, and Canadian provincial regulatory agencies on dozens of occasions. My testimony list is attached as Attachment 16-B.

Q6. Are you sponsoring any attachments to your direct testimony in this Cause?

A6. Yes. I am sponsoring Attachments 16-A through Attachment 16-D, all of which were prepared by me or under my direction and supervision.

Q7. What is the purpose of your testimony?

A7. The purpose of my direct testimony is to explain how residential and commercial billing month sales for the Historic Base Period (January 1, 2020 through December 31, 2020) are normalized for weather. I also explain the adjustment to unbilled Historic Base Period consumption to reflect the unbilled estimate that would have been made under normal weather conditions. Further, I explain how design day consumption is derived. I also explain the methodology used to develop the forecasted number of customers and usage for the 2021 Budget Period (January 1, 2021 through December 31, 2021) and the Forward Test Year (January 1, 2022 through December 31, 2022).

<u>Weather Normalization of Historic Base Year Billed Volume</u>

Q8. Please explain the weather normalization methodology.

A8. At a high level, actual sales per customer are separated into base use and temperature-sensitive use per customer for each month of the Historic Base Period for the temperature-sensitive residential and commercial classes. Monthly temperature-sensitive use per customer is adjusted by the ratio of normal to actual heating degree days ("HDD") by month to derive normal temperature-sensitive use per customer by month. The monthly normal temperature-sensitive use per customer is added to the base use per customer to arrive at the normal sales per customer. This value is multiplied by the customer count by month to produce monthly normal sales. All calculations are performed on a billing month basis and use billing month sales, the average number of days in the billing cycle, and billing month HDD.

Q9. What data sources do you use for your calculations?

A9. I use the Company's billing records to obtain monthly customer counts and billed sales for the residential and commercial classes for the Historic Base Period. I use temperatures from DTN, a weather consulting service which aggregates National Weather Service weather stations relevant to the Company's service territory, to calculate HDD. I rely on temperature data from four weather stations due to the geographical dispersion of NIPSCO's customers. A weighted average HDD for the Company is calculated using the percent of residential heating customers assigned to each station as a weight for that station.

Q10. How is base usage determined?

A10. Base usage is the portion of usage that is not dependent on weather, i.e., not temperature-sensitive. I assume that there is no temperature sensitive usage in the summer months of July and August, therefore, all usage in July and August is base use and is not affected by the weather normalization process. In addition, the total use per customer per day (Total Use/Customer/Day) for July and August is all base use. If total use per customer per day in September is less than July or August, then I also assume September has no temperature sensitive usage (i.e., September is also assumed to be a base use-only month and not affected by the weather normalization process). The base use per customer per day used to weather normalize the remaining months of the Historic Base Period is calculated by averaging the two lowest observed use per customer per day values from the months of July through September.

Q11. How are monthly sales in the remaining months weather normalized?

A11. The base use per customer per day is multiplied by the number of days ((base use/customer/day)*days in billing cycle) to produce monthly base use per customer. Temperature-sensitive use per customer equals the total use per customer minus the base use per customer. The temperature-sensitive use per customer is normalized for weather by multiplying it by a ratio of normal HDD to actual HDD. Normal use per customer is calculated by adding the base use per customer to the normal temperature-sensitive use per customer. Total monthly normalized usage is generated by multiplying monthly normal use per customer by the monthly customer count. This calculation for the Historic Base Period is prepared separately for residential and commercial customers in Rates 111, 115, 121, and 125, and the results are presented in Attachment 16-C. For non-temperature-sensitive Rates 128 and 138, weather normalized usage is equal to actual usage, and results for these rates are also presented in Attachment 16-C.

Q12. Has the definition of normal weather changed from NIPSCO's last gas rate case?

A12. Yes. In this case, the historical average HDD have been defined as the most recent 20-year history (i.e., 20 years ended December 31, 2020). NIPSCO's last gas rate case filing defined normal weather as the 30-year average (i.e., 30 years ended December 31, 2016). The 20-year average ending December 31, 2020 is 5,990 HDD, while the 30-year average ending December 31, 2020 is 6,027 HDD, resulting in the 20-year average being approximately 0.6% lower than the 30-year average.

Q13. Why is NIPSCO using a 20-year average HDD in the weather

normalization process?

A13. NIPSCO is proposing to use a 20-year average HDD in the weather normalization process for several reasons. First, using a 20-year average is consistent with the methodology used by most of NiSource's other natural gas utilities and is consistent with the definition of normal weather used by several other gas utilities. In addition, an analysis of weather data demonstrates that a rolling 20-year average is generally a better predictor of one-year-ahead HDD and two-year ahead HDD than the 30-year average HDD. The 20-year average HDD is also a more dynamic measure than the 30-year average HDD.

Q14. Please identify the normal weather definition used by each of NiSource's other natural gas utilities.

A14. In addition to NIPSCO, NiSource has five other operating companies– Columbia Gas of Ohio, Columbia Gas of Pennsylvania, Columbia Gas of Virginia, Columbia Gas of Kentucky, and Columbia Gas of Maryland. Four of the five other natural gas utilities use a 20-year normal weather definition for ratemaking purposes (Columbia Gas of Ohio, Columbia Gas of Pennsylvania, Columbia Gas of Kentucky, and Columbia Gas of

Maryland).[1] NIPSCO Gas and Columbia Gas of Virginia are the only NiSource gas utilities that were or are using a 30-year normal weather definition for ratemaking purposes.

Q15. Do other states allow gas utilities to use a 20-year normal weather definition, or less, for ratemaking purposes?

A15. Yes. In addition to Kentucky, Maryland, Ohio, and Pennsylvania, gas utilities in Arizona, Louisiana, Massachusetts, Minnesota, Mississippi, Nebraska, New Mexico, and Oklahoma also use between a 10-year and 20-year average as the definition of normal weather for ratemaking purposes.[2]

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[1] See, for example: Columbia Gas of Ohio, Case Nos. 08-72-GA-AIR, *et al.*, approved December 3, 2008; Columbia Gas of Pennsylvania, Case R-2020-3018835, approved February 19, 2021; Columbia Gas of Kentucky, Case No. 2016-00162, approved December 22, 2016; Columbia Gas of Maryland, Order 89665 issued in Case No. 9644, November 7, 2020.

[2] See, for example: In the Matter of Southwest Gas Corporation, Docket No. G-01551A-19-0055, Direct Testimony of Carla Ayala, May 1, 2019, p. 6; CenterPoint Energy Arkla, Weather Normalization Adjustment Rider WNA, Effective January 1, 2007, p. 1; Massachusetts Department of Public Utilities Order, D.P.U. 17-170 (Boston Gas Company and Colonial Gas Company, d/b/a National Grid), September 28, 2018, p. 66-67; Minnesota Public Utilities Commission Findings of Fact, Conclusions and Order, Docket No. G-008/GR-15-424 (CenterPoint Energy Resources Corp d/b/a CenterPoint Energy Minnesota Gas), June 3, 2016, p. 66-67; CenterPoint Energy Resources Corp d/b/a/ Mississippi Gas, Weather Normalization Adjustment Rider WNA, Definition 1.4.7, November 6, 2018; Nebraska Public Service Commission Order, Application No. NG-0067 (SourceGas Distribution), May 22, 2012, p. 14-15; New Mexico Gas First Revised Rule No. 29, December 29, 2020, p. 2; Centerpoint Energy Resources Corp d/b/a/ CenterPoint Energy Oklahoma Gas, Rider Schedule No. 7 - Weather Normalization Adjustment,

Q16. Please explain your analysis that demonstrates that the 20-year average HDD is generally a better predictor of one-year-ahead and two-year-ahead annual HDD than the 30-year average HDD.

A16. Table 1 compares the actual HDD experienced each year from 1991 through 2020 with the historical average HDD calculated using either the 20-year average or the 30-year average ending the prior year or the second prior year. For example, in the Following Year analysis, the 20-year and 30-year average HDD for the year ending 1990 are used to predict the annual HDD for 1991. In the Two Years Ahead analysis, the 20-year and 30-year average HDD for the year ending 1990 are used to predict the annual HDD for 1992. The error is calculated as the difference between the 20-year or 30-year historical average HDD and the actual HDD for that year. The absolute error is calculated as the absolute value of the difference between the actual HDD and either the 20-year or 30-year average. Table 1 demonstrates that the 20-year average HDD has a lower error and lower absolute error on average when predicting the one-year-ahead and two-years-ahead HDD as compared to the 30-year average HDD.

Definition 7.4.1.

Table 1
Moving Averages as Predictors

	Annual Heating Degree Days			Following Year				Two Years Ahead			
				Error		Absolute Error		Error		Absolute Error	
	Actual	20-yr Average	30-yr Average	20-yr Average	30-yr Average	20-yr Average	30-yr Average	20-yr Average	30-yr Average	20-yr Average	30-yr Average
1990		6201	6294								
1991	5679	6182	6268	522	615	522	615				
1992	6081	6151	6251	101	187	101	187	120	213	120	213
1993	6325	6195	6239	-174	-74	174	74	-143	-57	143	57
1994	6089	6200	6237	106	150	106	150	62	162	62	162
1995	6374	6223	6243	-174	-137	174	137	-179	-135	179	135
1996	6715	6237	6247	-492	-472	492	472	-515	-478	515	478
1997	6638	6257	6248	-401	-391	401	391	-415	-395	415	395
1998	5118	6169	6203	1139	1130	1139	1130	1119	1129	1119	1129
1999	5776	6129	6177	393	427	393	427	481	472	481	472
2000	6227	6121	6168	-98	-50	98	50	-58	-24	58	24
2001	5683	6097	6155	438	485	438	485	446	494	446	494
2002	6006	6082	6132	91	149	91	149	115	162	115	162
2003	6390	6099	6164	-308	-258	308	258	-293	-235	293	235
2004	6033	6092	6166	66	131	66	131	49	99	49	99
2005	6137	6088	6173	-45	29	45	29	-38	27	38	27
2006	5549	6060	6143	539	624	539	624	543	617	543	617
2007	5927	6067	6133	133	216	133	216	161	246	161	246
2008	6464	6067	6119	-397	-331	397	331	-404	-321	404	321
2009	6293	6050	6110	-226	-174	226	174	-226	-160	226	160
2010	6001	6075	6097	49	109	49	109	66	118	66	118
2011	6054	6094	6093	21	43	21	43	-4	56	4	56
2012	5207	6050	6056	887	886	887	886	868	890	868	890
2013	6426	6055	6069	-376	-370	376	370	-332	-333	332	333
2014	7097	6106	6100	-1042	-1028	1042	1028	-1047	-1041	1047	1041
2015	6044	6089	6094	62	56	62	56	11	25	11	25
2016	5629	6035	6078	460	465	460	465	477	471	477	471
2017	5417	5974	6066	618	661	618	661	672	677	672	677
2018	6060	6021	6052	-86	6	86	6	-25	18	25	18
2019	6024	6033	6032	-3	28	3	28	-50	42	50	42
2020	5668	6005	6038	365	364	365	364	353	384	353	384
			Average	72	116	327	335	63	108	320	327

Q17. Please explain your analysis that demonstrates that the 20-year average HDD is more dynamic than the 30-year average HDD.

A17. Table 2 demonstrates that the average annual absolute change for the 20-year average HDD is 0.4%, while the average annual absolute change for the 30-year average is 0.2%. However, both are much more stable than the annual HDD, which has an average annual absolute change of 7.5%. In addition, the maximum annual absolute change for the 20-year average is 1.4%, while the maximum annual absolute change for the 30-year average is 0.7%, and the maximum annual absolute change for the annual HDD is 23.4%. The 20-year normal HDD is a more dynamic measure that is better able to react more quickly to weather changes because it replaces 5% of the data each year rather than the 3% that is replaced in the 30-year average.

Table 2
Annual Absolute Percent Change 1991-2020
NIPSCO Gas

	20-yr Average	30-yr Average	Annual HDD
Average	0.4%	0.2%	7.5%
Maximum	1.4%	0.7%	23.4%

<u>Normalization of Unbilled Volume in the Historic Base Period</u>

Q18. What is unbilled volume?

A18. Unbilled volume is an estimate of the therms consumed during the month between the day the meters were read and the last day of the month.

Q19. How does the Company estimate unbilled volume?

A19. The Company estimates unbilled volume using base usage factors, temperature sensitive factors, actual HDD in the unbilled period, and the average number of days in the unbilled period using the following formula:

Unbilled Balance = (Base Usage/Day * Days in the Unbilled Period) + (Usage/HDD * Actual HDD in the Unbilled Period)

Q20. How did you normalize unbilled volume?

A20. To obtain normal unbilled volume for the Historic Base Period, I applied the base usage per day and usage per HDD factors to the normal number of HDD in the unbilled period and the average number of days in the unbilled period using the following formula:

Unbilled Balance = (Base Usage/Day * Days in the Unbilled Period) + (Usage/HDD * Normal HDD in the Unbilled Period)

Normal HDD is defined as that proposed for rate making purposes, the average of 20 years ended December 31, 2020.

Q21. Have you demonstrated the details of the unbilled volume normalization procedure?

A21. Yes. The details of the unbilled volume normalization procedure are shown in <u>Attachment 16-D</u>. NIPSCO Witness Siegler uses my weather adjusted unbilled volumes to normalize the base period revenues for the Historic Base Period.

<u>**Design Day Demand**</u>

Q22. What is design day?

A22. Design day is a cold 24-hour period of demand that is used as a basis for planning gas capacity requirements.

Q23. How is design day demand estimated?

A23. Three linear regression models are built where total daily sendout is regressed against HDD for all "cold" days in the winter months (i.e., November through March days having more than 10 HDD), plus an indicator variable for weekends for three separate heating seasons (i.e., 2017/18, 2018/19, and 2019/20). The models have an R-Squared of 0.93, 0.91, and 0.88, respectively, indicating that the HDD and weekend variables account for between 88% and 93% of the day-to-day variation in sendout.

The design day temperature is calculated using coldest day data in each January from 1961 to 2020 and assuming a 3 percent probability (i.e., 1/33 year occurrence). The resulting design day weather is 80 HDD (equivalent to -15 degrees Fahrenheit). Each of the three regression equations described above are solved assuming design day weather of 80 HDD occurring on a weekday. The system-wide design day demand in this proceeding is the average of the design day demand calculated using the three regression equations described above.

Demand Forecast Methodology for the 2021 Budget Period and Forward Test Year

A. Demand Forecast Methodology Overview

Q24. Please explain the methodology employed for developing the forecasted number of customers and volume for the 2021 Budget Period and Forward Test Year.

A24. Total residential and total commercial customers and volume are forecasted using econometric models. Total industrial volume is forecasted based on knowledge gained through relationships with large industrial customers. Total residential, total commercial, and total industrial forecasts are subsequently split into sales, choice, and gas transportation service ("GTS") customers and volumes, as appropriate, using historical data.

Q25. What data sources do you use to develop the econometric models for the residential and commercial classes?

A25. I use the Company's billing records through March 2021 to obtain historical monthly customer counts and billed usage for the residential and commercial customer classes. Historical billed usage is divided by historical customer counts to produce monthly historical use per customer data for residential and commercial customers. The historical customer counts and use per customer are used as the dependent variables in the residential customer, residential use per customer, commercial customer, and commercial use per customer econometric models.

Several sources are used to obtain data for the independent variables included in the econometric models. Historical and forecast gas price data is sourced from the U.S. Energy Information Administration ("EIA"). Historical and forecast values for economic and demographic variables (e.g., population and gross state product) and deflator data are from IHS Global Insight, Inc., a data consultant. Historical weather data (HDD) is provided by DTN, a weather consulting service. Both IHS Global Insight, Inc. and DTN are large, independent data providers relied upon by the Company in previous rate cases, as well as relied upon by many other companies world-wide. The same 20-year average HDD ending December 31, 2020 described in the weather normalization process above is used as the weather during forecast period.

Q26. How are the economic effects associated with COVID-19 incorporated into the forecast?

A26. Data indicates that COVID-19 had three identifiable impacts on customer counts and usage that can generally be categorized as short-term, medium-term, and long-term impacts. First, on a very short-term basis, the shut-downs and other immediate changes to normal behavior associated with COVID-19 appear to have periodically affected use per customer for some classes in the spring of 2020 through the beginning of 2021. These short-term impacts are addressed when necessary by including an indicator variable[3] in the econometric model to account for specific months in which the use per customer significantly differed from what would have been expected absent COVID-19. These impacts on use per customer are not expected to persist into the 2021 Budget Period or Forward Test Year as the most significant shut-downs are largely over. Therefore, it is not necessary to make additional adjustments to the

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[3] In this case, an indicator variable (or dummy variable) is an independent variable that represents a time-related event. The indicator variable equals 1 when the specific time-related event occurs and equals 0 outside of that specific time. The coefficient on the indicator variable is determined through the econometric modeling process. Statistical results associated with the econometric model identify whether the indicator variable is significant.

forecast associated with impacts on use per customer associated with the temporary COVID-19 shut-downs.

Second, on a medium-term basis, the Indiana Governor's prohibitions on terminations of customers (i.e., moratoriums on customer shut-offs)[4] due to the economic effects of COVID-19 ("COVID-19 Moratoriums") affected customer counts starting in the spring of 2020 and continue to affect residential and commercial customer counts. As will be described in more detail below, residential and commercial customer counts for the 2021 Budget Period produced from the econometric model were adjusted upward to capture the impacts of the COVID-19 Moratorium that are not captured by the econometric models, but residential and commercial customer counts for the Forward Test Year are not adjusted as it is anticipated that customer counts will return to expected levels before the start of the Forward Test Year. The impact of the COVID-19 Moratoriums on industrial customer counts appears to be minimal, therefore no COVID-19 Moratorium adjustment is necessary for industrial forecasted customer counts.

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[4] Governor Holcomb, State of Indiana Executive Department, Executive Order 20-05, March 19, 2020.

Third, shut-downs and changes in consumer activity associated with COVID-19 affected the local and national economy, with impacts being sustained into the long-term, which in turn affects natural gas customers and usage. For example, unemployment spiked in the spring of 2020, and while unemployment has declined from the peak, it is currently expected to take time for employment levels to return to pre-COVID levels. These longer-term economic impacts associated with COVID-19 are incorporated into the forecast through the use of economic independent variable data. Historical and forecasted economic data series used in the econometric models reflect the economic outlook of IHS Global Insight as of March 2021. Therefore, COVID-19 economic impacts on customer counts and usage are incorporated in the forecasts produced by the econometric models so the forecasts do not require further adjustment to account for longer-term economic conditions related to COVID-19.

B. Residential Customer Forecast

Q27. Please describe the residential customer forecast methodology.

A27. The residential customer forecast is developed using a monthly econometric model that incorporates population and several monthly variables for shaping. As described above, residential customer counts starting in April 2020 were affected by the COVID Moratorium on customer shut-offs due to the economic impacts of COVID-19. As shown by the orange line in Figure 1 below, residential customer counts typically are highest in the winter and decrease in the summer as customers are shut-off, (i.e., removed or terminated) for non-payment or other reasons. The prohibition on terminations resulted in residential customer counts that remained at higher-than-normal levels throughout the remainder of 2020 and into 2021. The Company resumed termination procedures in mid-August 2020; however, late payment fees, deposits and disconnect/reconnect fees were waived for residential customers through mid-October 2020. In addition, energy assistance program customers have a winter moratorium from December through mid-March. Therefore, from a modeling perspective, indicator variables are added to the residential customer count model for each month of April 2020 through March 2021 (the end of the historical data set) to account for the fact that the customer count data for this period does not reflect normal business conditions. These indicator variables essentially eliminate the impact of the COVID-19 Moratorium on the econometric model and result in a raw model forecast that does not include the effects of the COVID-19

Moratorium, illustrated by the green "Raw Model Output" line in Figure 1. However, in reality, there are additional customers on the system related to the COVID-19 Moratorium that are not accounted for in the raw forecast produced by the econometric model. Therefore, the model results are adjusted to account for the COVID-19 Moratorium, as described below.

Q28. How is the COVID-19 Moratorium accounted for in the residential customer forecast?

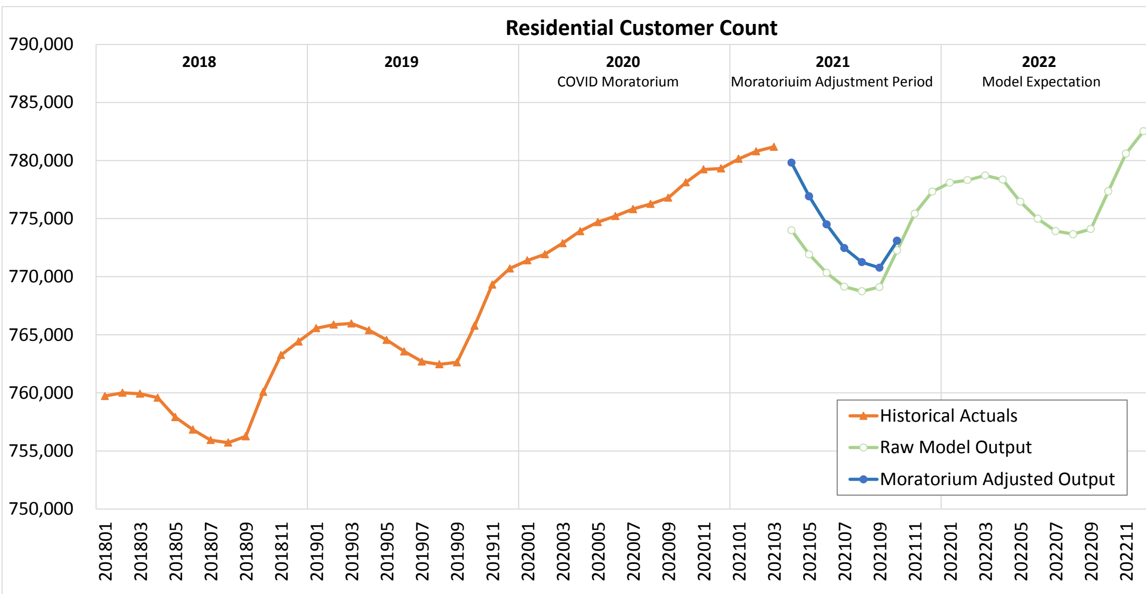
A28. The residential customer forecast produced by the econometric model for April 2021 is increased by 5,827 customers (approximately 0.75%) to account for the additional residential customers that are estimated to be on the system as a result of the COVID-19 Moratorium, as shown by the blue line in Figure 1. This is not based upon a specification of individual customers that would have been terminated, but represents an estimation of the additional residential customers who currently are being served by NIPSCO above the customer count that would have been anticipated but for the COVID-19 Moratorium. The level of the residential moratorium adjustment is based on the value of the March 2021 dummy variable in the econometric model.

Q29. Please explain how the adjustment for the COVID Moratorium on shut-offs is phased out of the forecast.

A29. Although terminations have resumed, the Company did not automatically terminate delinquent customers. The Company continues to work with customers who are behind on their bills to develop payment arrangements and identify available assistance funding. It is expected that over time the differential of 5,827 additional residential customers will phase out as termination procedures are reinstated and the normal cycle of customer counts returns. Given the information available at this time, it is estimated that customer counts will return to normal business conditions (i.e., the 5,827 additional residential customers that were assumed to be associated with the COVID-19 Moratorium will be addressed) by November 2021. Therefore, adjustments are necessary for several months of 2021 to account for the gradual reduction of the additional residential customers resulting from the COVID-19 Moratorium. For the purposes of the customer count forecast, it is assumed starting in May 2021 the 5,827 residential customer increase is reduced by an equal proportion, such that by November 2021 no adjustment is made, and the forecast returns to the levels produced by the econometric model as shown in the blue line in

Figure 1. The adjustments associated with the COVID-19 Moratorium only affect the months of April 2021 through October 2021, so only the 2021 Budget Period is impacted. The Forward Test Year customer count forecast is the unadjusted forecast resulting from the econometric model.

Figure 1



Q30. Please describe the residential use per customer forecast methodology.

A30. The residential use per customer forecast is developed using a monthly econometric model that incorporates weather in the form of HDD, real natural gas prices, and several monthly variables for additional shaping. As described above, residential use per customer was temporarily and periodically affected by the shut-downs associated with COVID-19. From a modeling perspective, an indicator variable was added to the residential use per customer count model for the months of October 2020, December 2020, and February 2021 because data indicates that residential use per customer was significantly affected in those months. These indicator variables essentially eliminate the impact of the short-term COVID-19 shut-downs on the econometric model and results in a forecast that does not include these short-term effects. Because these effects from the short-term COVID-19 shut-downs are expected to be over, no adjustment to the forecasted use per customer is necessary.

Q31. How is the forecast of monthly residential volume determined?

A31. Monthly residential customer counts are multiplied by monthly residential use per customer to produce monthly residential volume.

Q32. How is the total residential customers and usage split into residential sales and residential CHOICE?

A32. Residential CHOICE customer counts are based on extrapolating the recent trend in residential CHOICE customers. Residential sales customer counts are determined by subtracting residential CHOICE customer count from the total residential customer count.

Use per customer for residential CHOICE customers has been higher than use per customer for residential sales customers in recent years. Forecasted use per customer for residential CHOICE customers is determined by applying the historical monthly ratio of residential CHOICE use per customer to total residential use per customer. Forecasted residential CHOICE usage is determined by multiplying residential CHOICE customers by residential CHOICE use per customer. Residential sales usage is determined by subtracting residential CHOICE usage from the total residential usage.

C. Commercial Customer Forecast

Q33. Please describe the commercial customer forecast methodology.

A33. The commercial customer forecast is developed using a monthly econometric model that incorporates real gross state product and several monthly variables for shaping. As described above, commercial customer counts in 2020 and early 2021 were also significantly affected by the economic impacts of the COVID-19 Moratorium on customer shut-offs. As shown by the orange line in Figure 2 below, commercial customer counts typically are highest in the winter and decrease in the summer as customers are shut-off, (i.e., removed or terminated) for non-payment or other reasons. The prohibition on terminations resulted in commercial customer counts that remained at higher-than-normal levels throughout the remainder of 2020 and into 2021. As I mentioned earlier in my testimony, shut-offs have resumed. From a modeling perspective, indicator variables are added to the commercial customer count model for each month of March 2020 through March 2021 (the end of the historical data set) to account for the fact that the customer count data for this period does not reflect normal business conditions. These indicator variables essentially eliminate the impact of the COVID-19 Moratorium on the econometric model and result in a raw model forecast that does not include the effects of the COVID-19 Moratorium, illustrated by the green "Raw Model Output" line in Figure 2. However, in reality, there are additional customers on the system related to the COVID-19 Moratorium that are not accounted for in the raw forecast produced by the econometric model. Therefore, the model results are adjusted to account for the COVID-19 Moratorium, as described below.

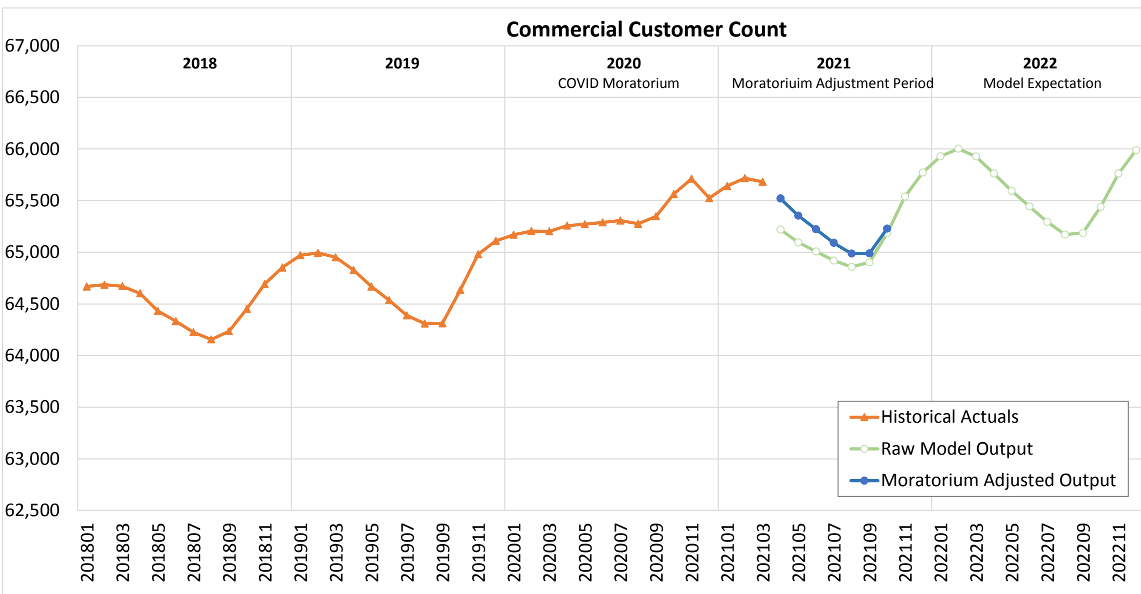
Q34. How is the COVID-19 Moratorium accounted for in the commercial customer forecast?

A34. Consistent with the residential analysis described above, the commercial customer count forecast produced by the econometric model for the April 2021 is increased by 302 customers (approximately 0.5%) to account for the additional commercial customers that are estimated to be on the system as a result of the COVID-19 Moratorium, as shown by the blue line in Figure 2. Again, this is not based upon a specification of individual customers that would have been terminated, but represents an estimation of the additional commercial customers who currently are being served by NIPSCO above the customer count that would have been anticipated but for the COVID-19 Moratorium. The level of the commercial moratorium adjustment is based on the value of the March 2021 indicator variable in the econometric model.

Q35. Please explain how the adjustment for the COVID-19 Moratorium is phased out of the forecast.

A35. Consistent with the residential adjustment, it is assumed starting in May 2021 the 302 commercial customer increase is reduced by an equal proportion each month, such that by November 2021 no adjustment is made, and the forecast returns to the levels produced by the econometric model as shown in the blue line in Figure 2. The adjustments associated with the COVID-19 Moratorium only affect the months of April 2021 through October 2021, so only the 2021 Budget Period is impacted. The Forward Test Year customer count forecast is the unadjusted forecast resulting from the econometric model.

Figure 2



Q36. Please describe the commercial use per customer forecast methodology.

A36. The commercial use per customer forecast is developed using a monthly econometric model that incorporates weather in the form of HDD, real natural gas prices, and several monthly variables for additional shaping. As described above, commercial use per customer was temporarily affected by the shut-downs associated with COVID-19. From a modeling perspective, an indicator variable is added to the commercial use per customer count model for each of the months of April 2020, May 2020, December 2020, and January 2021 because commercial use per customer was significantly lower than expected during these months. These indicator variables essentially eliminate the impact of the short-term COVID-19 shut-downs on the econometric model and results in a forecast that does not include these short-term effects.

Q37. How is the forecast of monthly commercial volume determined?

A37. Monthly commercial customer counts are multiplied by monthly commercial use per customer to produce monthly commercial volume.

Q38. How are the total commercial customers and volumes split into commercial sales, commercial CHOICE, and commercial General Transportation Service ("GTS")?

A38. Commercial GTS customers are forecasted to remain at recent historical customer levels while commercial CHOICE customers are forecasted to continue to decrease at recently observed rates. Commercial sales customers are the customers remaining when commercial GTS and commercial CHOICE customers are subtracted from the total commercial customer forecast. Total commercial usage is allocated to commercial GTS based proportions experienced in the most recent 12-months. Use per customer for commercial CHOICE customers has been higher than use per customer for commercial sales customers in recent years. Forecasted use per customer for commercial CHOICE customers is determined by applying the historical monthly ratio of commercial CHOICE use per customer to total commercial use per customer. Forecasted commercial CHOICE usage is determined by multiplying commercial CHOICE customers by commercial CHOICE use per customer. Commercial sales usage is determined by subtracting commercial GTS and commercial CHOICE usage from the total commercial usage.

D. Industrial Customer Forecast

Q39. Please describe the industrial customer forecast methodology.

A39. The full industrial customer forecast is provided by the Major Accounts group. The Major Accounts group relies on individual interviews of the largest industrial customers to understand their upcoming plans and expected level of gas consumption. The Major Accounts group also relies on historical industrial consumption and industry trends to forecast industrial gas demand.

Q40. How is the total industrial customer usage split into industrial sales, industrial CHOICE, and industrial GTS?

A40. The Major Accounts group also provides the industrial forecast in the specific categories of industrial sales, industrial CHOICE and industrial GTS.

Q41. Does this conclude your prefiled direct testimony?

A41. Yes.

VERIFICATION

I, Melissa Bartos, Vice President, Concentric Energy Advisors, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information and belief.

Melissa Bartos

Date: September 29, 2021

MELISSA F. BARTOS
Vice President

Ms. Bartos is a financial and economic consultant with more than twenty years of experience in the energy industry. In the last several years, she has focused on natural gas markets issues, including conducting comprehensive market assessments for various clients considering infrastructure investments and developing detailed demand forecasts for a number of gas distribution companies. Ms. Bartos has also designed, built, and enhanced numerous financial and statistical models to support clients in asset-based transactions, energy contract negotiations, reliability studies, asset and business valuations, rate and regulatory matters, cost-of-service analysis, and risk management. Her modeling experience includes building Monte-Carlo simulation models, designing an allocated cost-of-service model, statistical modeling using SPSS, and programming using Visual Basic for Applications (VBA). Ms. Bartos has also provided expert testimony on multiple occasions regarding natural gas demand forecasting and supply planning issues, natural gas markets and marginal cost studies.

REPRESENTATIVE PROJECT EXPERIENCE

Natural Gas Market Assessments

- Reviewed and evaluated long-term natural gas supply and demand, existing natural gas pricing dynamics, and future implications associated with new natural gas infrastructure in New England, New York, and New Jersey.
- Provided an analysis of the existing Gulf Coast natural gas market, the client's natural gas pipeline competitors, changing flows, and how those factors may affect transportation values to the client going forward.
- Prepared a comprehensive study examining the costs associated with improving natural gas pipeline access from western Canada and the eastern U.S. to Atlantic Canada.
- Produced a report on the benefits associated with incremental natural gas supplies delivered to New York City.
- Prepared an independent natural gas supply and pipeline transportation route assessment associated with natural gas for the client's proposed LNG export terminal.
- Conducted a study that examined potential commercial and industrial conversions from oil-based fuels to natural gas in various east coast U.S. markets.
- Produced a report that identified growth potential in off-system stationary and mobile markets in the mid-west that could be served by compressed natural gas or liquefied natural gas.
- Performed an external audit and filed expert testimony associated with two natural gas utilities' hurdle rate/contribution in aid of construction calculations for new off main customers.

- Produced a report that identified and reviewed innovative cost model approaches that utilities and regulators are using across the U.S. that allow expansion of gas distributions systems to new communities.
- Assisted in developing a strategy to identify residential natural gas growth opportunities within the client's franchise area.
- Presented at two Northeast Gas Association conferences regarding "Regulatory Policy and Residential Main Extensions".
- Conducted a study to determine the cost of significantly reducing peak day natural gas demand for a northeast gas utility through energy efficiency, conservation and demand management measures. Project involved researching natural gas energy efficiency plans in multiple U.S. states and Canadian provinces, reviewing energy efficiency potential studies, and exploring geothermal, peak pricing and direct load control options.

Demand Forecasting

- Filed expert testimony regarding the development of demand forecast models and the evaluation of natural gas resource plans for several gas utilities.
- Provided litigation support regarding demand forecasting techniques with respect to certain natural gas pipeline and storage decisions for a mid-west gas utility.
- Evaluated demand forecasts and produced alternative demand forecasts in the context of due diligence support for several asset transactions.
- Reviewed demand forecasting practices and procedures and recommended certain changes to improve the methodology and accuracy of the forecast for a multi-state utility.
- For a mid-west gas utility, developed a natural gas demand forecast that was utilized for supply and capacity decisions.

Ratemaking and Utility Regulation

- Participated in the rate case of a large North American gas distribution company, which determined the client's five-year incentive regulation plan, including performing benchmarking and productivity analyses that were filed with the regulator.
- Developed and testified in support of several marginal cost studies filed in rate cases for several New England utilities.
- Provided comprehensive analysis, drafted testimony and provided litigation support regarding the appropriate return on equity for a New England water utility, and for proposed wind and coal electric generation facility additions for a mid-west combination utility.
- Performed a detailed analysis of the components included in the client's lost and unaccounted for gas calculation.
- Conducted multiple natural gas portfolio asset optimization analyses to evaluate performance of the client's asset manager for regulatory purposes.

- On behalf of multiple New England gas companies, participated in the 2009 Avoided Energy Supply Cost Study Group (for New England), which worked with third-party consultants to develop the marginal energy supply costs that will be avoided due to reductions in the use of electricity, natural gas, and other fuels resulting from energy efficiency programs.

PROFESSIONAL HISTORY

Concentric Energy Advisors, Inc. (2002 – Present)
Vice President
Assistant Vice President
Project Manager
Senior Consultant

Navigant Consulting, Inc. (1996 – 2002)
Senior Consultant

EDUCATION

University of Massachusetts at Lowell
M.S., Mathematics (Statistics), 2003

College of the Holy Cross
B.A., Mathematics and Psychology, *magna cum laude*, 1998

PROFESSIONAL ASSOCIATIONS

Member of the American Statistical Association

Member of the Northeast Energy and Commerce Association

Member of the Northeast Gas Association

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Connecticut Public Utilities Regulatory Authority				
Connecticut Natural Gas Corporation & Southern Connecticut Gas Company	2014	Connecticut Natural Gas Corporation & Southern Connecticut Gas Company	Docket No. 13-06-02	CIAC Hurdle Rate Calculation
Federal Energy Regulatory Commission				
PennEast Pipeline Company, LLC	2015	PennEast Pipeline Company, LLC	Docket No. CP15-558	Market Conditions/Need
PennEast Pipeline Company, LLC	2016	PennEast Pipeline Company, LLC	Docket No. CP15-558	Market Conditions/Need
Millennium Pipeline Company, LLC	2017	Millennium Pipeline Company, LLC	Docket No. CP16-486	Market Conditions/Need
Laclede Gas Company	2017	Spire STL Pipeline, LLC	Docket No. CP17-40	Market Conditions/Need
Maine Public Utilities Commission				
Northern Utilities, Inc.	2011	Northern Utilities	Docket No. 2011-526	Integrated Resource Plan; Demand Forecast
Massachusetts Department of Public Utilities				
New England Gas Company	2008	New England Gas Company	D.P.U. 08-11	Integrated Resource Plan; Demand Forecast; Supply Planning
New England Gas Company	2010	New England Gas Company	D.P.U. 10-61	Integrated Resource Plan; Demand Forecast; Supply Planning
Berkshire Gas Company	2010	Berkshire Gas Company	D.P.U. 10-100	Integrated Resource Plan; Demand Forecast
New England Gas Company	2012	New England Gas Company	D.P.U. 12-41	Integrated Resource Plan; Demand Forecast; Supply Planning
Berkshire Gas Company	2012	Berkshire Gas Company	D.P.U. 12-62	Integrated Resource Plan; Demand Forecast
NSTAR Gas Company	2014	NSTAR Gas Company	D.P.U. 14-63	Integrated Resource Plan; Demand Forecast
Berkshire Gas Company	2014	Berkshire Gas Company	D.P.U. 14-98	Integrated Resource Plan; Demand Forecast

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Liberty Utilities (New England Gas Company)	2015	Liberty Utilities (New England Gas Company)	D.P.U. 15-75	Marginal Cost of Service Study
Berkshire Gas Company	2016	Berkshire Gas Company	D.P.U. 16-103	Integrated Resource Plan; Demand Forecast
Eversource Energy	2017	Eversource Energy (NSTAR Electric and WMECO)	D.P.U. 17-05	Marginal Cost of Service Study
National Grid (Boston Gas Company and Colonial Gas Company)	2017	National Grid (Boston Gas Company and Colonial Gas Company)	D.P.U. 17-170	Marginal Cost of Service Study
Bay State Gas Company d/b/a/ Columbia Gas of Massachusetts	2018	Bay State Gas Company d/b/a/ Columbia Gas of Massachusetts	D.P.U. 18-45	Marginal Cost of Service Study
Berkshire Gas Company	2018	Berkshire Gas Company	D.P.U. 18-40	Marginal Cost of Service Study
Berkshire Gas Company	2018	Berkshire Gas Company	D.P.U. 18-107	Integrated Resource Plan; Demand Forecast
NSTAR Gas Company	2019	NSTAR Gas Company	D.P.U. 19-120	Marginal Cost of Service Study
Bay State Gas Company d/b/a Columbia Gas of Massachusetts	2019	Bay State Gas Company d/b/a Columbia Gas of Massachusetts	D.P.U. 19-135	Integrated Resource Plan; Demand Forecast
Berkshire Gas Company	2020	Berkshire Gas Company	D.P.U. 20-139	Integrated Resource Plan; Demand Forecast
Boston Gas d/b/a National Grid	2020	Boston Gas d/b/a National Grid	D.P.U. 20-120	Marginal Cost Study
New Hampshire Public Utilities Commission				
Northern Utilities, Inc.	2011	Northern Utilities	DG 2011-290	Integrated Resource Plan; Demand Forecast
Liberty Utilities (EnergyNorth Natural Gas)	2017	Liberty Utilities (EnergyNorth Natural Gas)	DG 17-048	Marginal Cost of Service Study
Liberty Utilities (Granite State Electric)	2019	Liberty Utilities (Granite State Electric)	De 19-064	Marginal Cost of Service Study
New Jersey Board of Public Utilities				
South Jersey Gas Company	2015	South Jersey Gas Company	GR15010090	Energy Efficiency Cost Benefit Analysis

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Ontario Energy Board				
Enbridge Gas Distribution	2012	Enbridge Gas Distribution	EB-2011-0354	Industry Benchmarking Study
Enbridge Gas Distribution	2013	Enbridge Gas Distribution	EB-2012-0459	Incentive Rate Making
Régie de l'énergie du Québec				
TransCanada Pipelines Ltd.	2014	TransCanada Pipelines Ltd.	R-3900-2014	Natural Gas Market Assessment
Washington Utilities and Transportation Commission				
Puget Sound Energy, Inc.	2015	Puget Sound Energy, Inc.	UG-151663	Distributed LNG Market Assessment

NIPSCO Gas Normal Therms

Twelve Months Ended **December 2020**

Normal Therms	111	115	121	125	128	138	Total	Normalized Rates
January	123,278,735	1,366,454	53,272,059	9,588,026	222,053,929	5,404,552	414,963,755	187,505,275
February	121,613,442	1,310,665	52,636,508	9,393,382	236,924,509	5,852,602	427,731,108	184,953,997
March	102,032,757	1,125,706	43,988,562	8,300,267	205,366,735	4,046,322	364,860,349	155,447,291
April	63,344,850	700,902	25,113,891	5,165,804	176,163,245	3,591,021	274,079,713	94,325,447
May	35,547,402	385,081	13,903,609	3,494,498	186,074,061	3,146,952	242,551,603	53,330,590
June	20,517,606	232,190	8,819,626	2,803,321	179,236,882	2,966,200	214,575,824	32,372,742
July	12,306,531	120,651	6,410,661	2,457,828	185,774,353	2,940,433	210,010,456	21,295,671
August	11,132,985	106,668	6,301,216	2,510,108	191,524,322	2,909,999	214,485,299	20,050,977
September	12,048,544	115,960	7,532,635	2,654,924	193,452,933	3,862,121	219,667,116	22,352,063
October	19,784,277	211,898	13,261,933	3,209,842	206,647,064	4,225,360	247,340,373	36,467,950
November	46,519,397	509,203	25,535,164	5,280,595	216,755,007	4,159,070	298,758,437	77,844,360
December	87,992,385	952,805	37,712,843	7,677,469	240,232,956	4,961,368	379,529,826	134,335,502
Annual	656,118,909	7,138,184	294,488,709	62,536,063	2,440,205,995	48,065,999	3,508,553,858	1,020,281,864

Actual Therms	111	115	121	125	128	138	Total	Normalized Rates
January	104,294,160	1,153,330	45,303,617	8,396,667	222,053,929	5,404,552	386,606,255	159,147,774
February	107,004,459	1,151,727	46,479,131	8,467,668	236,924,509	5,852,602	405,880,095	163,102,984
March	95,724,648	1,055,101	41,358,093	7,892,108	205,366,735	4,046,322	355,443,006	146,029,948
April	65,297,918	723,080	25,825,055	5,269,026	176,163,245	3,591,021	276,869,344	97,115,078
May	44,916,998	491,121	16,945,984	3,952,192	186,074,061	3,146,952	255,527,307	66,306,294
June	19,450,839	217,916	8,516,894	2,761,298	179,236,882	2,966,200	213,150,028	30,946,946
July	12,306,531	120,651	6,410,661	2,457,828	185,774,353	2,940,433	210,010,456	21,295,671
August	11,132,985	106,668	6,301,216	2,510,108	191,524,322	2,909,999	214,485,299	20,050,977
September	12,098,608	116,532	7,743,456	2,684,489	193,452,933	3,862,121	219,958,139	22,643,085
October	22,124,073	240,480	15,217,234	3,435,980	206,647,064	4,225,360	251,890,191	41,017,767
November	45,265,159	494,949	24,844,934	5,174,470	216,755,007	4,159,070	296,693,588	75,779,510
December	80,885,032	874,430	34,791,922	7,193,476	240,232,956	4,961,368	368,939,184	123,744,860
Annual	620,501,409	6,745,985	279,738,194	60,195,308	2,440,205,995	48,065,999	3,455,452,890	967,180,896
	-	-	-	-	-	-		

Normal - Actual Therms	111	115	121	125	128	138	Total	Normalized Rates
January	18,984,575	213,123	7,968,443	1,191,359	-	-	28,357,501	28,357,501
February	14,608,983	158,939	6,157,377	925,714	-	-	21,851,012	21,851,012
March	6,308,109	70,606	2,630,469	408,159	-	-	9,417,343	9,417,343
April	(1,953,068)	(22,178)	(711,164)	(103,222)	-	-	(2,789,631)	(2,789,631)
May	(9,369,596)	(106,040)	(3,042,375)	(457,694)	-	-	(12,975,704)	(12,975,704)
June	1,066,767	14,274	302,733	42,023	-	-	1,425,796	1,425,796
July	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-
September	(50,065)	(573)	(210,820)	(29,565)	-	-	(291,023)	(291,023)
October	(2,339,797)	(28,582)	(1,955,301)	(226,138)	-	-	(4,549,817)	(4,549,817)
November	1,254,239	14,255	690,231	106,126	-	-	2,064,850	2,064,850
December	7,107,353	78,374	2,920,922	483,993	-	-	10,590,642	10,590,642
Annual	35,617,500	392,198	14,750,515	2,340,755	-	-	53,100,968	53,100,968
	5.7%	5.8%	5.3%	3.9%	0.0%	0.0%	1.5%	5.5%

Weather Normalization Routine

Normal HDD	2001	2020	20	Years

Rate														
111		1	2	3=2/1	4=11*12	5=3-4	6	7	8=5*(7/6) [1]	9=4+8	10=9*1	11	12=Avg	13
		Actual		Actual Vol/Cus			Weather		Normal Vol/Cus		Normal	Billling	NTS UPC	Max
		Customers	Volume	Total	Base	TS	HDD	HDDN	TS	Total	Volume	Days	per Day	HDDN/HDD
2020	1	766,564	104,294,160	136.1	15.9	120.2	985	1188	144.9	160.8	123,278,735	32.52	0.4884	1.5
2020	2	767,104	107,004,459	139.5	14.5	125.0	1017	1172	144.0	158.5	121,613,442	29.76	0.4884	1.5
2020	3	768,048	95,724,648	124.6	14.7	109.9	910	978	118.1	132.8	102,032,757	30.14	0.4884	1.5
2020	4	769,087	65,297,918	84.9	14.8	70.1	635	612	67.6	82.4	63,344,850	30.29	0.4884	1.5
2020	5	769,871	44,916,998	58.3	14.0	44.3	419	304	32.2	46.2	35,547,402	28.67	0.4884	1.5
2020	6	770,397	19,450,839	25.2	15.0	10.3	89	101	11.7	26.6	20,517,606	30.67	0.4884	1.5
2020	7	770,990	12,306,531	16.0	16.0	0.0	4	6	0.0	16.0	12,306,531	32.00	0.4988	1.5
2020	8	771,441	11,132,985	14.4	14.4	0.0	3	1	0.0	14.4	11,132,985	30.19	0.4780	1.5
2020	9	771,983	12,098,608	15.7	15.3	0.4	32	27	0.4	15.6	12,048,544	31.24	0.5017	1.5
2020	10	773,317	22,124,073	28.6	14.5	14.1	252	198	11.1	25.6	19,784,277	29.67	0.4884	1.5
2020	11	774,440	45,265,159	58.4	13.8	44.7	469	486	46.3	60.1	46,519,397	28.19	0.4884	1.5
2020	12	774,529	80,885,032	104.4	15.2	89.2	807	890	98.4	113.6	87,992,385	31.14	0.4884	1.5
			620,501,409				5622	5963		853	656,118,909			

[1] Ratio of (7/6) limited to Max (13).

Weather Normalization Routine

Normal HDD	2001	2020	20	Years

Rate

115		1	2	3=2/1	4=11*12	5=3-4	6	7	8=5*(7/6) [1]	9=4+8	10=9*1	11	12=Avg	13
		Actual		Actual Vol/Cus			Weather		Normal Vol/Cus		Normal	Billling	NTS UPC	Max
		Customers	Volume	Total	Base	TS	HDD	HDDN	TS	Total	Volume	Days	per Day	HDDN/HDD
2020	1	4,845	1,153,330	238.0	24.6	213.4	985	1188	257.4	282.0	1,366,454	32.52	0.7565	1.5
2020	2	4,836	1,151,727	238.2	22.5	215.6	1017	1172	248.5	271.0	1,310,665	29.76	0.7565	1.5
2020	3	4,834	1,055,101	218.3	22.8	195.5	910	978	210.1	232.9	1,125,706	30.14	0.7565	1.5
2020	4	4,835	723,080	149.6	22.9	126.6	635	612	122.1	145.0	700,902	30.29	0.7565	1.5
2020	5	4,831	491,121	101.7	21.7	80.0	419	304	58.0	79.7	385,081	28.67	0.7565	1.5
2020	6	4,830	217,916	45.1	23.2	21.9	89	101	24.9	48.1	232,190	30.67	0.7565	1.5
2020	7	4,831	120,651	25.0	25.0	0.0	4	6	0.0	25.0	120,651	32.00	0.7804	1.5
2020	8	4,823	106,668	22.1	22.1	0.0	3	1	0.0	22.1	106,668	30.19	0.7326	1.5
2020	9	4,776	116,532	24.4	23.6	0.8	32	27	0.6	24.3	115,960	31.24	0.7811	1.5
2020	10	4,772	240,480	50.4	22.4	28.0	252	198	22.0	44.4	211,898	29.67	0.7565	1.5
2020	11	4,768	494,949	103.8	21.3	82.5	469	486	85.5	106.8	509,203	28.19	0.7565	1.5
2020	12	4,771	874,430	183.3	23.6	159.7	807	890	176.1	199.7	952,805	31.14	0.7565	1.5
			6,745,985				5622	5963		1,481	7,138,184			

[1] Ratio of (7/6) limited to Max (13).

Weather Normalization Routine

Normal HDD	2001	2020	20	Years

Rate														
121		1	2	3=2/1	4=11*12	5=3-4	6	7	8=5*(7/6) [1]	9=4+8	10=9*1	11	12=Avg	13
		Actual		Actual Vol/Cus			Weather		Normal Vol/Cus		Normal	Billling	NTS UPC	Max
		Customers	Volume	Total	Base	TS	HDD	HDDN	TS	Total	Volume	Days	per Day	HDDN/HDD
2020	1	64,659	45,303,617	700.7	102.7	598.0	985	1188	721.2	823.9	53,272,059	32.52	3.1570	1.5
2020	2	64,697	46,479,131	718.4	94.0	624.5	1017	1172	719.6	813.6	52,636,508	29.76	3.1570	1.5
2020	3	64,693	41,358,093	639.3	95.2	544.1	910	978	584.8	680.0	43,988,562	30.14	3.1570	1.5
2020	4	64,749	25,825,055	398.8	95.6	303.2	635	612	292.3	387.9	25,113,891	30.29	3.1570	1.5
2020	5	64,764	16,945,984	261.7	90.5	171.2	419	304	124.2	214.7	13,903,609	28.67	3.1570	1.5
2020	6	64,780	8,516,894	131.5	96.8	34.7	89	101	39.3	136.1	8,819,626	30.67	3.1570	1.5
2020	7	64,801	6,410,661	98.9	98.9	0.0	4	6	0.0	98.9	6,410,661	32.00	3.0915	1.5
2020	8	64,769	6,301,216	97.3	97.3	0.0	3	1	0.0	97.3	6,301,216	30.19	3.2225	1.5
2020	9	64,838	7,743,456	119.4	98.6	20.8	32	27	17.6	116.2	7,532,635	31.24	3.8231	1.5
2020	10	65,051	15,217,234	233.9	93.7	140.3	252	198	110.2	203.9	13,261,933	29.67	3.1570	1.5
2020	11	65,201	24,844,934	381.1	89.0	292.1	469	486	302.6	391.6	25,535,164	28.19	3.1570	1.5
2020	12	65,015	34,791,922	535.1	98.3	436.8	807	890	481.7	580.1	37,712,843	31.14	3.1570	1.5
			279,738,194				5622	5963		4,544	294,488,709			

[1] Ratio of (7/6) limited to Max (13).

Weather Normalization Routine

Normal HDD	2001	2020	20	Years

Rate															
125		1	2	3=2/1	4=11*12	5=3-4	6	7	8=5*(7/6) [1]	9=4+8	10=9*1	11	12=Avg	13
		Actual		Actual Vol/Cus			Weather		Normal Vol/Cus		Normal	Billling	NTS UPC	Max
		Customers	Volume	Total	Base	TS	HDD	HDDN	TS	Total	Volume	Days	per Day	HDDN/HDD
2020	1	437	8,396,667	19214.3	5986.1	13228.2	985	1188	15954.4	21940.6	9,588,026	32.52	184.0534	1.5
2020	2	437	8,467,668	19376.8	5477.8	13899.0	1017	1172	16017.4	21495.2	9,393,382	29.76	184.0534	1.5
2020	3	438	7,892,108	18018.5	5547.9	12470.6	910	978	13402.5	18950.4	8,300,267	30.14	184.0534	1.5
2020	4	434	5,269,026	12140.6	5574.2	6566.4	635	612	6328.6	11902.8	5,165,804	30.29	184.0534	1.5
2020	5	433	3,952,192	9127.5	5276.2	3851.3	419	304	2794.2	8070.4	3,494,498	28.67	184.0534	1.5
2020	6	434	2,761,298	6362.4	5644.3	718.1	89	101	815.0	6459.3	2,803,321	30.67	184.0534	1.5
2020	7	434	2,457,828	5663.2	5663.2	0.0	4	6	0.0	5663.2	2,457,828	32.00	176.9749	1.5
2020	8	435	2,510,108	5770.4	5770.4	0.0	3	1	0.0	5770.4	2,510,108	30.19	191.1319	1.5
2020	9	434	2,684,489	6185.5	5749.5	436.0	32	27	367.9	6117.3	2,654,924	31.24	198.0101	1.5
2020	10	436	3,435,980	7880.7	5460.3	2420.4	252	198	1901.8	7362.0	3,209,842	29.67	184.0534	1.5
2020	11	433	5,174,470	11950.3	5188.6	6761.7	469	486	7006.8	12195.4	5,280,595	28.19	184.0534	1.5
2020	12	434	7,193,476	16574.8	5731.9	10842.9	807	890	11958.1	17690.0	7,677,469	31.14	184.0534	1.5
			60,195,308				5622	5963		143,617	62,536,063			

[1] Ratio of (7/6) limited to Max (13).

		Therms 111	Therms 115	Therms 121	Therms 125	Therms 128	Therms 138
2020	1	104294160	1153330	45303617	8396667	222053929	5404552
2020	2	107004459	1151727	46479131	8467668	236924509	5852602
2020	3	95724648	1055101	41358093	7892108	205366735	4046322
2020	4	65297918	723080	25825055	5269026	176163245	3591021
2020	5	44916998	491121	16945984	3952192	186074061	3146952
2020	6	19450839	217916	8516894	2761298	179236882	2966200
2020	7	12306531	120651	6410661	2457828	185774353	2940433
2020	8	11132985	106668	6301216	2510108	191524322	2909999
2020	9	12098608	116532	7743456	2684489	193452933	3862121
2020	10	22124073	240480	15217234	3435980	206647064	4225360
2020	11	45265159	494949	24844934	5174470	216755007	4159070
2020	12	80885032	874430	34791922	7193476	240232956	4961368

		Customers 111	Customers 115	Customers 121	Customers 125	Customers 128	Customers 138
2020	1	766564	4845	64659	437	186	96
2020	2	767104	4836	64697	437	186	96
2020	3	768048	4834	64693	438	186	96
2020	4	769087	4835	64749	434	187	96
2020	5	769871	4831	64764	433	187	96
2020	6	770397	4830	64780	434	187	96
2020	7	770990	4831	64801	434	187	96
2020	8	771441	4823	64769	435	187	96
2020	9	771983	4776	64838	434	187	96
2020	10	773317	4772	65051	436	187	95
2020	11	774440	4768	65201	433	187	96
2020	12	774529	4771	65015	434	187	96

Weather Master Data

Company			Billing HDD	Billing HDDN							Actual Unb	Actual Unb-1	Normal Unb	Normal Unb-1
59	2020	1	985	1188	65	BN	2	20012020C	51921	-0.17	510	484	600	566
59	2020	2	1017	1172	65	BN	2	20012020C	51921	-0.13	520	510	516	600
59	2020	3	910	978	65	BN	2	20012020C	51921	-0.07	349	520	362	516
59	2020	4	635	612	65	BN	2	20012020C	51921	0.038	266	349	199	362
59	2020	5	419	304	65	BN	2	20012020C	51921	0.377	86	266	85	199
59	2020	6	89	101	65	BN	2	20012020C	51921	-0.11	4	86	5	85
59	2020	7	4	6	65	BN	2	20012020C	51921	-0.32	0	4	0	5
59	2020	8	3	1	65	BN	2	20012020C	51921	1.85	1	0	2	0
59	2020	9	32	27	65	BN	2	20012020C	51921	0.167	78	1	53	2
59	2020	10	252	198	65	BN	2	20012020C	51921	0.273	272	78	238	53
59	2020	11	469	486	65	BN	2	20012020C	51921	-0.036	402	272	456	238
59	2020	12	807	890	65	BN	2	20012020C	51921	-0.093	604	402	617	456

			Calendar	Calendar										
59	2020	1	1011	1223	65	C	2	20012020C	123120	-0.17	0	0	0	0
59	2020	2	1027	1087	65	C	2	20012020C	123120	-0.056	0	0	0	0
59	2020	3	739	825	65	C	2	20012020C	123120	-0.1	0	0	0	0
59	2020	4	553	448	65	C	2	20012020C	123120	0.233	0	0	0	0
59	2020	5	239	190	65	C	2	20012020C	123120	0.255	0	0	0	0
59	2020	6	7	21	65	C	2	20012020C	123120	-0.65	0	0	0	0
59	2020	7	0	2	65	C	2	20012020C	123120	-1	0	0	0	0
59	2020	8	4	3	65	C	2	20012020C	123120	0.394	0	0	0	0
59	2020	9	110	79	65	C	2	20012020C	123120	0.392	0	0	0	0
59	2020	10	446	382	65	C	2	20012020C	123120	0.166	0	0	0	0
59	2020	11	599	704	65	C	2	20012020C	123120	-0.15	0	0	0	0
59	2020	12	1009	1051	65	C	2	20012020C	123120	-0.041	0	0	0	0

NGDAYS from Mainframe

		Billing Day	Calendar
2020	1	32.52	31
2020	2	29.76	29
2020	3	30.14	31
2020	4	30.29	30
2020	5	28.67	31
2020	6	30.67	30
2020	7	32.00	31
2020	8	30.19	31
2020	9	31.24	30
2020	10	29.67	31
2020	11	28.19	30
2020	12	31.14	31
		364.48	366.00

NIPSCO Gas

			1	2	3=(1*5)+(2*7)	4=(1*6)+(2*8)	5	6	7	8
							Unbilled Factors			
					Normal Unbilled Balance MDth		Daily Base Load		TS Vol per HDD	
CO	year	month	unbilled days	normal unbilled HDD	Res	Com	Res	Com	Res	Com
59	2019	12	16.48	566	5,729	2,753	38.297	25.255	9.007	4.128
59	2020	1	14.95	600	6,629	3,319	37.324	28.252	10.118	4.827
59	2020	2	14.19	516	5,119	2,571	37.375	28.277	8.892	4.204
59	2020	3	15.05	362	3,737	1,781	37.375	27.061	8.769	3.795
59	2020	4	14.76	199	2,228	1,011	37.375	24.290	8.424	3.278
59	2020	5	17.10	85	1,279	622	37.375	26.015	7.535	2.087
59	2020	6	16.43	5	607	386	36.957	23.486	0.000	0.000
59	2020	7	15.43	0	577	396	37.375	25.671	0.000	0.000
59	2020	8	16.24	2	607	435	37.375	26.807	0.000	0.000
59	2020	9	15.00	53	725	696	37.375	27.909	3.093	5.242
59	2020	10	16.33	238	2,394	1,572	37.375	28.277	7.494	4.666
59	2020	11	18.14	456	4,555	2,514	36.269	26.243	8.546	4.468
59	2020	12	18.00	617	6,476	3,330	36.826	26.722	9.422	4.617
Dec 2020 minus Dec 2019					747	577				