



Exhibit 3 – Operating Revenues

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3.0 OPERATING REVENUES

1. ENGLP's operating revenue is divided into two components – gas distribution and transportation revenue, and other operating revenue. Prior to 2015, other operating revenue included a rental equipment program, contract work program, service work program, merchandise sales, direct purchase fees, delayed payment charges, interest revenue, and transfer/connection charges. After 2015, other operating revenue from the rental equipment program (i.e., hot water tank rentals) was eliminated as the assets providing those revenues were sold by NRG as of July 1, 2015.

2. Gas distribution and transportation revenues do not include the gas supply charge related to the system gas supply fee, PGCVA reference price, the GPRA recovery or the gas commodity recovery charge.

3. ENGLP revenues are collected from six rate classes:

- Rate 1 – General Service Rate
- Rate 2 – Seasonal Service
- Rate 3 – Special Large Volume Contract Rate
- Rate 4 - General Service Peaking
- Rate 5 - Interruptible Peaking Contract Rate
- Rate 6 - Integrated Grain Processor Co-Operative Aylmer Ethanol Production Facility

3.1 Throughput and Revenue Forecast

4. A report forecasting throughput including weather normalization and connection counts has been prepared by Elenchus Research Associates Inc. This report outlines the results of, and methodology used to derive, the weather normal load forecast prepared for use in the Application. The methodology outlined in this report is largely consistent with the methodology used by NRG in previous rates applications, most recently approved by the OEB in EB-2010-0018. The report is included in Exhibit 3, Tab 2, Schedule 1 of this Application. ENGLP is not



proposing any demand side management, cap and trade or any other GHG reduction-related activities that would affect the throughput forecasts presented in this Application.

5. Using the forecast data presented in Exhibit 3, Tab 2, Schedule 1 the following revenue forecasts for the years 2018-2020 have been developed using the rates approved by the OEB in EB-2018-0235. The revenue forecasts are provided in Tables 3.1-1 to 3.1-9 below.

**Table 3.1-1
 Summary - Distribution Revenue Under Current
 Distribution Rates**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Rate 1 - Residential	4,120,249	4,393,422	4,364,396
2 Rate 1 - Commercial	759,482	761,569	747,422
3 Rate 1 - Industrial	239,820	235,380	228,587
4 Rate 2	167,257	170,709	159,418
5 Rate 3	176,125	183,781	173,856
6 Rate 4	125,020	138,256	137,288
7 Rate 5	57,215	61,999	60,012
8 Rate 6	1,589,704	1,133,887	1,133,887
9 Total Revenue	7,234,872	7,079,005	7,004,867

**Table 3.1-2
 Rate 1 - Residential**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	8,363	8,616	8,877
3 Volume (m3's)			
4 Tier 1 (First 1,000 m3 / mo.)	16,726,306	16,450,933	16,935,901
5 Tier 2 (Over 1,000 m3 / mo.)	110,051	104,699	107,776
6 Rates			
7 Fixed Monthly Rate	13.50	15.50	15.50
8 Tier 1 Rate (first 1,000 m3's)	16.2312	15.9486	15.9486
9 Tier 2 Rate (> 1,000 m3's)	10.9099	11.3519	11.3519
10 Revenue*			
11 Fixed Monthly Rate	1,405,058	1,602,654	1,651,122
12 Tier 1 Rate (first 1,000 m3's)	2,703,063	2,623,693	2,701,039
13 Tier 2 Rate (> 1,000 m3's)	12,128	11,885	12,235
14 Distribution Revenue Excluding IRM Rebalancing Rider	4,120,249	4,238,233	4,364,396
15 IRM Rebalancing Rider		155,189	
16 Distribution Revenue Including IRM Rebalancing Rider	4,120,249	4,393,422	4,364,396

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.



**Table 3.1-3
 Rate 1 - Commercial**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	477	485	494
3 Volume (m3's)			
4 Tier 1 (First 1,000 m3 / mo.)	2,366,759	2,240,849	2,279,405
5 Tier 2 (Over 1,000 m3 / mo.)	2,694,120	2,528,420	2,572,300
6 Rates			
7 Fixed Monthly Rate	13.50	15.50	15.50
8 Tier 1 Rate (first 1,000 m3's)	16.2312	15.9486	15.9486
9 Tier 2 Rate (> 1,000 m3's)	10.9099	11.3519	11.3519
10 Revenue*			
11 Fixed Monthly Rate	80,098	90,261	91,884
12 Tier 1 Rate (first 1,000 m3's)	382,481	357,384	363,533
13 Tier 2 Rate (> 1,000 m3's)	296,903	287,024	292,005
14 Total Revenue	759,482	734,668	747,422
15 IRM Rebalancing Rider		26,901	
16 Distribution Revenue Including IRM Rebalancing Rider	759,482	761,569	747,422

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.

**Table 3.1-4
 Rate 1 - Industrial**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	67	67	68
3 Volume (m3's)			
4 Tier 1 (First 1,000 m3 / mo.)	430,916	390,053	392,687
5 Tier 2 (Over 1,000 m3 / mo.)	1,442,737	1,341,669	1,350,528
6 Rates			
7 Fixed Monthly Rate	13.50	15.50	15.50
8 Tier 1 Rate (first 1,000 m3's)	16.2312	15.9486	15.9486
9 Tier 2 Rate (> 1,000 m3's)	10.9099	11.3519	11.3519
10 Revenue*			
11 Fixed Monthly Rate	11,186	12,553	12,648
12 Tier 1 Rate (first 1,000 m3's)	69,638	62,208	62,628
13 Tier 2 Rate (> 1,000 m3's)	158,995	152,305	153,311
14 Total Revenue	239,820	227,066	228,587
15 IRM Rebalancing Rider		8,314	
16 Distribution Revenue Including IRM Rebalancing Rider	239,820	235,380	228,587

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.



**Table 3.1-5
 Rate 2**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	53	52	50
3 Volume (m3's)			
4 April - October			
5 Tier 1 (First 1,000 m3 / mo.)	90,336	88,065	85,252
6 Tier 2 (Next 24,000 m3 / mo.)	743,346	735,595	712,097
7 Tier 3 (Over 25,000 m3 / mo.)	173,721	140,529	136,040
8 November - March			
9 Tier 1 (First 1,000 m3 / mo.)	59,372	68,343	66,160
10 Tier 2 (Next 24,000 m3 / mo.)	283,790	272,145	263,451
11 Tier 3 (Over 25,000 m3 / mo.)	31,380	17,988	17,414
12 Rates			
13 Fixed Monthly Rate	15.00	17.25	17.25
14 April - October			
15 Tier 1 (First 1,000 m3 / mo.)	15.8212	17.2765	17.2765
16 Tier 2 (Next 24,000 m3 / mo.)	9.4826	9.4826	9.4826
17 Tier 3 (Over 25,000 m3 / mo.)	6.1698	6.1698	6.1698
18 November - March			
19 Tier 1 (First 1,000 m3 / mo.)	19.9424	21.7767	21.7767
20 Tier 2 (Next 24,000 m3 / mo.)	15.6960	15.6960	15.6960
21 Tier 3 (Over 25,000 m3 / mo.)	15.2899	15.2899	15.2899
22 Revenue*			
23 Fixed Monthly Rate	9,953	10,692	10,350
24 April - October			
25 Tier 1 (First 1,000 m3 / mo.)	14,480	15,215	14,729
26 Tier 2 (Next 24,000 m3 / mo.)	70,488	69,754	67,525
27 Tier 3 (Over 25,000 m3 / mo.)	10,718	8,670	8,393
28 November - March			
29 Tier 1 (First 1,000 m3 / mo.)	12,276	14,883	14,407
30 Tier 2 (Next 24,000 m3 / mo.)	44,544	42,716	41,351
31 Tier 3 (Over 25,000 m3 / mo.)	4,798	2,750	2,663
32 Total Revenue	167,257	164,679	159,418
33 IRM Rebalancing Rider		6,030	
34 Distribution Revenue Including IRM Rebalancing Rider	167,257	170,709	159,418

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.



**Table 3.1-6
Rate 3**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	6	6	6
3 Firm Demand	299,631	299,631	299,631
4 Firm Delivery (volume - m ³ 's)	1,893,687	1,801,305	1,721,684
5 Rates			
6 Fixed Monthly Rate	150.00	172.50	172.50
7 Firm Demand	29.0974	29.0974	29.0974
8 Firm Delivery	4.0357	4.3127	4.3127
9 Revenue*			
10 Fixed Monthly Rate	11,205	12,420	12,420
11 Firm Demand	87,185	87,185	87,185
12 Firm Delivery	77,735	77,685	74,251
13 Total Revenue	176,125	177,290	173,856
14 IRM Rebalancing Rider		6,492	
15 Distribution Revenue Including IRM Rebalancing Rider	176,125	183,781	173,856

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.



**Table 3.1-7
 Rate 4**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	36	37	38
3 Volumes (m3's)			
4 April - December			
5 Block 1 (First 1,000 m3 / mo.)	94,084	91,612	94,302
6 Block 2 (Over 1,000 m3 / mo.)	942,313	1,003,585	1,033,055
7 January - March			
8 Block 1 (First 1,000 m3 / mo.)	14,892	17,490	18,003
9 Block 2 (Over 1,000 m3 / mo.)	5,010	3,541	3,645
10 Rates			
11 Fixed Monthly Rate	15.0000	17.2500	17.2500
12 April - December			
13 Block 1 (First 1,000 m3 / mo.)	15.8149	17.1487	17.1487
14 Block 2 (Over 1,000 m3 / mo.)	10.5218	10.5218	10.5218
15 January - March			
16 Block 1 (First 1,000 m3 / mo.)	20.1755	21.8770	21.8770
17 Block 2 (Over 1,000 m3 / mo.)	16.9052	16.9052	16.9052
18 Revenue*			
19 Fixed Monthly Rate	6,723	7,642	7,866
20 April - December			
21 Block 1 (First 1,000 m3 / mo.)	15,298	15,710	16,172
22 Block 2 (Over 1,000 m3 / mo.)	99,148	105,595	108,696
23 January - March			
24 Block 1 (First 1,000 m3 / mo.)	3,004	3,826	3,939
25 Block 2 (Over 1,000 m3 / mo.)	847	599	616
26 Total Revenue	125,020	133,372	137,288
27 IRM Rebalancing Rider		4,884	
28 Distribution Revenue Including IRM Rebalancing Rider	125,020	138,256	137,288

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.



**Table 3.1-8
 Rate 5**

	A 2018 Forecast	B 2019 Bridge	C 2020 Test
1 Billing Parameters			
2 Connections	4	4	4
3 Firm Delivery (volume - m3's)	673,249	685,748	685,748
4 Rates			
5 Fixed Monthly Rate	150.00	172.50	172.50
6 Firm Delivery	7.38875	7.54391	7.54391
7 Revenue*			
8 Fixed Monthly Rate	7,470	8,077	8,280
9 Firm Delivery	49,745	51,732	51,732
10 Total Revenue	57,215	59,809	60,012
11 IRM Rebalancing Rider		2,190	
12 Distribution Revenue Including IRM Rebalancing Rider	57,215	61,999	60,012

* 2018 revenues assume rates from EB-2018-0235 effective October 1, 2018.

**Table 3.1-9
 Rate 6**

	A 2018 Forecast Jan - Sept	B 2018 Forecast Oct - Dec	C 2018 Forecast Jan - Dec	D 2019 Bridge	E 2020 Test
1 Billing Parameters					
2 Connections	1	1	1	1	1
3 Firm Delivery (volume - m3's)	24,324,619	16,050,354	40,374,973	59,243,876	59,243,876
4 Firm Demand	1,429,470	626,400	2,055,870	2,505,600	2,505,600
5 Rates					
6 Fixed Monthly Rate	150.00	124,323.96		94,490.62	94,490.62
7 Firm Delivery	3.8894				
8 Firm Demand	18.8392				
9 Revenue					
10 Fixed Monthly Rate	1,350	372,972	374,322	1,133,887	1,133,887
11 Firm Delivery	946,082		946,082		
12 Firm Demand	269,301		269,301		
13 Total	1,216,732	372,972	1,589,704	1,133,887	1,133,887

3.2 Accuracy of Throughput Forecast and Variance Analysis

6. Tables 3.2-1 to 3.2-8 below, provide the schedule of throughput volumes, revenues, and customer count by rate class.



Comparison to OEB Approved Values

7. OEB approved volumes are based on values presented in EB-2010-0018 and were not updated until ENGLP's 2018 IRM Application as reflected in Table 3.2-9 and Table 3.2-10. As such, the approved historical values in years following 2011 do not produce meaningful comparisons due to growth in connections which drive volume.

8. As shown in Table 3.2-11, in 2011, both volumes and revenues were less than the approved amounts; 2,216,993 m³'s (normalized) and -\$125,349 in revenue. This discrepancy appears to be driven primarily by significantly lower consumption by IGPC than the approved amount, offset by higher than approved consumption in other rate classes.

9. In 2012, actual and normalized volumes were 74,388 m³'s less than the approved value while revenue exceeded the approved amount by \$129,512. Normalized volumes in 2012, for customers in rate classes 1 - 5 in Table 3.2-3, show a 1,621,022 m³ increase from the approved amount being driven by connection growth of 248 relative to the approved values. This increase is offset by IGPC consuming 1,695,410 m³'s less than the approved amount.

10. Between 2013 and 2017, both volumes (actual and normalized) and revenues exceeded OEB approved values from EB-2010-0018 primarily as a result of connection growth.

Comparison of Year over Year Normalized Actuals

11. As shown in Table 3.2-11 below, between 2012 and 2017, the year over year connection growth produced higher volumes and incremental revenues.

12. Volume in rate year 2018 (October 2017 – September 2018) was lower than 2017 (October 2016 to September 2017) as a result of lower consumption by IGPC as a result of a plant shutdown in September of 2018 which more than offset increased consumption from other rate classes in the year.

13. Consumption for the period January – December 2018 is higher than that of the October 2017 – September 2018 rate year. In October 2018, consumption from IGPC materially increased due to a plant expansion causing large year over year variation in system throughput.



This impact is magnified in 2019 when this change is factored over a full 12 months (January to December 2019).

14. In December 2018, the OEB approved rates for ENGLP in EB-2018-0235 with an effective date of October 1, 2018. The effect of this decision increased the rates and subsequent revenues for rate classes 1–5 (9 months at prior rates and 3 months at EB-2018-0235 rates). However, the incremental revenue generated by these rates in the last quarter of 2018 is offset by a lower fixed-rate to IGPC for the same time period. Part of this is a result of IGPC beginning to pay transportation charges directly to Union Gas whereas that amount was previously flowed through to ENGLP. This outcome is magnified in 2019 when the lower rates for IGPC are spread across 12 months causing revenue in 2019 to be \$155,867 less than 2018.



Table 3.2-1
OEB Approved Volumes
(m³'s)

Rate Year	A	B	C	D	E	F	G	H	I	J	K
Year	Oct - Sept 2011	Oct - Sept 2012	Oct - Sept 2013	Oct - Sept 2014	Oct - Sept 2015	Oct - Sept 2016	Oct - Sept 2017	Oct - Sept 2018	Forecast* Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Rate 1 - Residential	13,103,581	13,103,581	13,103,581	13,103,581	13,103,581	13,103,581	13,103,581	13,103,581	13,103,581	14,699,145	14,699,145
2 Rate 1 - Commercial	4,131,750	4,131,750	4,131,750	4,131,750	4,131,750	4,131,750	4,131,750	4,131,750	4,131,750	4,326,736	4,326,736
3 Rate 1 - Industrial	598,028	598,028	598,028	598,028	598,028	598,028	598,028	598,028	598,028	1,544,914	1,544,914
4 Rate 2	502,860	502,860	502,860	502,860	502,860	502,860	502,860	502,860	502,860	1,454,147	1,454,147
5 Rate 3	2,195,299	2,195,299	2,195,299	2,195,299	2,195,299	2,195,299	2,195,299	2,195,299	2,195,299	1,485,572	1,485,572
6 Rate 4	454,263	454,263	454,263	454,263	454,263	454,263	454,263	454,263	454,263	912,931	912,931
7 Rate 5	947,162	947,162	947,162	947,162	947,162	947,162	947,162	947,162	947,162	553,894	553,894
8 Rate 6	33,416,816	33,416,816	33,416,816	33,416,816	33,416,816	33,416,816	33,416,816	33,416,816	33,416,816	38,423,518	38,423,518
9 Total	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	63,400,857	63,400,857

* No volumes approved for a Jan - Dec 2018 rate year.

Table 3.2-2
Actual / Forecast Volumes
(m³'s)

Period Year	A	B	C	D	E	F	G	H	I	J	K
Year	Oct - Sept 2011	Oct - Sept 2012	Oct - Sept 2013	Oct - Sept 2014	Oct - Sept 2015	Oct - Sept 2016	Oct - Sept 2017	Oct - Sept 2018	Forecast Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Rate 1 - Residential	12,825,392	11,291,854	13,531,207	16,088,024	16,056,272	13,660,975	14,676,393	17,032,346	16,836,357	16,555,631	17,043,677
2 Rate 1 - Commercial	4,052,772	3,362,848	4,122,307	4,829,641	4,694,604	4,029,161	4,313,791	5,246,705	5,060,879	4,769,270	4,851,704
3 Rate 1 - Industrial	1,011,475	1,258,899	1,422,335	1,534,158	1,733,658	1,449,099	1,485,534	1,826,769	1,873,654	1,731,722	1,743,215
4 Rate 2	1,752,028	1,860,244	1,960,797	1,955,809	1,386,920	1,231,709	1,516,589	1,044,491	1,381,945	1,322,665	1,280,413
5 Rate 3	2,516,809	2,319,084	1,636,206	1,794,654	1,750,310	1,530,185	1,642,277	1,662,105	1,893,687	1,801,305	1,721,684
6 Rate 4	234,604	491,946	710,719	903,963	1,427,690	865,109	910,102	1,095,301	1,056,298	1,116,228	1,149,006
7 Rate 5	695,814	1,123,128	904,722	990,935	1,181,585	632,393	565,347	737,991	673,249	685,748	685,748
8 Rate 6	30,577,936	31,721,406	31,357,510	31,527,596	33,955,603	38,700,863	38,528,525	33,739,752	40,374,973	59,243,876	59,243,876
9 Total	53,666,830	53,429,409	55,645,803	59,624,780	62,186,642	62,099,494	63,638,559	62,385,461	69,151,042	87,226,445	87,719,322



Table 3.2-3
Normalized Volumes
(m³'s)

Period Year	A	B	C	D	E	F	G	H	I	J	K
	Oct - Sept 2011	Oct - Sept 2012	Oct - Sept 2013	Oct - Sept 2014	Oct - Sept 2015	Oct - Sept 2016	Oct - Sept 2017	Oct - Sept 2018	Forecast Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Rate 1 - Residential	12,356,951	12,730,133	13,694,535	14,627,615	15,082,669	14,657,722	15,722,811	16,824,343	16,836,357	16,555,631	17,043,677
2 Rate 1 - Commercial	3,920,434	3,803,776	4,170,301	4,366,332	4,388,268	4,338,322	4,651,850	5,191,706	5,060,879	4,769,270	4,851,704
3 Rate 1 - Industrial	1,005,051	1,394,013	1,421,020	1,427,189	1,641,773	1,615,395	1,597,511	1,909,607	1,873,654	1,731,722	1,743,215
4 Rate 2	1,752,028	1,860,244	1,960,797	1,955,809	1,386,920	1,231,709	1,516,589	1,390,897	1,381,945	1,322,665	1,280,413
5 Rate 3	2,589,948	2,150,725	1,881,029	1,693,664	1,553,668	1,443,894	1,368,297	1,900,603	1,893,687	1,801,305	1,721,684
6 Rate 4	234,604	491,946	710,719	903,963	1,427,690	865,109	910,102	1,127,637	1,056,298	1,116,228	1,149,006
7 Rate 5	695,814	1,123,128	904,722	990,935	1,181,585	632,393	565,347	733,512	673,249	685,748	685,748
8 Rate 6	30,577,936	31,721,406	31,357,510	31,527,596	33,955,603	38,700,863	38,528,525	33,687,861	40,374,973	59,243,876	59,243,876
9 Total	53,132,766	55,275,371	56,100,634	57,493,103	60,618,177	63,485,408	64,861,032	62,766,165	69,151,042	87,226,445	87,719,322

Table 3.2-4
OEB Approved Connections

Rate Year Year	A	B	C	D	E	F	G	H	I	J	K
	Oct - Sept 2011	Oct - Sept 2012	Oct - Sept 2013	Oct - Sept 2014	Oct - Sept 2015	Oct - Sept 2016	Oct - Sept 2017	Oct - Sept 2018	Forecast* Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Rate 1 - Residential	6,560	6,560	6,560	6,560	6,560	6,560	6,560	6,560	6,560	8,148	
2 Rate 1 - Commercial	414	414	414	414	414	414	414	414	414	462	
3 Rate 1 - Industrial	42	42	42	42	42	42	42	42	42	66	
4 Rate 2	73	73	73	73	73	73	73	73	73	53	
5 Rate 3	4	4	4	4	4	4	4	4	4	5	
6 Rate 4	23	23	23	23	23	23	23	23	23	36	
7 Rate 5	5	5	5	5	5	5	5	5	5	4	
8 Rate 6	1	1	1	1	1	1	1	1	1	1	
9 Total	7,122	7,122	7,122	7,122	7,122	7,122	7,122	7,122	7,122	8,775	0

* No connections approved for a Jan - Dec 2018 rate year.



**Table 3.2-5
 Actual & Forecasted Average Connections**

Period Year	A	B	C	D	E	F	G	H	I	J	K
	Oct - Sept 2011	Oct - Sept 2012	Oct - Sept 2013	Oct - Sept 2014	Oct - Sept 2015	Oct - Sept 2016	Oct - Sept 2017	Oct - Sept 2018	Forecast Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Rate 1 - Residential	6,568	6,810	7,112	7,398	7,670	7,897	8,073	8,313	8,363	8,616	8,877
2 Rate 1 - Commercial	404	411	422	435	443	450	459	474	477	485	494
3 Rate 1 - Industrial	41	50	56	62	63	64	66	66	67	67	68
4 Rate 2	64	67	65	65	63	60	56	53	53	52	50
5 Rate 3	4	4	4	4	4	4	4	6	6	6	6
6 Rate 4	23	23	31	33	34	35	36	36	36	37	38
7 Rate 5	5	5	5	5	5	5	5	4	4	4	4
8 Rate 6	1	1	1	1	1	1	1	1	1	1	1
9 Total	7,110	7,370	7,696	8,003	8,284	8,516	8,699	8,953	9,007	9,269	9,538

**Table 3.2-6
 Actual & Forecasted Year End Connections**

Period Year	A	B	C	D	E	F	G	H	I	J	K
	Oct - Sept 2011	Oct - Sept 2012	Oct - Sept 2013	Oct - Sept 2014	Oct - Sept 2015	Oct - Sept 2016	Oct - Sept 2017	Oct - Sept 2018	Forecast Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Rate 1 - Residential	6,625	6,915	7,216	7,502	7,735	7,993	8,148	8,390	8,490	8,747	9,011
2 Rate 1 - Commercial	401	416	422	437	444	453	462	477	481	490	498
3 Rate 1 - Industrial	43	51	59	63	61	66	66	67	67	68	69
4 Rate 2	68	67	65	65	62	62	53	54	52	51	49
5 Rate 3	4	4	4	4	4	4	5	6	6	6	6
6 Rate 4	22	28	32	33	34	36	36	36	36	37	38
7 Rate 5	5	5	5	5	5	5	4	4	4	4	4
8 Rate 6	1	1	1	1	1	1	1	1	1	1	1
9 Total	7,169	7,487	7,804	8,110	8,346	8,620	8,775	9,035	9,138	9,403	9,677



Table 3.2-7
OEB Approved Revenues
 (\$)

Rate Year	A Oct - Sept 2011	B Oct - Sept 2012	C Oct - Sept 2013	D Oct - Sept 2014	E Oct - Sept 2015	F Oct - Sept 2016	G Oct - Sept 2017	H Oct - Sept 2018	I Forecast* Jan - Dec 2018	J Bridge** Jan - Dec 2019	K Test Jan - Dec 2020
1 Rate 1 - Residential	3,049,854	3,049,854	3,071,919	3,082,753	3,118,766	3,155,284	3,155,284	3,155,284		3,982,517	3,827,328
2 Rate 1 - Commercial	589,395	589,395	594,397	596,852	604,874	613,002	613,002	613,002		690,299	663,398
3 Rate 1 - Industrial	76,381	76,381	76,992	77,292	78,261	79,241	79,241	79,241		212,096	203,782
4 Rate 2	69,658	69,658	70,201	70,468	71,312	72,167	72,167	72,167		188,760	182,730
5 Rate 3	165,397	165,397	166,687	167,322	169,321	171,352	171,352	171,352		146,837	140,345
6 Rate 4	62,517	62,517	63,004	63,244	64,001	64,769	64,769	64,769		157,998	153,114
7 Rate 5	74,840	74,840	75,424	75,710	76,615	77,534	77,534	77,534		51,384	49,194
8 Rate 6	1,492,305	1,492,305	1,503,945	1,509,652	1,527,768	1,546,089	1,546,089	1,546,089		1,133,887	1,133,887
9 Total	5,580,347	5,580,347	5,622,569	5,643,293	5,710,918	5,779,438	5,779,438	5,779,438		6,563,778	6,353,778

* no revenues approved for a Jan - Dec 2018 rate year.

** includes 2019 rebalancing rider.

Table 3.2-8
Historic Revenues
 (\$)

Period Year	A Oct - Sept 2011	B Oct - Sept 2012	C Oct - Sept 2013	D Oct - Sept 2014	E Oct - Sept 2015	F Oct - Sept 2016	G Oct - Sept 2017	H Oct - Sept 2018	I Forecast Jan - Dec 2018	J Bridge* Jan - Dec 2019	K Test Jan - Dec 2020
1 Rate 1 - Residential	3,002,868	2,820,249	3,225,422	3,682,808	3,726,738	3,487,504	3,728,013	4,110,455	4,120,249	4,393,422	4,364,396
2 Rate 1 - Commercial	609,191	503,215	598,145	689,328	674,450	609,914	656,041	782,201	759,482	761,569	747,422
3 Rate 1 - Industrial	122,916	154,018	173,061	189,762	212,091	185,393	211,528	236,324	239,820	235,380	228,587
4 Rate 2	244,327	186,521	209,653	212,008	162,092	142,379	195,210	163,335	167,257	170,709	159,418
5 Rate 3	164,834	160,171	135,002	141,651	140,306	134,602	127,767	145,357	176,125	183,781	173,856
6 Rate 4	38,355	58,488	84,860	107,298	167,515	102,848	91,607	129,821	125,020	138,256	137,288
7 Rate 5	57,212	89,534	73,570	80,311	91,724	55,931	47,871	60,332	57,215	61,999	60,012
8 Rate 6	1,478,179	1,485,545	1,491,329	1,499,258	1,531,844	1,783,621	1,797,592	1,659,021	1,589,704	1,133,887	1,133,887
9 Total	5,717,882	5,457,741	5,991,042	6,602,424	6,706,760	6,502,192	6,855,629	7,286,845	7,234,872	7,079,005	7,004,867

* includes rebalancing rate rider in 2019.



Table 3.2-9
Historic Revenues - Normalized
(\$)

Period Year	A Oct - Sept 2011	B Oct - Sept 2012	C Oct - Sept 2013	D Oct - Sept 2014	E Oct - Sept 2015	F Oct - Sept 2016	G Oct - Sept 2017	H Oct - Sept 2018	I Forecast Jan - Dec 2018	J Bridge* Jan - Dec 2019	K Test Jan - Dec 2020
1 Rate 1 - Residential	2,946,924	3,059,702	3,280,512	3,484,366	3,608,590	3,653,317	3,854,306	4,071,646	4,120,249	4,393,422	4,364,396
2 Rate 1 - Commercial	562,738	551,692	605,483	635,409	641,518	651,686	694,847	769,375	759,482	761,569	747,422
3 Rate 1 - Industrial	122,913	169,990	175,540	177,925	203,936	205,615	203,830	241,633	239,820	235,380	228,587
4 Rate 2	181,356	193,256	204,729	207,095	155,780	137,734	166,070	156,774	167,257	170,709	159,418
5 Rate 3	171,339	155,791	146,745	140,071	135,069	133,100	130,199	154,981	176,125	183,781	173,856
6 Rate 4	33,330	63,365	91,065	117,828	196,614	110,617	115,272	141,495	125,020	138,256	137,288
7 Rate 5	57,116	86,664	72,119	78,584	91,852	54,529	49,552	60,009	57,215	61,999	60,012
8 Rate 6	1,379,283	1,429,399	1,426,773	1,438,654	1,539,933	1,771,450	1,802,906	1,654,578	1,589,704	1,133,887	1,133,887
9 Total	5,454,998	5,709,859	6,002,966	6,279,932	6,573,292	6,718,047	7,016,982	7,250,490	7,234,872	7,079,005	7,004,867

* includes rebalancing rate rider in 2019.



Table 3.2-10
Historical OEB-approved vs Historical Actual

Period Year	A Oct - Sept 2011	B Oct - Sept 2012	C Oct - Sept 2013	D Oct - Sept 2014	E Oct - Sept 2015	F Oct - Sept 2016	G Oct - Sept 2017	H Oct - Sept 2018	I Forecast* Jan - Dec 2018	J Bridge** Jan - Dec 2019	K Test Jan - Dec 2020
1 Volumes (m3's)											
2 Actuals	53,666,830	53,429,409	55,645,803	59,624,780	62,186,642	62,099,494	63,638,559	62,385,461	69,151,042	87,226,445	87,719,322
3 Historical Approved	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759		63,400,857	
4 Difference	(1,682,929)	(1,920,350)	296,044	4,275,021	6,836,883	6,749,735	8,288,800	7,035,702		23,825,588	
5 Revenues (\$'s)											
6 Actuals	5,717,882	5,457,741	5,991,042	6,602,424	6,706,760	6,502,192	6,855,629	7,286,845	7,234,872	7,079,005	7,004,867
7 Historical Approved	5,580,347	5,580,347	5,622,569	5,643,293	5,710,918	5,779,438	5,779,438	5,779,438		6,563,778	
8 Difference	137,535	(122,606)	368,473	959,131	995,842	722,754	1,076,191	1,507,407		515,227	
9 Connections (#'s)											
10 Actuals	7,110	7,370	7,696	8,003	8,284	8,516	8,699	8,953	9,007	9,269	9,538
11 Historical Approved	7,122	7,122	7,122	7,122	7,122	7,122	7,122	7,122		8,775	
12 Difference	(12)	248	573	881	1,162	1,394	1,577	1,831		494	

*No OEB approved values exist for a Jan – Dec 2018 rate year.

**includes rebalancing rate rider in 2019.



Table 3.2-11
Historical OEB-approved vs Normalized Historical Actual

Period Year	A Oct - Sept 2011	B Oct - Sept 2012	C Oct - Sept 2013	D Oct - Sept 2014	E Oct - Sept 2015	F Oct - Sept 2016	G Oct - Sept 2017	H Oct - Sept 2018	I Forecast* Jan - Dec 2018	J Bridge** Jan - Dec 2019	K Test Jan - Dec 2020
1 Volumes (m3's)											
2 Actuals	53,132,766	55,275,371	56,100,634	57,493,103	60,618,177	63,485,408	64,861,032	62,766,165	69,151,042	87,226,445	87,719,322
3 Historical Approved	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759	55,349,759		63,400,857	
4 Difference	(2,216,993)	(74,388)	750,875	2,143,344	5,268,418	8,135,649	9,511,273	7,416,406		23,825,588	
6 Revenues (\$'s)											
7 Actuals	5,454,998	5,709,859	6,002,966	6,279,932	6,573,292	6,718,047	7,016,982	7,250,490	7,234,872	7,079,005	7,004,867
8 Historical Approved	5,580,347	5,580,347	5,622,569	5,643,293	5,710,918	5,779,438	5,779,438	5,779,438		6,563,778	
9 Difference	(125,349)	129,512	380,397	636,639	862,374	938,609	1,237,544	1,471,052		515,227	
11 Connections (#'s)											
12 Actuals	7,110	7,370	7,696	8,003	8,284	8,516	8,699	8,953	9,007	9,269	9,538
13 Historical Approved	7,122	7,122	7,122	7,122	7,122	7,122	7,122	7,122		8,775	
14 Difference	(12)	248	573	881	1,162	1,394	1,577	1,831		494	

*No OEB approved values exist for a Jan – Dec 2018 rate year.

**includes rebalancing rate rider in 2019.



Table 3.2-12
Historical Actual Normalized vs Preceding Year's Historical Actual - Normalized

Period Year	A Oct - Sept 2011	B Oct - Sept 2012	C Oct - Sept 2013	D Oct - Sept 2014	E Oct - Sept 2015	F Oct - Sept 2016	G Oct - Sept 2017	H Oct - Sept 2018	I Forecast* Jan - Dec 2018	J Bridge** Jan - Dec 2019	K Test Jan - Dec 2020
1 Volumes (m3's)											
2 Historical Actual	53,132,766	55,275,371	56,100,634	57,493,103	60,618,177	63,485,408	64,861,032	62,766,165	69,151,042	87,226,445	87,719,322
3 Prior Year Actual		53,132,766	55,275,371	56,100,634	57,493,103	60,618,177	63,485,408	64,861,032		69,151,042	87,226,445
4 Difference		2,142,606	825,262	1,392,470	3,125,074	2,867,231	1,375,624	(2,094,868)		18,075,403	492,877
5 Revenues (\$'s)											
6 Historical Actual	5,454,998	5,709,859	6,002,966	6,279,932	6,573,292	6,718,047	7,016,982	7,250,490	7,234,872	7,079,005	7,004,867
7 Prior Year Actual		5,454,998	5,709,859	6,002,966	6,279,932	6,573,292	6,718,047	7,016,982		7,234,872	7,074,347
8 Difference		254,862	293,107	276,966	293,359	144,756	298,934	233,508		(155,867)	(69,481)
9 Connections (#'s)											
10 Actual Connections	7,110	7,370	7,696	8,003	8,284	8,516	8,699	8,953	9,007	9,269	9,538
11 Prior Year Connections		7,110	7,370	7,696	8,003	8,284	8,516	8,699		9,007	9,269
12 Difference		261	325	307	281	232	183	254		262	269

*No OEB approved values exist for a Jan – Dec 2018 rate year.

**includes rebalancing rate rider in 2019.



3.3 Transactional Services / Storage and Transportation Revenue

15. ENGLP currently does not provide any transactional services nor does it have any storage capabilities. ENGLP has not historically, or currently earn any transportation revenue, as all local production that flows into the distribution system is used by ENGLP customers. As directed in EB-2010-0018, ENGLP currently is required to charge NRG Corp. a transportation fee of \$0.95 per mcf and administrative charge of \$250 per month for use of ENGLP's distribution system to transport gas.

16. For the last number of years, NRG Corp. has not used the distribution system to transport gas and ENGLP's current Gas Purchase Agreement requires ENGLP to purchase all gas produced by these wells. As such, ENGLP has not included any Transmission Services Charges for the purposes of calculating the 2020 Test Year revenue requirement and rates.

17. Historically these charges applied solely to NRG Corp. as it was the only natural gas producer tied into NRG's system. Also, the current rate order and schedule of tariffs and rates for Transmission Services refers specifically to these charges being applied to NRG Corp. In 2018, the NRG Corp. wells were acquired by another natural gas producer. As ENGLP is considering tying in more wells to its system for use by ENGLP customers, ENGLP is proposing changes to its schedule of tariff and rates for Transmission Services in the proposed rate schedules provided with this Application in Exhibit 8, Tab 2, Schedule 4 to apply Transmission Services charges more broadly (i.e., not specific to one natural gas producer) in the event that natural gas producers commence using ENGLP's distribution system to transport gas into Enbridge Gas' Union South system. At this time, ENGLP is not expecting any gas producers to use its distribution system to transport gas into Enbridge Gas' Union South system.

3.4 Other Revenue

18. Table 3.4-1 provides a summary of ENGLP's Other Revenue.

19. ENGLP is forecasting its Other Revenues to remain relatively flat for the 2018 Forecast, 2019 Bridge Year and 2020 Test Year. Although relatively immaterial (i.e., no variances of +/- \$50,000), ENGLP notes the following variances for the following Other Revenue items from the 2018 Forecast to the 2019 Bridge Year:



- Interest and Misc: In 2018 there was a one-time billing adjustment of \$41,383.83 representing the commodity charge under-billed to a customer. This related to consumption during the period of October 2016 to October 2017.
- Utility Fees: Up until 2013, this included fees received for service installations, which was offset against the capital cost of such additions. In 2015, NRG discontinued doing outlet piping installations (now contracted by the customer directly), which has resulted in a reduction in utility fees. The 2019 Bridge Year Forecast (and 2020 Test Period Forecast) are equal to the average of the years 2015-2018.
- Transfer/Connect Charges: Other than for 2018, the amount of these charges has historically been relatively stable. The 2019 Bridge Year Forecast (and 2020 Test Period Forecast) are based on the annual average from 2010–2018.
- Delayed Payments: The forecasts for the 2019 Bridge Year (and 2020 Test Year) are based on the average for years 2010 to 2018.
- Affiliate Charges: ENGLP has not forecast any affiliate revenues. ENGLP has identified 2 FTE's that will be shared 25% with ENGLP Southern Bruce. These efficiencies are included in the calculation of the revenue requirement as reduced O&M costs (Section 4.3.1.1) and will not be accounted for as affiliate revenue.
- Transmission Charges: as explained above, ENGLP has not forecasted transmission revenues. This revenue represents the rates charged to local natural gas producers that use ENGLP's distribution system to move gas into Enbridge's system.

20. Also, as reflected on row 1 of Table 3.4-1 below, on July 1, 2015, NRG sold its ancillary hot water heater rental business which was the main source of its other revenue.

21. ENGLP is proposing to set the returned cheque/payment charge for the Aylmer business unit at the highest Insufficient Funds charge amongst the banks at which its customers obtain banking services. ENGLP is proposing to update this charge annually to reflect changes in the banks' not sufficient funds charges. Any such request will be brought forward for approval in conjunction with ENGLP's annual Price Cap IR application.

22. As described in Section 2.3.1 (Conditions of Service), ENGLP's miscellaneous and service charges were last approved by the Board in EB-2010-0018. Together, these charges



produce other revenue which is treated in Exhibit 8 as an offset to distribution revenue. While this Application proposes to update these charges, given the magnitude of the change as well as the total amount of other revenue forecast, ENGLP does not expect these changes to materially impact any discrete customer groups.



Table 3.4-1
Other Revenue
(\$)

	A	B	C	D	E	F	G	H	I	K	L
	Sept - Oct 2011	Sept - Oct 2012	Sept - Oct 2013	Sept - Oct 2014	Sept - Oct 2015	Sept - Oct 2016	Sept - Oct 2017	Stub Oct - Dec 2017	Forecast Jan - Dec 2018	Bridge Jan - Dec 2019	Test Jan - Dec 2020
1 Non-Utility Income	770,211	795,925	801,794	820,360	710,219	0	0	0	0	0	0
2 Interest and Misc	14,878	1,067	1,208	12,985	22,570	(27,653)	3,889	200	45,933	5,577	5,577
3 Gain on Sale (Vehicles)	0	8,400	6,373	0	3,500	0	0	0	0	0	0
4 Utility Fees	62,573	78,736	27,214	23,755	13,490	14,933	15,428	497	29,272	18,281	18,281
5 Transfer/Connect Fees	30,988	34,565	37,570	38,978	38,624	41,982	39,824	7,506	16,170	34,372	34,372
6 Direct Purchase	5,146	4,153	4,296	4,669	5,355	10,507	6,277	0	10,866	6,156	6,156
7 Delayed Payment Fees	40,617	71,640	61,743	52,477	64,373	46,881	37,795	1,736	17,552	48,527	48,527
8 Affiliate Charges								0	0	0	0
9 Transmission Charges								0	0	0	0
10 Total	924,413	994,486	940,198	953,224	858,131	86,650	103,212	9,939	119,793	112,913	112,913
11 Variance		70,073	(54,288)	13,026	(95,093)	(771,481)	16,563		109,854	(6,880)	0



34 King Street East, Suite 600
Toronto, Ontario, M5C 2X8
elenchus.ca

Weather Normalized Distribution System Load Forecast: 2020 Cost of Service

**Report prepared by
Elenchus Research Associates Inc.**

**Prepared for:
EPCOR Natural Gas LP**

18 December 2018

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1 INTRODUCTION

This report outlines the results of, and methodology used to derive, the 2020 weather normal load forecast prepared for use in the Cost of Service application for 2020 rates for EPCOR Natural Gas Limited Partnership (“ENGLP”).

The methodology outlined in this report is largely consistent with the methodology used by Natural Gas Resources Limited (“NRG”) in previous rates applications, most recently approved in EB-2010-0018. Alternate methods were tested but generally found to be inferior to the previously approved methodology.

The regression equations used to normalize and forecast ENGLP’s weather sensitive load use monthly heating degree days as measured at Environment Canada’s London CS weather station to take into account temperature sensitivity. This location is the closest weather station to ENGLP’s service territory with strong historical weather data. ENGLP experiences peak loads in winter months, though certain rate classes are not weather sensitive. Environment Canada defines heating degree days as the difference between the average daily temperature and 18°C for each day. Heating degree days is 0 when the average temperature is above 18°C.

ENGLP serves six rate classes, R1 to R6, one of which (R1) contains three sub-classes: Residential, Commercial, and Industrial. Each R1 sub-class and the R3 class are weather-sensitive. Consumption of the R2, R4, R5, and R6 rate classes are not correlated to heating degree days. Consumption per customer forecasts for the R1 sub-classes use a baseload and excess consumption methodology to examine the impact of temperature on consumption. The R3 class’ baseload consumption has fluctuated in historic years so the regression for this uses total consumption with a time trend. Consistent with EB-2016-0236, 5-year rolling average consumption per customer is used to forecast consumption of the non-weather sensitive classes.

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

ENGLP does not have a DSM plan so adjustments were made to the class forecasts to account for DSM savings.

1.1 SUMMARIZED RESULTS

ENGLP, and previously NRG, used an October to September rate year until 2018. The distributor is moving to a January to December rate year in 2019. The following table

summarizes the historic and weather normalized consumption according to the new rate year (January to December calendar year).

Normal Forecast

	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2017 Normalized	2018 Forecast*	2019 Forecast	2020 Forecast
R1 Residential	14,287,143	16,127,158	14,948,329	14,417,053	15,400,135	16,015,988	16,836,357	16,555,631	17,043,677
R1 Industrial	1,436,592	1,666,209	1,430,900	1,462,707	1,752,123	1,860,454	1,873,654	1,731,722	1,743,215
R1 Commercial	4,352,319	4,788,282	4,420,443	4,117,374	4,734,213	4,945,685	5,060,879	4,769,270	4,851,704
R2 Seasonal	1,844,495	1,988,124	1,242,867	1,394,132	1,410,653	1,410,653	1,381,945	1,322,665	1,280,413
R3	1,644,742	1,792,006	1,692,328	1,492,346	1,653,466	1,712,042	1,893,687	1,801,305	1,721,684
R4	861,111	1,345,169	994,710	904,160	1,124,029	1,124,029	1,056,298	1,116,228	1,149,006
R5	1,016,630	1,128,958	672,622	562,860	753,900	753,900	673,249	685,748	685,748
R6	31,582,423	31,735,774	34,710,609	40,074,176	36,485,139	36,485,139	40,374,973	59,243,876	59,243,876
Total	57,025,455	60,571,680	60,112,808	64,424,808	63,313,659	64,307,890	69,151,042	87,226,445	87,719,322

*The 2018 forecast includes actual figures to August and forecast figures thereafter.

Table 1 Consumption Forecast by class

The following table summarizes the historic and forecast customer/connections for 2013-2020:

Customers / Connections

	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual*	2019 Forecast	2020 Forecast
R1 Residential	7181	7470	7726	7956	8110	8363	8616	8877
R1 Industrial	58	63	62	65	66	67	67	68
R1 Commercial	424	437	445	453	462	477	485	494
R2 Seasonal	64	65	63	59	55	53	52	50
R3	4	4	4	4	5	6	6	6
R4	32	33	34	35	36	36	37	38
R5	5	5	5	5	5	4	4	4
R6	1	1	1	1	1	1	1	1
Total	7,769	8,079	8,340	8,578	8,738	9,007	9,269	9,538

*The 2018 customer count includes actual figures to September and forecasts thereafter.

Table 2 Customer Forecast for 2013-2020

Forecasts of 2020 consumption by tier, for the classes billed based on volume tiers, is provided below.

2020 Tier Forecast

kW	Period	Tier 1	Tier 2	Tier 3	Total
R1 Residential		16,935,901	107,776		17,043,677
R1 Industrial		392,687	1,350,528		1,743,215
R1 Commercial		2,279,405	2,572,300		4,851,704
Seasonal	Apr-Oct	85,252	712,097	136,040	933,388
Seasonal	Nov-Mar	66,160	263,451	17,414	347,024
R4	Jan-Mar	18,003	3,645		21,648
R4	Apr-Dec	94,302	1,033,055		1,127,358

Table 3 2020 Consumption Forecast by Tier

2 METHODOLOGY

Energy use for R1 Residential, R1 Industrial, R1 Commercial and R3 rate classes are forecast with multivariate regressions. Regressions were not selected for R2 Seasonal, R4, R5 and R6 rate classes as these classes do not exhibit sufficient sensitivity to the explanatory variables available for a statistical regression approach.

2.1 CONSUMPTION OF WEATHER SENSITIVE CLASSES

Consumption of the three R1 rate classes are forecast using a base load and excess consumption method. Average monthly consumption per customer is first calculated for each class. The amounts are then reduced by the base load consumption, which is considered the average consumption in the summer months of July and August. The remaining consumption is considered the weather-sensitive load (or “excess” load).

The excess load is regressed by the actual heating degree days in each month to determine the impact of cold weather on average consumption. A time-series (Prais-Winsten) regression is used to determine the coefficient, consistent with the methodology used in prior NRG throughput forecasts. A simple Ordinary Least Squares (“OLS”) model is not appropriate as the errors exhibit a high level of autocorrelation (as demonstrated by Durbin-Watson statistics close to, or below, 1).

Actual heating degree days are then multiplied by the coefficients and base load consumption is added back to determine the average predicted consumption in each month. Predicted total consumption of a class is determined by multiplying this sum by the actual number of customers.

The methodology is similar for the R3 class but the base load is not removed before the regression. While the calculated base load consumption is generally consistent from year to year for the R1 classes, the base load appears to have declined in historic years. As a consequence of higher base load consumption in earlier years, the calculated base load is higher than consumption in 25 of the 107 sample months and over double the volume of consumption in the most recent summer months.

To forecast 2020 consumption forecast heating degree days, as described in section 4, are used in place of actual heating degree days. Weather normalized consumption in historic years is determined by removing the deviations from average weather from consumption. This is done by multiplying the coefficients by the difference between actual and average heating degree days and applying the difference to actual consumption.

2.2 CONSUMPTION OF NON-WEATHER SENSITIVE CLASSES

Consumption of four rate classes (R2 Seasonal, R4, R5 and R6) are not weather-sensitive and do not exhibit sensitivity to the explanatory variables. Total and monthly volumes fluctuate from year to year so a 5-year rolling average is used to forecast monthly consumption for each of these classes.

2.3 CUSTOMER COUNTS

Customer counts in 2020 are forecast by applying the geometric mean annual growth rate from 2009 to 2018 to the 2018 average customer count. Calculations for each class are provided in section 5 and 6 of this report.

2.4 CONSUMPTION TIERS

The R1 classes, R2 Seasonal Class, and R4 classes are billed according to consumption tiers (also known as volume blocks). Historic tiered data was available from January 2017 to November 2018.

The R1 classes are billed different rates on consumption above and below a 1,000 m³ threshold. As these classes are weather-sensitive, the share of energy consumed in each tier is determined by adjusting actual consumption in each month for each individual customer to weather normal consumption. This method allows a class' forecast consumption to be consistent with the weather normalized total volume while maintaining the consumption profile of the rate classes. The weather-normalized consumption split between Tier 1 and Tier 2 in historic years is determined for each month and used to forecast the monthly splits in the forecast months. When two years of data was available, an average of the 2017 and 2018 splits was used.

The R2 Seasonal and R4 classes are not weather-sensitive so the average of 2017 and 2018 tier splits were applied to total annual consumption. The month of December 2017 was used with the 2018 data to provide a full year of data.

3 CLASS SPECIFIC CONSUMPTION REGRESSIONS

3.1 R1 RESIDENTIAL

For the R1 Residential Class consumption the equation was estimated using 107 observations from 2009:10-2018:08. The natural logarithm of heating degree days for the months of September to June were used, as measured at the London CS weather station as described in the introduction.

Several other variables were examined and found to not show a statistically significant relationship to energy usage. Those included economic indicators of full-time employment and GDP, days in each month, work days in each month, and a time trend.

Base load consumption of 33.9m³ was removed from the average consumption variable in each month. This amount is added back to the predicted values.

The following table outlines the resulting regression model:

Model 1: Prais-Winsten, using observations 2009:10-2018:08 (T = 107)

Dependent variable: ExLNResAverage

rho = 0.341613

	coefficient	std. error	t-ratio	p-value
const	0.286376	0.061265	4.674397	9.62E-06
LNHDDJanuary	0.828357	0.014685	56.40873	2.07E-75
LNHDDFebruary	0.822583	0.014954	55.00849	2.15E-74
LNHDDMarch	0.818889	0.015329	53.42136	3.28E-73
LNHDDApril	0.78583	0.01641	47.88837	8.14E-69
LNHDDMay	0.761622	0.019218	39.63051	2.65E-61
LNHDDJune	0.514494	0.024541	20.96434	1.32E-37
LNHDDSeptember	0.446901	0.019967	22.38168	7.10E-40
LNHDDOctober	0.719796	0.016929	42.51864	4.44E-64
LNHDDNovember	0.791805	0.01587	49.89424	1.84E-70
LNHDDDecember	0.822914	0.015058	54.65091	3.95E-74

Statistics based on the rho-differenced data

Mean dependent var	3.77219	S.D. dependent var	2.00E+00
Sum squared resid	4.31458	S.E. of regression	0.211999
R-squared	0.98978	Adjusted R-squared	0.988715
F(10, 96)	522.0839	P-value(F)	5.24E-79
rho	0.01145	Durbin-Watson	1.94E+00

Table 4 R1 Residential Regression Model

In the above table, and all regression results tables in the section, LN denotes natural logarithm, HDD denotes heating degree days, and the month name denotes a dummy variable representing 1 in the labeled month and 0 in all other months. The values within the LNHDDJanuary variable, for example, includes the natural logarithm of the number of heating degree days for each January, and 0 in all other months. The label for the

dependent variable includes “Ex” denoting the values of this variable are the excess consumption above the class’ base load.

Using the above model coefficients, we derive the following:

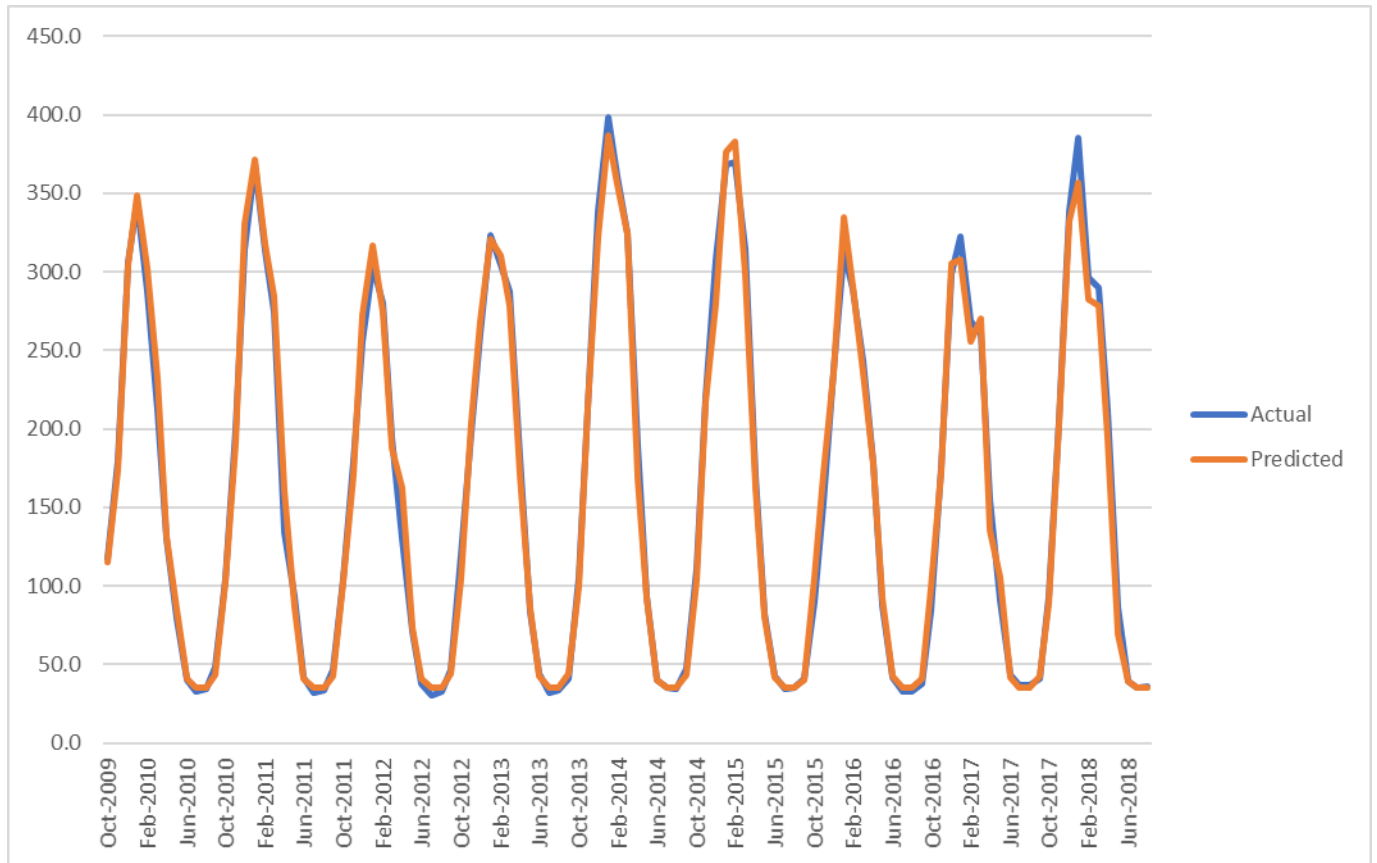


Figure 1 R1 Residential Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates per customer for the period is 2.4%. The MAPE calculated monthly over the period is 5.3%.

Year	Residential		Absolute Error (%)
	Actual	Predicted	
2010	1,827.0	1,878.7	2.8%
2011	1,876.3	1,922.6	2.5%
2012	1,704.9	1,748.5	2.6%
2013	1,989.8	1,959.7	1.5%
2014	2,162.0	2,082.2	3.7%
2015	1,938.2	1,966.1	1.4%
2016	1,813.1	1,860.4	2.6%
2017	1,892.5	1,853.7	2.0%
2018	1,379.6	1,291.9	6.4%
Total	15,203.7	15,271.9	0.4%

Mean Absolute Percentage Error (Annual)	2.4%
Mean Absolute Percentage Error (Monthly)	5.3%

Table 5 R1 Residential model error

3.2 R1 INDUSTRIAL

For the R1 Industrial Class consumption the equation was estimated using 107 observations from 2009:10-2018:08. The natural logarithm of heating degree days for the months from August to May were used, as measured at the London CS weather station.

Several other variables were examined and found to not show a statistically significant relationship to energy usage. Those included economic indicators of full-time employment and GDP, days in each month, work days in each month, and a time trend.

Base load consumption of 529.3m³ was removed from the average consumption variable in each month. This amount is added back to the predicted values.

The following table outlines the resulting regression model:

Model 2: Prais-Winsten, using observations 2009:10-2018:08 (T = 107)

Dependent variable: ExLNR1Average

rho = 0.556478

	coefficient	std. error	t-ratio	p-value
const	1.913912226	0.323677	5.91304	5.14E-08
LNHDDJanuary	0.88938857	0.072938	12.19384	3.24E-21
LNHDDFebruary	0.876451565	0.07329	11.95871	1.01E-20
LNHDDMarch	0.884618456	0.072791	12.15278	3.95E-21
LNHDDApril	0.887053969	0.072844	12.17749	3.50E-21
LNHDDMay	0.856787202	0.07221	11.86525	1.58E-20
LNHDDAugust	1.009178715	0.154106	6.548612	2.86E-09
LNHDDSeptember	0.934984319	0.098311	9.510471	1.68E-15
LNHDDOctober	1.139557655	0.082787	13.76499	1.90E-24
LNHDDNovember	1.083290705	0.078424	13.81319	1.52E-24
LNHDDDecember	0.937670949	0.074919	12.51583	6.91E-22

Statistics based on the rho-differenced data

Mean dependent var	6.146111421	S.D. dependent var	2.556188
Sum squared resid	86.03767028	S.E. of regression	0.946692
R-squared	0.875891013	Adjusted R-squared	8.63E-01
F(10, 96)	32.41634104	P-value(F)	1.65E-26
rho	0.021667051	Durbin-Watson	1.95E+00

Table 6 R1 Industrial Regression Model

Using the above model coefficients we derive the following:

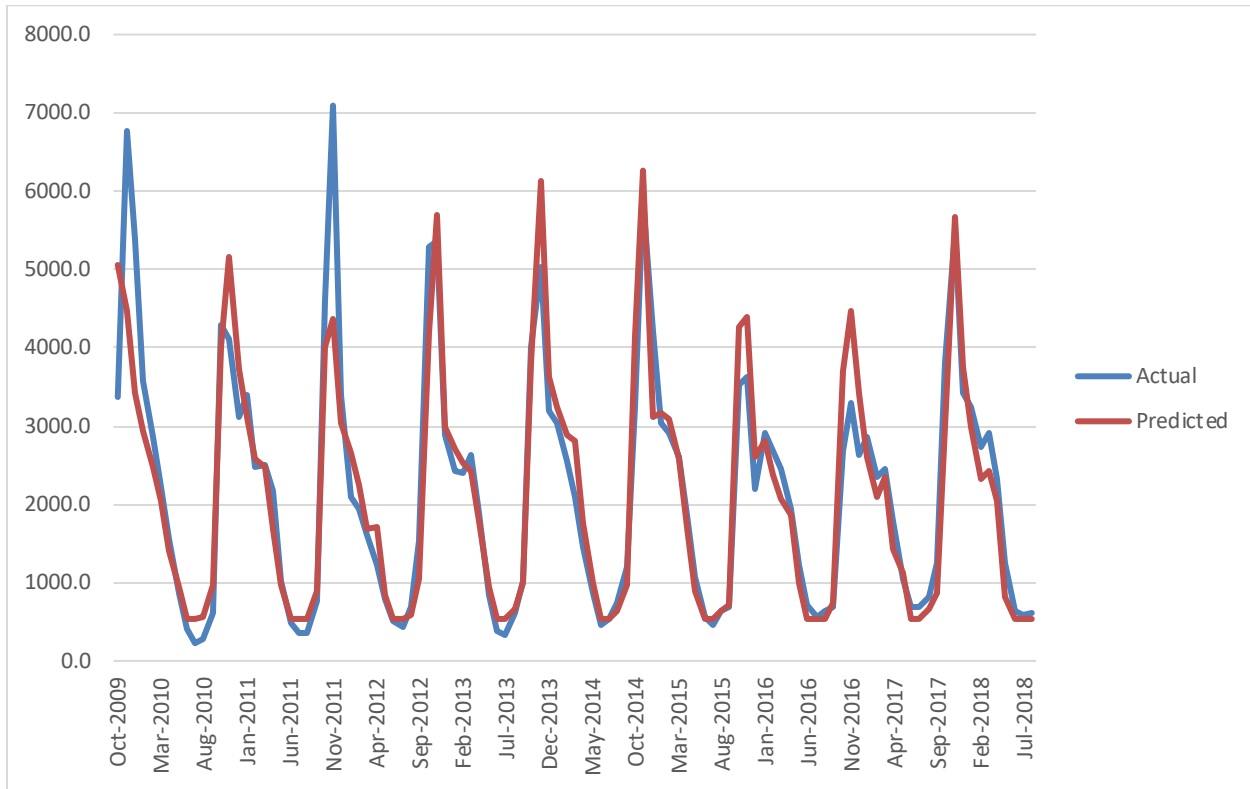


Figure 2 R1 Industrial Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 7.1%. The MAPE calculated monthly over the period is 18.8%.

Year	R1 Industrial		Absolute Error (%)
	Actual	Predicted	
2010	24,101.1	25,300.0	5.0%
2011	28,608.0	24,758.4	13.5%
2012	24,350.5	24,736.0	1.6%
2013	24,752.3	26,685.2	7.8%
2014	26,305.8	27,890.3	6.0%
2015	23,185.5	25,123.6	8.4%
2016	22,433.0	24,052.7	7.2%
2017	26,620.2	24,649.7	7.4%
2018	14,264.9	12,195.6	14.5%
Total	200,356.4	203,195.9	1.4%

Mean Absolute Percentage Error (Annual)	7.1%
Mean Absolute Percentage Error (Monthly)	18.8%

Table 7 R1 Industrial model error

3.3 R1 COMMERCIAL

For the R1 Commercial Class consumption the equation was estimated using 107 observations from 2009:10-2018:08. The natural logarithm of heating degree days for the months from September to June were used, as measured at the London CS weather station.

Several other variables were examined and found to not show a statistically significant relationship to energy usage. Those included economic indicators of full-time employment and GDP, days in each month, work days in each month, and a time trend.

Base load consumption of 200.3m³ was removed from the average consumption variable in each month. This amount is added back to the predicted values.

The following table outlines the resulting regression model:

Model 3: Prais-Winsten, using observations 2009:10-2018:08 (T = 107)
 Dependent variable: ExLNComAverage
 rho = 0.0871572

	coefficient	std. error	t-ratio	p-value
const	1.443241	0.184195	7.835378	6.33E-12
LNHDDJanuary	0.898141	0.047277	18.99753	2.74E-34
LNHDDFebruary	0.896155	0.048152	18.61077	1.30E-33
LNHDDMarch	0.88806	0.049533	17.92852	2.12E-32
LNHDDApril	0.859753	0.053615	16.03561	6.67E-29
LNHDDMay	0.826371	0.064814	12.74986	2.26E-22
LNHDDJune	0.550493	0.090957	6.052206	2.76E-08
LNHDDSeptember	0.619685	0.073979	8.376481	4.51E-13
LNHDDOctober	0.780384	0.056767	13.74718	2.06E-24
LNHDDNovember	0.855724	0.051725	16.54369	7.35E-30
LNHDDDecember	0.888466	0.048614	18.27598	5.07E-33

Statistics based on the rho-differenced data

Mean dependent var	5.268285	S.D. dependent var	2.239159
Sum squared resid	54.07961	S.E. of regression	0.750553
R-squared	0.898246	Adjusted R-squared	0.887647
F(10, 96)	73.5668	P-value(F)	1.64E-40
rho	-0.01829	Durbin-Watson	2.04E+00

Table 8 R1 Commercial Regression Model

Using the above model coefficients we derive the following:

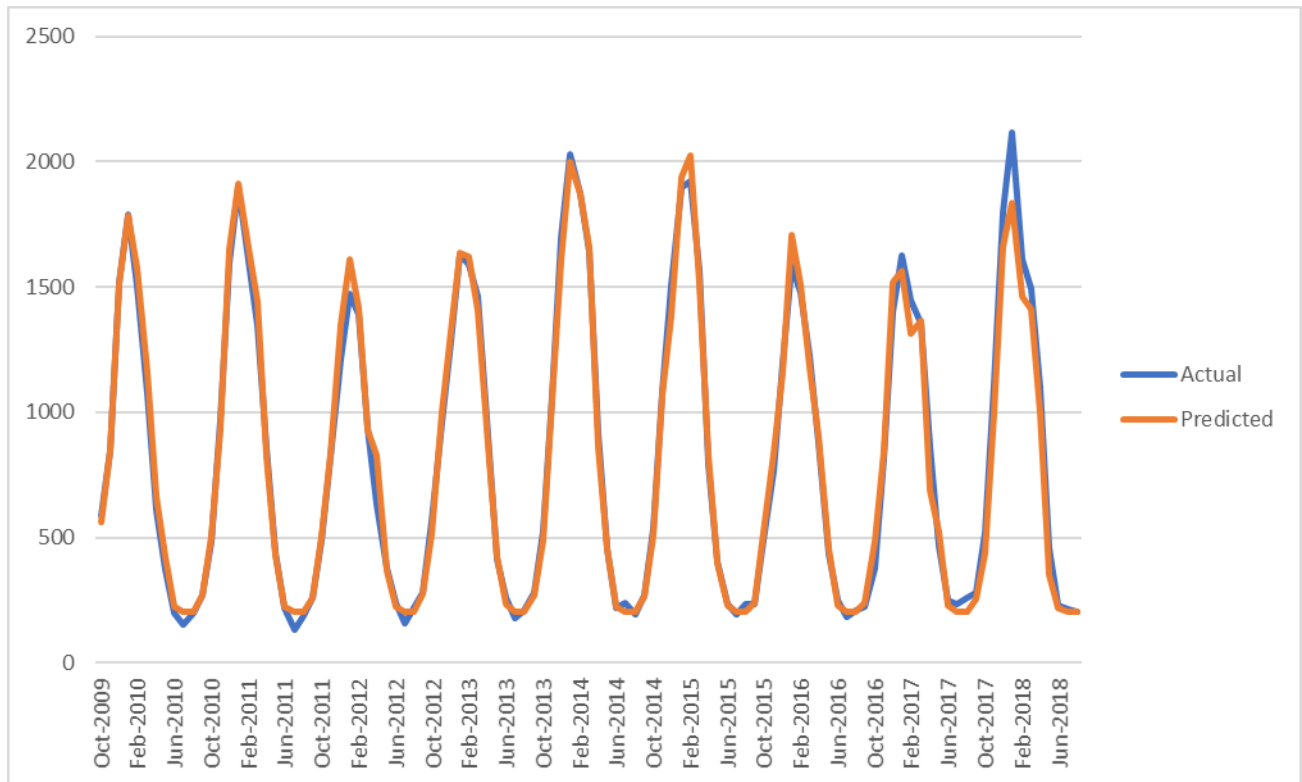


Figure 3 R1 Commercial Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 3.9%. The MAPE calculated monthly over the period is 7.1%.

Year	R1 Commercial		Absolute Error (%)
	Actual	Predicted	
2010	9,215.8	9,602.9	4.2%
2011	9,476.8	9,848.1	3.9%
2012	8,515.3	8,914.4	4.7%
2013	10,226.6	10,025.4	2.0%
2014	10,963.7	10,703.6	2.4%
2015	9,935.2	10,102.6	1.7%
2016	9,065.5	9,491.1	4.7%
2017	10,218.9	9,442.6	7.6%
2018	7,433.7	6,684.8	10.1%
Total	77,617.9	78,130.6	0.7%
Mean Absolute Percentage Error (Annual)			3.9%
Mean Absolute Percentage Error (Monthly)			7.1%

Table 9 R1 Commercial model error

3.4 R3

For the R3 Class consumption the equation was estimated using 107 observations from 2009:10-2018:08. The natural logarithm of heating degree days for the months from September to May were used, as measured at the London CS weather station. A natural log of a time trend is also included, beginning at $\ln(10)$ in October 2009 (increasing by $\ln(10+t)$ each month) is used as this class exhibits declining average consumption over time.

The R3 class' customer count declined from 6 to 4 from October 2009 to June 2010, which had a clear impact on average consumption per customer, as shown on the below chart. A dummy variable is used for this period (denoted d2009), set at 1 for the months October 2009 to May 2010 and 0.5 in June 2010, the month the customer count fell to 4. A dummy variable for June was included as consumption in June was typically greater than what was expected based on the weather in that month. A dummy variable for the shoulder months of March, April, May, September, October, and November was also used to reflect lower consumption in those months than could be explained by heating degree days.

Several other variables were examined and found to not show a statistically significant relationship to energy usage. Those included economic indicators of full-time employment and GDP, days in each month, and work days in each month.

The following table outlines the resulting regression model:

Model 8: Prais-Winsten, using observations 2009:10-2018:08 (T = 107)
 Dependent variable: LNContractR3Average
 rho = 0.600607

	coefficient	std. error	t-ratio	p-value
Const	11.4633612	0.450051	25.47122742	1.03E-43
LNHDDJanuary	0.249947838	0.018506	13.50641003	1.20E-23
LNHDDFebruary	0.237305521	0.018832	12.60122119	7.95E-22
LNHDDMarch	0.439458416	0.087933	4.997634234	2.72E-06
LNHDDApril	0.413137339	0.094959	4.350684666	3.48E-05
LNHDDMay	0.39686933	0.114931	3.453120249	8.36E-04
LNHDDSeptember	0.380029109	0.129216	2.94104127	4.13E-03
LNHDDOctober	0.380673822	0.100703	3.780180895	2.77E-04
LNHDDNovember	0.408185589	0.091849	4.44407144	2.43E-05
LNHDDDecember	0.229662771	0.018752	12.24705003	4.20E-21
InTrend	-0.488377185	0.108665	-4.494355666	2.01E-05
d2009	-0.937840905	0.230615	-4.066699641	9.98E-05

June	0.224005779	0.083847	2.671613043	8.91E-03
Shoulder	-1.303660595	0.548763	-2.38E+00	0.019571

Statistics based on the rho-differenced data

Mean dependent var	10.3103726	S.D. dependent var	6.88E-01
Sum squared resid	4.864423779	S.E. of regression	2.29E-01
R-squared	0.903210734	Adjusted R-squared	8.90E-01
F(13, 93)	43.88033372	P-value(F)	6.92E-34
rho	0.030651773	Durbin-Watson	1.94E+00

Table 10 R3 Regression Model

Using the above model coefficients we derive the following:

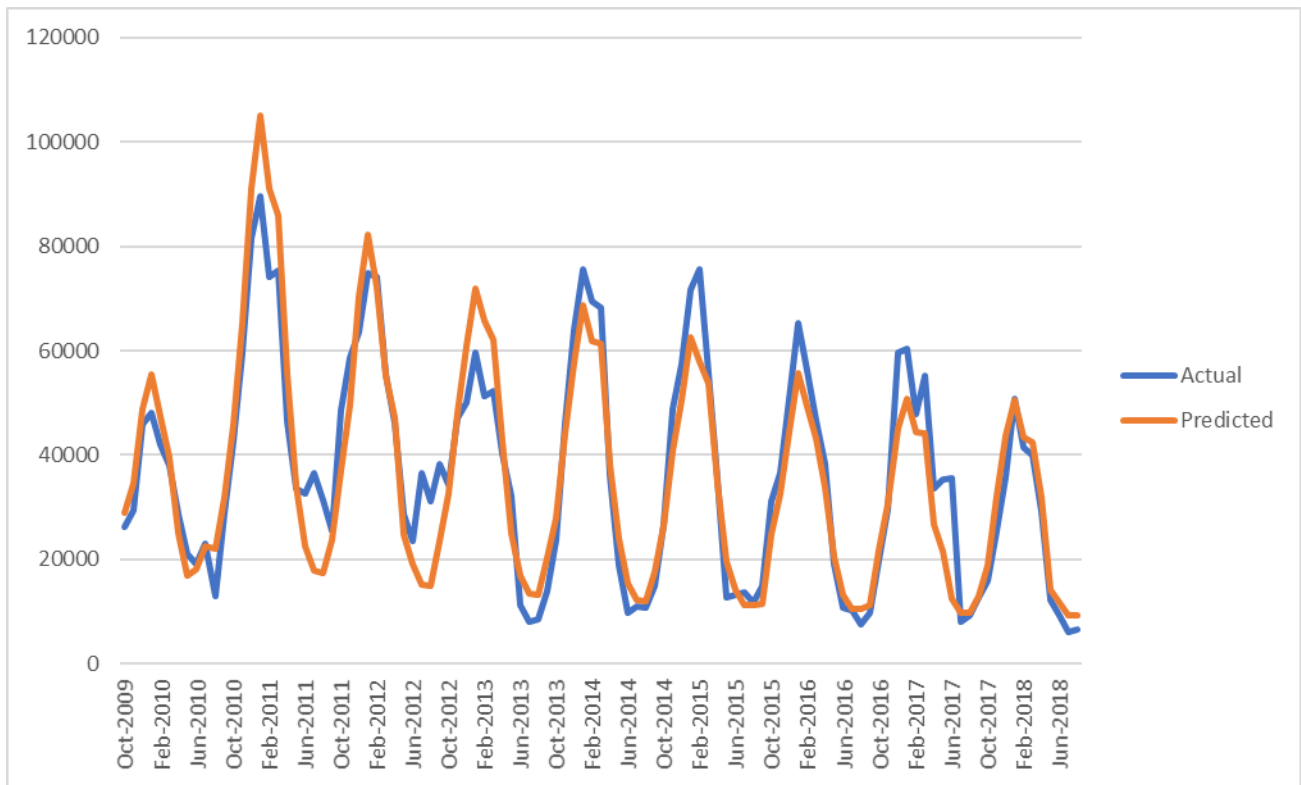


Figure 4 R3 Predicted vs Actual observations

Annual estimates using actual weather are compared to actual values in the table below. Mean absolute percentage error (MAPE) for annual estimates for the period is 8.0%. The MAPE calculated monthly over the period is 18.8%. The MAPEs are relatively high for this class but more variance can be expected in a class with only 4 to 6 customers.

Year	R3		Absolute
	Actual	Predicted	Error (%)
2010	445,893.3	481,596.9	8.0%

2011	616,171.8	610,633.1	0.9%
2012	540,426.3	495,807.8	8.3%
2013	411,185.5	461,725.4	12.3%
2014	448,001.5	429,751.8	4.1%
2015	423,082.0	378,318.8	10.6%
2016	373,086.5	346,150.4	7.2%
2017	375,566.4	327,721.9	12.7%
2018	195,783.4	213,096.0	8.8%
Total	3,633,413.2	3,531,706.1	2.8%

Mean Absolute Percentage Error (Annual)	8.0%
Mean Absolute Percentage Error (Monthly)	18.8%

Table 11 R3 model error

4 WEATHER NORMALIZATION

It is not possible to accurately forecast weather for months or years in advance. Therefore, one can only base future weather expectations on what has happened in the past. Individual years may experience unusual spells of weather (unusually cold winter, unusually warm summer, etc.). However, over time, these unusual spells “average” out. While there may be trends over several years (e.g., warmer winters for example), using several years of data rather than one particular year filters out the extremes of any particular year. While there are several different approaches to determining an appropriate weather normal, ENGLP has adopted the 10-year trend of 10-year monthly degree day averages.

Various methods were analysed to determine the most appropriate methodology to forecast monthly heating degree days in 2020. A 5-year average, 10-year average, 20-year trend, 5-year weighted average, 10-year trend of 5 year averages, 10-year trend of 10-year averages, and the midpoint of the 10-year average and 20-year trend.

Data from 1980 to 2018 was used to evaluate each method’s predicted heating degree days against the actual heating degree days for each month since January 2000. Data from Environment Canada’s London Airport weather station was used for the period from 1980 to 2002. London Airport’s temperature data is only provided until 2002, which is approximately when temperature data for London CS begins. Data from the London A weather station (another London Airport weather station with temperature data as of March 2012) is used in place of London CS when data from that station is unavailable.

Each method was ranked according to the magnitude of the deviations between predicted and actual heating degree days, with 1 being the closest predicted value and 7 being the furthest. The rankings were done on monthly and annual bases. The following table

shows the annual rankings, average annual and monthly rankings, and variance of the deviations on monthly and annual bases.

Year	5-Year Average	10-Year Average	20-Year Trend	Weighted 5-Year Average	10-Year Trend (5MA)	10-Year Trend (10MA)	10-Yr Avg & 20-Yr Trend Midpoint
2000	2	1	5	6	7	4	3
2001	2	5	3	1	7	6	4
2002	2	5	1	4	7	6	3
2003	7	2	5	6	4	1	3
2004	6	2	5	4	7	1	3
2005	4	3	6	2	7	1	5
2006	6	2	4	7	1	5	3
2007	2	4	6	3	7	1	5
2008	1	4	6	3	7	2	5
2009	1	2	6	3	4	7	5
2010	3	5	2	7	6	1	4
2011	1	6	5	4	7	2	3
2012	5	6	1	4	7	3	2
2013	4	3	7	6	1	2	5
2014	4	2	7	6	3	1	5
2015	4	2	5	1	7	6	3
2016	6	3	5	7	1	2	4
2017	2	4	6	7	1	3	5
Average Rank							
Monthly	4.09	3.86	4.10	4.25	3.96	3.84	3.91
Annual	3.44	3.39	4.72	4.50	5.06	3.00	3.89
Variance of Difference between Predicted and Actual							
Monthly	4,249	3,788	4,283	4,616	4,160	3,710	3,997
Annual	72,005	61,831	70,319	78,735	74,382	57,264	65,169

Table 12 HDD Rankings and Variance

The rankings and variance analysis reveals that the 10-year trend of the 10-year average is the best methodology for predicting future heating degree days. On a monthly and annual basis, the predicted heating degree days using this methodology is closest to actual heating degree days and the deviations from actual weather have the lowest variance among the methods analysed.

For clarity, the 10-year trend of the 10-year moving average is the annualized trend of one 10-year period to the next 10-year period. For example, the 2000 predicted value uses the trend from the average heating degree days between 1980 and 1989 to the average between 1990 and 1999. See section 4 for further details.

This method is the best predictive method as it accounts for trends in heating degree days over time without being over reliant on the data of any one year. Simple averages do not consider weather trends over time and typical trend forecasts can be significantly impacted by single data points.

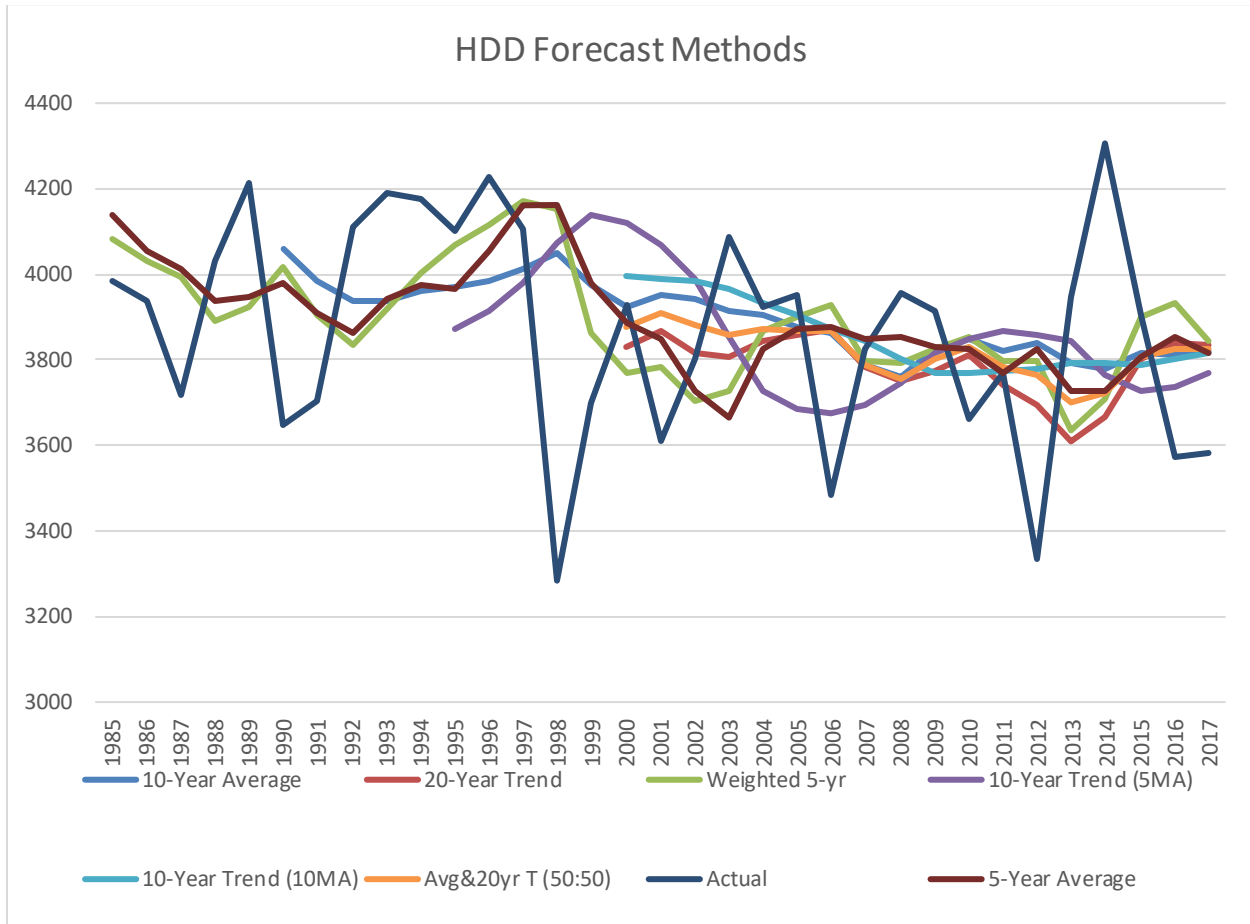


Figure 5 Weather Forecast for Various Methods

The monthly predicted and forecast heating degree days are detailed in the following table.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Actual
2000	697	666	562	351	170	40	10	17	109	276	460	639	3996	3930
2001	705	659	567	354	171	40	10	16	107	273	460	628	3990	3611
2002	717	650	566	357	171	40	10	16	105	267	460	626	3984	3801
2003	726	642	567	358	169	40	11	16	102	261	453	620	3964	4089
2004	727	629	565	356	173	38	11	14	96	256	447	621	3932	3924
2005	733	620	565	352	174	37	10	12	89	253	440	618	3903	3952
2006	737	613	558	347	171	37	10	11	82	252	432	620	3871	3485
2007	742	608	555	340	169	37	8	11	73	253	423	622	3842	3827
2008	737	604	551	331	166	36	7	11	67	257	410	622	3800	3956
2009	728	609	549	326	161	36	6	10	63	255	402	626	3771	3914

2010	718	619	550	320	163	34	6	10	60	255	399	634	3769	3664
2011	715	628	551	315	165	34	6	10	59	256	397	637	3772	3769
2012	714	638	551	308	165	33	6	10	59	256	397	639	3776	3335
2013	718	651	554	305	165	32	6	10	60	257	396	639	3793	3949
2014	720	661	547	303	160	31	6	10	64	256	398	634	3791	4306
2015	720	666	541	304	155	30	6	10	67	252	405	633	3788	3904
2016	718	673	543	308	149	28	6	10	72	249	417	629	3802	3575
2017	722	684	548	312	141	27	7	10	75	248	424	616	3814	3582
2018	728	687	547	318	135	28	7	11	75	245	426	608	3814	
2019	728	680	546	319	128	29	7	11	74	241	426	604	3794	
2020	733	670	546	327	121	29	7	11	74	239	427	604	3789	

Table 13 Forecast HDD

5 WEATHER-NORMALIZED CLASS FORECASTS

5.1 R1 RESIDENTIAL

Incorporating the normalized and forecast heating degree days the following weather corrected consumption and forecast values are calculated:

Year	Customers	R1 Residential				
		Consumption		Actual	Normalized	
		Per Customer	Total		Per Customer	Total
2010	6472	1827	11,824,006.2	11,839,669	1870	12,104,164.6
2011	6609	1876	12,400,851.8	12,393,486	1880	12,427,735.8
2012	6896	1705	11,756,626.1	11,751,822	1885	13,001,068.4
2013	7181	1990	14,289,175.1	14,287,143	1954	14,033,441.3
2014	7470	2162	16,150,602.8	16,127,158	2001	14,949,403.7
2015	7726	1938	14,974,491.5	14,948,329	1895	14,642,987.5
2016	7956	1813	14,425,323.4	14,417,053	1878	14,938,488.1
2017	8110	1892	15,347,218.4	15,400,135	1975	16,015,988.4
2018	8363				2,013	16,836,356.7
2019	8616				1,921	16,555,631.1
2020	8877				1,920	17,043,676.5

Table 14 Actual vs Normalized R1 Residential

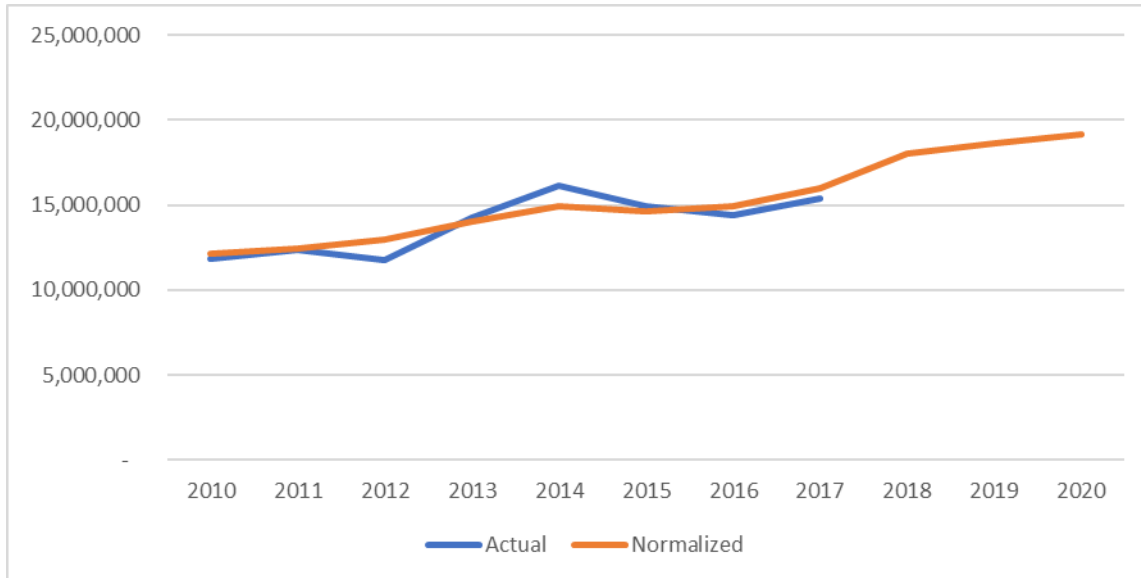


Figure 6 Actual vs Normalized R1 Residential

A tiered forecast was produced using actual individual customer data adjusted to weather-normal consumption.

R1 Residential			
	Tier 1	Tier 2	Total
2017	15,289,194	110,941	15,400,135
2018	16,726,306	110,051	16,836,357
2019	16,450,933	104,699	16,555,631
2020	16,935,901	107,776	17,043,677

Table 15 Forecasted R1 Residential Tiered Consumption

The Geometric mean of the annual growth from 2009 to 2018 was used to forecast the growth rate from 2019 to 2020.

Year	Residential Customers	Percent of Prior Year
2009	6396	
2010	6472	101.2%
2011	6609	102.1%
2012	6896	104.3%
2013	7181	104.1%
2014	7470	104.0%
2015	7726	103.4%
2016	7956	103.0%
2017	8110	101.9%
2018	8363	103.1%
2019	8616.4	103.0%
2020	8877.1	103.0%

Table 16 Forecasted R1 Residential Customer Count

5.2 R1 INDUSTRIAL

Incorporating the normalized and forecast heating degree days the following weather corrected consumption and forecast values are calculated:

Year	Customers	R1 Industrial Consumption		Actual	Normalized	
		Per Customer	Total		Per Customer	Total
2010	43	24101	1,034,341.0	960,283	25349	1,087,887.0
2011	43	28608	1,225,375.6	1,247,376	30507	1,306,695.5
2012	51	24350	1,252,019.1	1,265,913	25084	1,289,757.1
2013	58	24752	1,429,444.4	1,436,592	24292	1,402,860.3
2014	63	26306	1,659,455.7	1,666,209	24509	1,546,118.5
2015	62	23186	1,439,434.7	1,430,900	23570	1,463,324.4
2016	65	22433	1,461,880.9	1,462,707	24695	1,609,289.6
2017	66	26620	1,752,498.6	1,752,123	28260	1,860,453.7
2018	67				28,140	1,873,653.6
2019	67				25,660	1,731,722.3
2020	68				25,636	1,743,215.3

Table 17 Actual vs Normalized R1 Industrial

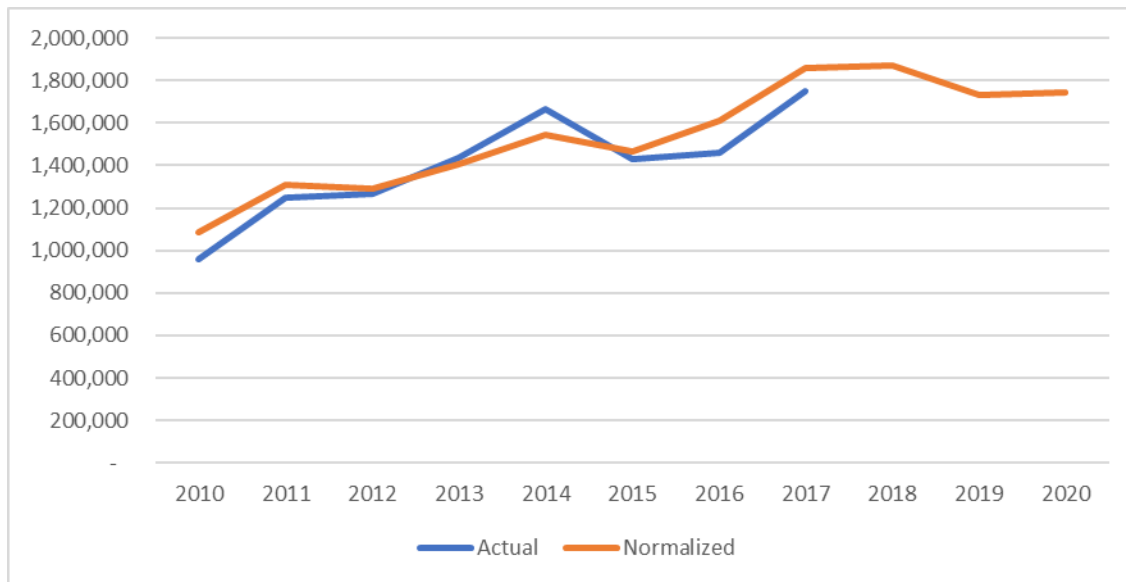


Figure 7 Actual vs Normalized R1 Industrial

A tiered forecast was produced using actual individual customer data adjusted to weather-normal consumption.

R1 Industrial

	Tier 1	Tier 2	Total
2017	362,170	1,389,954	1,752,123
2018	430,916	1,442,737	1,873,654
2019	390,053	1,341,669	1,731,722
2020	392,687	1,350,528	1,743,215

Table 18 Forecasted R1 Industrial Tiered Consumption

The Geometric mean of the annual growth from 2014 to 2018 was used to forecast the growth rate from 2019 to 2020. The number of customers in this class grew significantly from 2009 to 2013 so the growth rates from these years was excluded as they do not reflect the current customer growth trend.

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

Year	R1 Industrial Customers	Percent of Prior Year
2009	30	
2010	43	141.5%
2011	43	99.8%
2012	51	120.0%
2013	58	112.3%
2014	63	109.2%
2015	62	98.4%
2016	65	105.0%
2017	66	101.0%
2018	67	101.1%
2019	67.5	101.4%
2020	68.4	101.4%

Table 19 Forecasted R1 Industrial Customer Count

5.3 R1 COMMERCIAL

Incorporating the normalized and forecast heating degree days the following weather corrected consumption and forecast values are calculated:

Year	Customers	R1 Commercial				
		Consumption		Actual	Normalized	
		Per Customer	Total		Per Customer	Total
2010	405	9216	3,736,258.8	3,735,278	9455	3,833,369.2
2011	405	9477	3,833,380.4	3,846,511	9531	3,855,428.7
2012	415	8515	3,533,843.6	3,526,397	9452	3,922,470.4
2013	424	10227	4,336,095.1	4,352,319	10028	4,252,064.8
2014	437	10964	4,795,706.0	4,788,282	10096	4,416,228.7
2015	445	9935	4,421,983.3	4,420,443	9689	4,312,476.6
2016	453	9065	4,102,131.0	4,117,374	9405	4,255,919.0
2017	462	10219	4,716,893.5	4,734,213	10715	4,945,684.5
2018	477				10,615	5,060,878.6
2019	485				9,828	4,769,269.6
2020	494				9,821	4,851,704.3

Table 20 Actual vs Normalized R1 Commercial

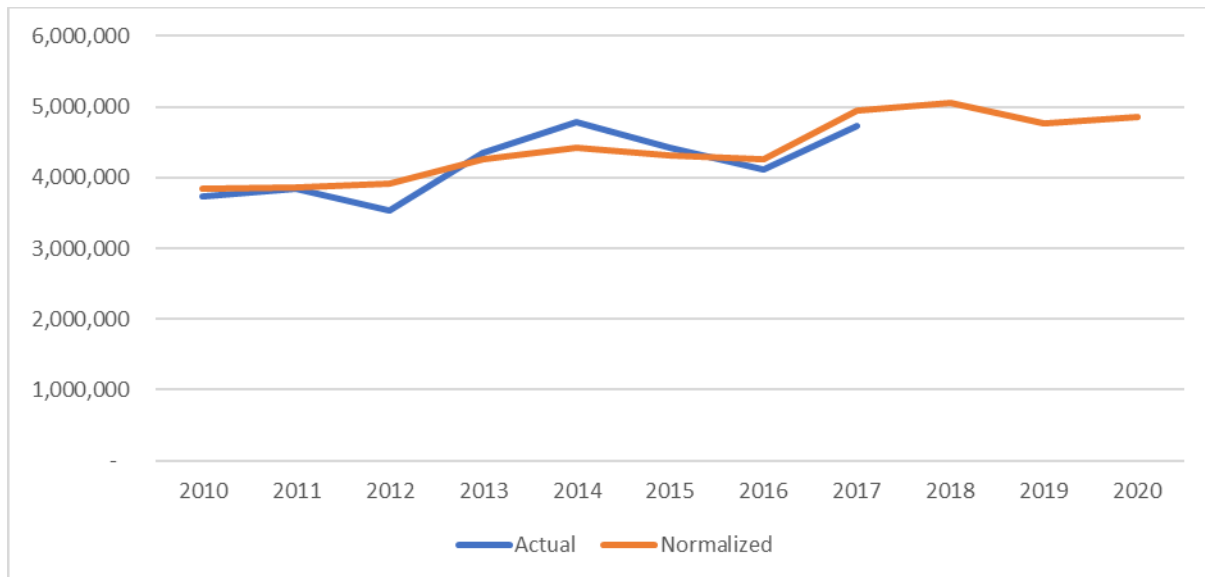


Figure 8 Actual vs Normalized R1 Commercial

A tiered forecast was produced using actual individual customer data adjusted to weather-normal consumption.

R1 Commercial			
	Tier 1	Tier 2	Total
2017	1,979,828	2,754,385	4,734,213
2018	2,366,759	2,694,120	5,060,879
2019	2,240,849	2,528,420	4,769,270
2020	2,279,405	2,572,300	4,851,704

Table 21 Forecasted R1 Commercial Tiered Consumption

The Geometric mean of the annual growth from 2009 to 2018 was used to forecast the growth rate from 2019 to 2020.

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

R1 Commercial Year	Customers	Percent of Prior Year
2009	407	
2010	405	99.7%
2011	405	99.8%
2012	415	102.6%
2013	424	102.2%
2014	437	103.2%
2015	445	101.8%
2016	453	101.7%
2017	462	102.0%
2018	477	103.3%
2019	485.3	101.8%
2020	493.9	101.8%

Table 22 Forecasted R1 Commercial Customer Count

5.4 R3

Incorporating the normalized and forecast heating degree days, continuing time trend and calendar dummy variables, the following weather corrected consumption and forecast values are calculated:

Year	Customers	Consumption		Actual	Normalized	
		Per Customer	Total		Per Customer	Total
2010	5	445893	2,117,993.1	2,108,344	450193	2,138,416.3
2011	4	616172	2,464,687.0	2,464,687	617594	2,470,374.4
2012	4	540426	2,161,705.0	2,161,705	558722	2,234,886.9
2013	4	411186	1,644,742.0	1,644,742	405282	1,621,126.1
2014	4	448002	1,792,006.0	1,792,006	429438	1,717,753.2
2015	4	423082	1,692,328.0	1,692,328	424349	1,697,395.2
2016	4	373087	1,492,346.0	1,492,346	380754	1,523,014.7
2017	5	375566	1,690,048.8	1,653,466	380454	1,712,042.5
2018	6				315,615	1,893,687.1
2019	6				300,218	1,801,305.3
2020	6				286,947	1,721,683.8

Table 23 Actual vs Normalized R3

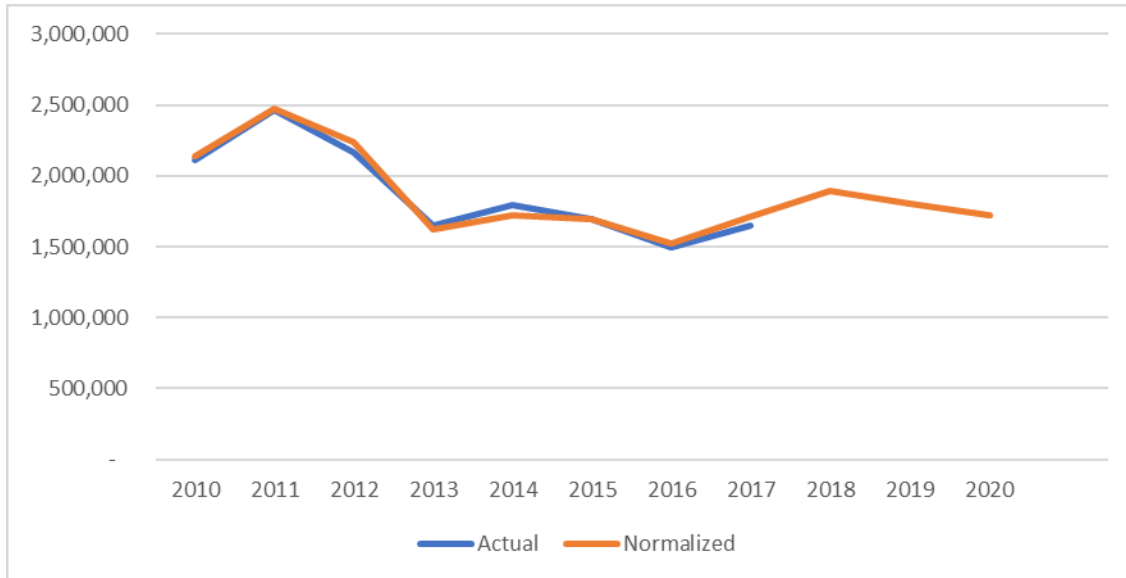


Figure 9 Actual vs Normalized R3

The R3 class has fluctuated between 4 and 6 customers since 2009. The current count of 6 customers is expected to continue to 2020.

6 NON-WEATHER SENSITIVE CLASS FORECASTS

6.1 R2 SEASONAL

Monthly consumption is forecast using a five-year average of consumption per customer in each month. The sum of monthly forecast values per customer are used to calculate annual total consumption as follows:

Year	Customers	R2 Seasonal				
		Consumption		Actual	Forecast	
		Per Customer	Total		Per Customer	Total
2010	65	25388	1,650,218.1	1,638,992		
2011	65	27387	1,768,756.9	1,849,679		
2012	66	28174	1,868,850.9	1,885,826		
2013	64	28302	1,820,740.6	1,844,495		
2014	65	30594	1,980,939.6	1,988,124		
2015	63	20017	1,256,037.9	1,242,867		
2016	59	23524	1,382,013.2	1,394,132		
2017	55	26211	1,435,061.6	1,410,653		1,410,653.1
2018	53	25,930.2	1,381,945.1		25,930	1,381,945.1
2019	52				25,608	1,322,664.9
2020	50				25,608	1,280,412.6

Table 24 Actual vs Normalized R2 Seasonal

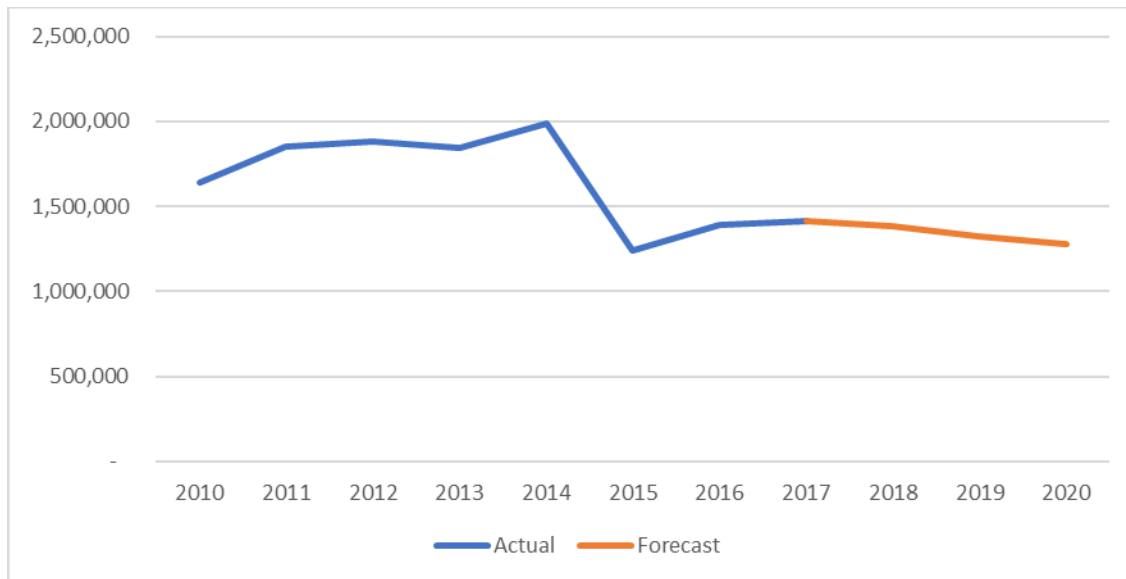


Figure 10 Actual vs Normalized R2 Seasonal

An average of tiered consumption shares in 2017 and 2018 was used to forecast tiered consumption in future years. The R2 seasonal class has three tiers with different rates in April to October and November to March. Tier 1 consumption is consumption up to 1,000 m³, tier 2 applies to consumption between 1,000 m³ and 25,000 m³, and all consumption above 25,000 m³ is considered tier 3.

	R2 Seasonal						
	April 1 to Oct 31			Nov 1 to Mar 31			Total
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3	
2017	101,262	857,951	129,629	71,693	244,784	5,335	1,410,653
2018	90,336	743,346	173,721	59,372	283,790	31,380	1,381,945

2019	88,065	735,595	140,529	68,343	272,145	17,988	1,322,665
2020	85,252	712,097	136,040	66,160	263,451	17,414	1,280,413

The Geometric mean of the annual growth from 2009 to 2018 was used to forecast the growth rate from 2019 to 2020.

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

Year	R2 Seasonal Customers	Percent of Prior Year
2009	71	
2010	65	92.0%
2011	65	99.4%
2012	66	102.7%
2013	64	97.0%
2014	65	100.6%
2015	63	96.9%
2016	59	93.6%
2017	55	93.2%
2018	53	97.3%
2019	51.6	96.9%
2020	50.1	96.9%

Table 25 Forecasted R2 Seasonal Customer Count

6.2 R4

Using a 5-year average for monthly consumption, consumption and forecast values are calculated as follows:

Year	Customers	Consumption		Actual	Forecast	
		Per Customer	Total		Per Customer	Total
2010	23	11597	269,633.7	267,879		
2011	23	21688	487,988.5	477,633		
2012	25	23036	575,898.1	678,458		
2013	32	26175	831,058.7	861,111		
2014	33	39661	1,318,721.5	1,345,169		
2015	34	29232	996,339.5	994,710		
2016	35	25140	888,266.4	904,160		
2017	36	31238	1,119,348.2	1,124,029		1,124,028.6
2018	36	29,341.6	1,056,298.3		29,342	1,056,298.3
2019	37				30,237	1,116,227.8
2020	38				30,237	1,149,005.7

Table 26 Actual vs Forecast R4

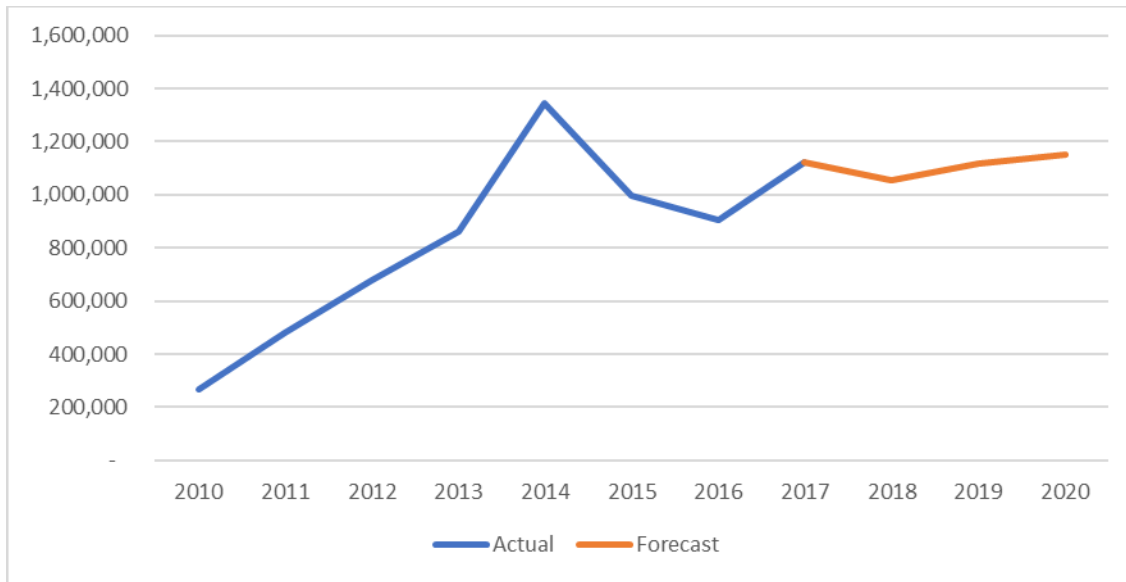


Figure 11 Actual vs Normalized R4

An average of tiered consumption shares in 2017 and 2018 was used to forecast tiered consumption in future years. The R4 class has two tiers with different rates in January to March and April to December. Tier 1 consumption is consumption up to 1,000 m³ and all consumption above 1,000 m³ is considered tier 2.

	R4				
	Jan 1 to Mar 31		Apr 1 to Dec 31		Total
	Tier 1	Tier 2	Tier 1	Tier 2	
2017	13,025	1,210	84,919	1,024,874	1,124,029
2018	14,892	5,010	94,084	942,313	1,056,298
2019	17,490	3,541	91,612	1,003,585	1,116,228
2020	18,003	3,645	94,302	1,033,055	1,149,006

The Geometric mean of the annual growth from 2013 to 2018 was used to forecast the growth rate from 2019 to 2020. The number of customers in this class grew significantly from 2009 to 2012 so the growth rates from these years was excluded as they do not reflect the current customer growth trend.

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

Year	R4 Customers	Percent of Prior Year
2009	23	-
2010	23	101.1%
2011	23	96.8%

2012	25	111.1%
2013	32	127.0%
2014	33	104.7%
2015	34	102.5%
2016	35	103.7%
2017	36	101.4%
2018	36	100.5%
2019	36.9	102.5%
2020	37.9	102.5%

Table 27 Forecasted R4 Customer Count

6.3 R5

Using a 5-year average for monthly consumption, consumption and forecast values are calculated as follows:

Year	Customers	Consumption		Actual	Forecast	
		Per Customer	Total		Per Customer	Total
2010	5	138769	728,538.1	697,560		
2011	5	222975	1,114,874.0	1,114,874		
2012	5	177350	886,748.0	886,748		
2013	5	203326	1,016,630.0	1,016,630		
2014	5	225771	1,147,668.9	1,128,958		
2015	5	134524	672,622.0	672,622		
2016	5	112572	562,860.0	562,860		
2017	5	186530	870,472.3	753,900		753,900.3
2018	4	168,312.3	673,249.3		168,312	673,249.3
2019	4				171,437	685,748.0
2020	4				171,437	685,748.0

Table 28 Actual vs Forecast R5

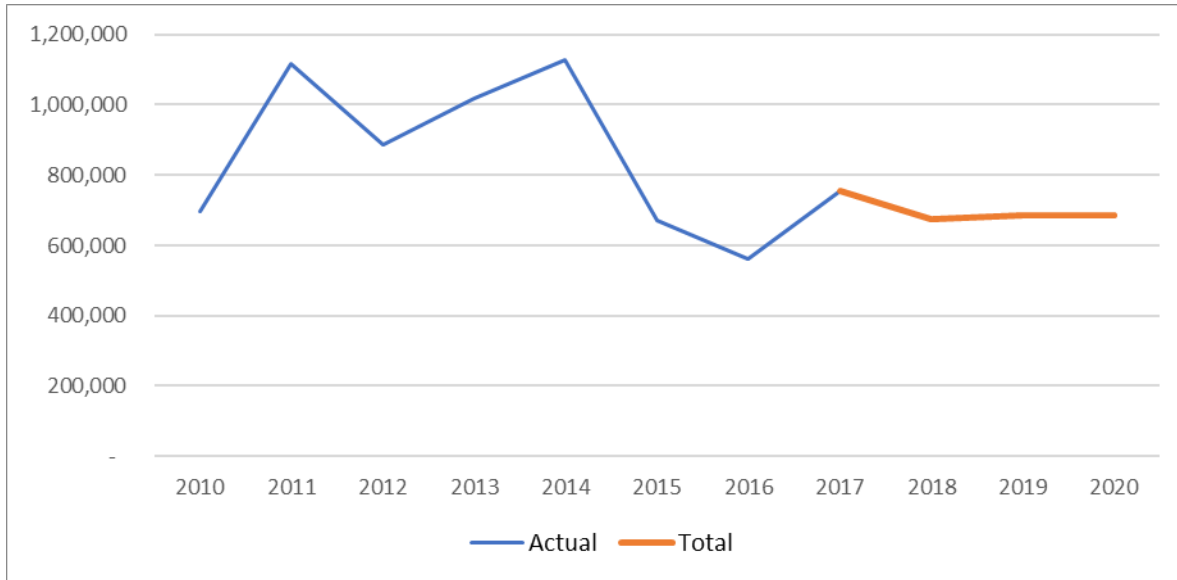


Figure 12 Actual vs Normalized Large Use R5

The R5 class had 5 customers from 2009 to 2017 and had 4 customers in 2018. It is expected to maintain 4 customers in 2020.

6.4 R6

R6 consumption has significantly increase in October and November 2018 over historic volumes. October and November 2018 consumption is, on average, 67.9% higher than average consumption in those months over the prior 5 years. Consumption in 2019 and 2020 is forecast by scaling 5-year average consumption in each month up by 67.9%. This method considers consumption in October and November to be at a new steady state that will persist to 2020.

Year	Customers	Consumption		Actual	Forecast	
		Per Customer	Total		Per Customer	Total
2010	1	33459684	33,459,684.2	33,459,684		
2011	1	30758504	30,758,503.7	30,758,504		
2012	1	31628262	31,628,262.1	31,628,262		
2013	1	31582423	31,582,422.9	31,582,423		
2014	1	31735774	31,735,774.1	31,735,774		
2015	1	34710609	34,710,609.3	34,710,609		
2016	1	40074176	40,074,176.1	40,074,176		
2017	1	36485139	36,485,138.7	36,485,139		36,485,138.7
2018	1	40,374,972.9	40,374,972.9		40,374,973	40,374,972.9
2019	1				59,243,876	59,243,875.6
2020	1				59,243,876	59,243,875.6

Table 29 Actual vs Forecast R6

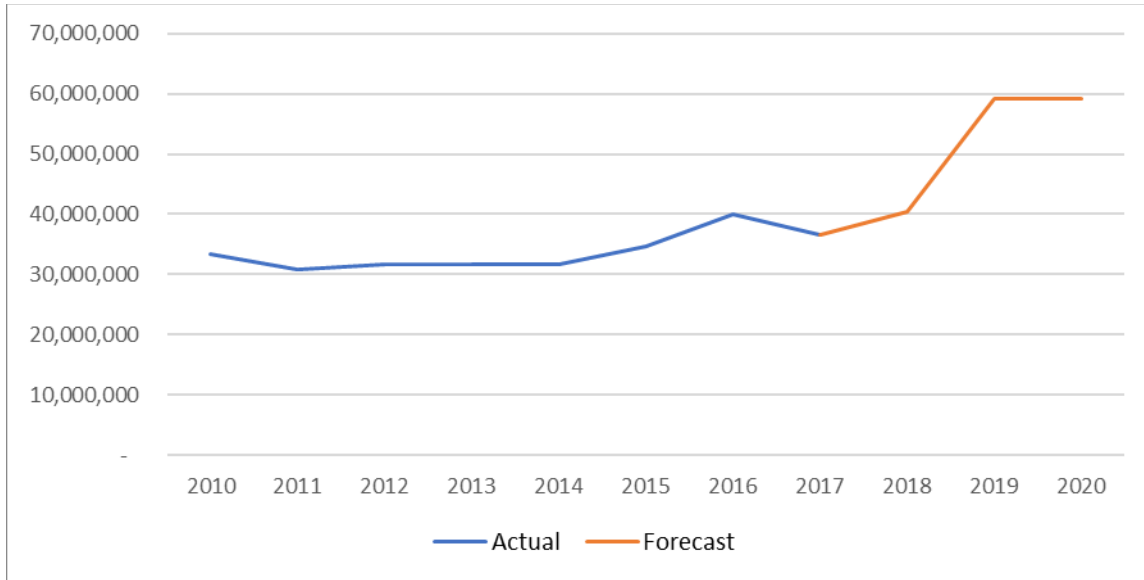


Figure 13 Actual vs Normalized R6

The forecast for this class relies on a small sample and carries a higher level of risk of deviating from actual consumption than the forecasts of the other classes.

The R6 class has one customer and is expected to persist with one customer into 2020.