EXHIBIT 3 - REVENUES

2021 Cost of Service

Halton Hills Hydro Inc.
EB-2020-0026

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3.2 LOAD AND REVENUE FORECAST

3.2.1 INTRODUCTION

3 The purpose of this evidence is to present the process used by Halton Hills Hydro Inc. ("HHHI") to

4 prepare the weather normalized load and customer/connection forecast used to design the

5 proposed 2021 Test Year distribution rates.

6 With the assistance of Borden, Ladner and Gervais, LLP, HHHI used the same regression analysis

7 methodology approved by the Ontario Energy Board (the "OEB" or "Board") in the 2016 HHHI

8 Cost of Service ("COS") application (EB-2015-0074). The regression analysis has been updated to

9 include actual data to the end of 2019. The updated regression analysis used most of the same

10 variables as those in the 2016 COS application. However, the Number of Customers variable was

11 eliminated since it had a non-intuitive negative coefficient. The estimated monthly CDM activity

12 was included as a variable and not added to the power purchase amount as was done in the 2016

13 COS application. This allowed the negative coefficient assigned to the Number of Customers

14 variable to be reassigned to a variable in an intuitive manner. HHHI was also concerned with the

15 process used in the 2016 COS application of adding the monthly CDM activity to the power

16 purchased amount as it produced a total billed 2016 kWh amount that was never achieved on an

17 actual and weather normal basis from 2016 to 2019. Additionally, by using the CDM monthly

18 activity as a variable, a slightly better statistical result was produced.

19 With regards to the overall process of load forecasting, HHHI is of the view that conducting a

20 regression analysis on historical electricity purchases to produce an equation that will predict

21 purchases is appropriate. HHHI has the data for the amount of electricity (in kWh) purchased from

22 the IESO for use by HHHI's customers. With a regression analysis, these purchases can be related

23 to other monthly explanatory variables such as heating degree days and cooling degree days

24 which occur in the same month. The results of the regression analysis produce an equation that

25 predicts the purchases based on the explanatory variables. This prediction model is then used as

26 the basis to forecast the total level of weather normalized purchases for the Bridge Year and the

27 Test Year, which is converted to billed kWh by rate class. A detailed explanation of the process is

28 provided later in this evidence.

1   Based on the OEB's approval of this methodology in HHHI's last COS application along with the

2   OEB's approval of this same method in recent COS applications for other applicants, HHHI submits

3   the load forecasting methodology is reasonable at this time for the purposes of this Application.

4   The following provides the material to support the weather normalized load forecast used by

5   HHHI in this Application.

6   Table 1 - Summary of Load and Customer/Connection Forecast, Table 2 - Billed Energy by Rate

7   Class and

8   Table 3 - Number of Customers/Connections and Annual Usage by Rate Class below provide a

9   summary of the weather normalized load and customer/connection forecast used in this

10 Application.

11   **Table 1 - Summary of Load and Customer/Connection Forecast**

Year	Billed Actual (GWh)	Growth (GWh)	Billed Weather Normal (GWh)	Growth (GWh)	Customer/ Connection Count	Growth
Billed Energy (GWh) and Customer Count / Connections						
2010	491.8		491.1		25,478	
2011	489.4	(2.4)	488.1	(3.0)	25,704	227
2012	488.5	(0.8)	487.8	(0.4)	25,837	133
2013	495.5	7.0	499.9	12.1	26,241	404
2014	501.8	6.3	507.1	7.2	26,330	89
2015	510.2	8.4	513.0	5.9	26,840	510
2016	503.2	(7.0)	494.6	(18.5)	27,110	270
2017	481.2	(22.0)	486.7	(7.9)	27,194	84
2018	499.4	18.2	490.9	4.3	27,580	386
2019	494.0	(5.5)	495.9	5.0	27,719	139
2020 Bridge Year	463.7	(30.3)	463.7	(32.3)	27,932	213
2021 Test Year	459.4	(4.3)	459.4	(4.3)	28,147	215

12

13 In the below **Table 2 - Billed Energy by Rate Class**, the billed GWh data from 2010 to 2019

14 reflects actual weather and weather normal conditions in each year. The weather normal values

15 are the actual values adjusted by the weather normal conversion factor outlined in

1   Table 6 - Total System Purchases Excluding Wholesale Market Participants. The weather

2   conversion factor is determined to be consistent with the approach outlined by the OEB in

3   Appendix 2-IA. For 2020 and 2021, the forecasted billed GWh is on a weather normal basis.

4   Customer/Connection values are on a year-end basis and Streetlighting, Sentinel Lights and

5   Unmetered Scattered Loads are measured as connections. The customer/connection values are

6   converted to an average basis for the purposes of rate design.

7   Table 2 - Billed Energy by Rate Class provides the historical billed amounts on an actual and

8   weather normalized basis by rate class using the weather normal conversion factor from

1   Table 6 - Total System Purchases Excluding Wholesale Market Participants. The forecasted bill

2   amounts for 2020 Bridge Year and 2021 Test Year are also provided by rate class.

3   **Table 2 - Billed Energy by Rate Class**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads	Total
Billed Energy (GWh) - Actual								
2010	215.0	54.8	115.5	102.2	0.6	2.7	0.9	491.8
2011	208.2	57.0	114.8	105.3	0.4	2.7	0.9	489.4
2012	213.8	56.9	112.0	101.7	0.4	2.8	0.9	488.5
2013	207.8	56.9	115.1	111.6	0.4	2.8	0.9	495.5
2014	203.4	51.5	126.1	116.7	0.4	2.8	0.9	501.8
2015	203.4	50.7	140.1	112.1	0.3	2.8	0.9	510.2
2016	204.4	51.3	137.3	107.2	0.3	1.8	0.9	503.2
2017	193.7	50.5	135.4	99.3	0.3	1.1	0.9	481.2
2018	208.4	52.0	144.9	91.8	0.3	1.1	1.0	499.4
2019	202.1	50.7	150.4	88.6	0.3	1.0	1.0	494.0
Billed Energy (GWh) - Weather Normal								
2010	214.8	54.7	115.4	102.1	0.6	2.7	0.9	491.1
2011	207.7	56.8	114.5	105.0	0.4	2.7	0.9	488.1
2012	213.4	56.9	111.8	101.6	0.4	2.8	0.9	487.8
2013	209.6	57.4	116.1	112.6	0.4	2.8	0.9	499.9
2014	205.5	52.1	127.4	117.9	0.5	2.8	0.9	507.1
2015	204.5	51.0	140.8	112.7	0.3	2.8	0.9	513.0
2016 Board Approved	205.6	59.0	136.6	112.2	0.5	1.5	0.9	516.2
2016	200.9	50.4	134.9	105.3	0.3	1.8	0.9	494.6
2017	195.9	51.1	136.9	100.4	0.3	1.1	0.9	486.7
2018	204.9	51.1	142.4	90.3	0.3	1.1	0.9	490.9
2019	202.9	50.9	151.0	89.0	0.3	1.0	1.0	495.9
2020 Bridge Year	205.2	47.2	136.9	72.2	0.3	1.0	1.0	463.7
2021 Test Year	207.2	46.7	133.0	70.3	0.3	1.0	1.0	459.4

4

5   Table 3 - Number of Customers/Connections and Annual Usage by Rate Class shows the historical

6   and forecasted number of customers / connections by rate class along with the historical usage

7   per customer / connection on an actual and weather normalized basis. The 2020 Bridge Year and

8   2021 Test Year forecasted usage per customer / connection is also provided on a weather

9   normalized basis.

10

1   **Table 3 - Number of Customers/Connections and Annual Usage by Rate Class**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads	Total
Number of Customers/Connections								
2010	18,867	1,606	168	11	328	4,362	138	25,478
2011	19,136	1,708	156	12	161	4,387	144	25,704
2012	19,194	1,710	200	12	153	4,417	151	25,837
2013	19,511	1,710	207	13	177	4,477	146	26,241
2014	19,623	1,701	198	13	170	4,477	147	26,330
2015	19,801	1,920	195	13	172	4,595	144	26,840
2016 Board Approved	19,971	1,967	206	13	175	4,649	144	27,124
2016	20,057	1,844	198	13	170	4,680	148	27,110
2017	20,188	1,810	186	11	173	4,674	152	27,194
2018	20,332	1,895	205	10	175	4,778	185	27,580
2019	20,476	1,824	217	11	175	4,833	183	27,719
2020 Bridge Year	20,663	1,850	219	9	175	4,833	183	27,932
2021 Test Year	20,852	1,876	219	9	175	4,833	183	28,147
Actual Annual Energy Usage per Customer/Connection (kWh per customer/connection)								
2010	11,397	34,119	687,602	9,295,192	1,744	621	6,662	
2011	10,881	33,368	736,116	8,771,053	2,702	625	6,192	
2012	11,137	33,299	560,069	8,476,137	2,872	625	5,912	
2013	10,650	33,274	556,031	8,585,561	2,508	619	6,166	
2014	10,365	30,300	636,624	8,886,367	2,637	622	6,259	
2015	10,270	26,407	718,289	8,624,074	1,901	602	6,286	
2016	10,193	27,818	693,381	8,245,619	1,607	392	6,244	
2017	9,595	27,916	727,816	9,028,155	1,504	241	6,149	
2018	10,250	27,430	706,898	9,182,937	1,497	229	5,154	
2019	9,871	27,771	692,928	8,057,829	1,439	203	5,257	
Normalized Annual Energy Usage per Customer/Connection (kWh per customer/connection)								
2010	11,383	34,076	686,731	9,283,415	1,742	620	6,653	
2011	10,854	33,283	734,253	8,748,853	2,696	624	6,177	
2012	11,120	33,247	559,195	8,462,908	2,868	624	5,903	
2013	10,744	33,567	560,927	8,661,158	2,530	624	6,220	
2014	10,475	30,621	643,363	8,980,428	2,665	628	6,326	
2015	10,326	26,552	722,219	8,671,254	1,911	605	6,321	
2016 Board Approved	10,294	29,995	662,343	8,457,793	2,637	330	6,222	
2016	10,017	27,337	681,396	8,103,092	1,579	385	6,136	
2017	9,703	28,231	736,037	9,130,133	1,521	244	6,219	
2018	10,076	26,962	694,842	9,026,328	1,471	225	5,066	
2019	9,910	27,883	695,709	8,090,168	1,445	204	5,278	
2020 Bridge Year	9,931	25,523	625,096	8,016,738	1,439	203	5,257	
2021 Test Year	9,936	24,899	607,105	7,813,557	1,439	203	5,257	

1   A completed Appendix 2-IB Load Forecast Analysis is presented at Appendix 3-1 of this Exhibit

2   and in Tab 10 of the RRWF.[1]

3

4   3.2.2 LOAD FORECAST METHODOLOGY AND DETAIL[2]

5   HHHI's weather normalized load forecast is developed in a three (3) step process. First, a total

6   system weather normalized purchased energy forecast is developed based on multivariate

7   regression model that incorporates historical load, weather, and other variables that impact

8   electricity usage. Second, the weather normalized purchased energy forecast is adjusted by a

9   historical loss factor to produce a weather normalized billed energy forecast. Finally, the forecast

10   of billed energy by rate class is developed based on a forecast of customer / connections numbers

11   and the 2019 usage patterns per customer / connection. For the rate classes that have weather

12   sensitive load, their forecasted billed energy is adjusted to ensure that the total billed energy

13   forecast by rate class is equivalent to the total weather normalized billed energy forecast that has

14   been determined from the regression analysis.   The forecast of customers by rate class is

15   determined using a geometric mean analysis for the Residential and General Service less than 50

16   kW classes. For all other classes, the 2019 level of customers / connections is held constant for

17   2020 and 2021.

18   The billed energy and number of customers forecast is adjusted to reflect the reduction in energy

19   from three (3) General Service 1,000 to 4,999 kW customers. There is also an adjustment applied

20   to reflect the expected impact of COVID-19 on the 2020 Bridge Year and 2021 Test Year load

21   forecast. For those rate classes that use kW for the distribution volumetric billing determinant, an

22   adjustment factor is applied to the class energy forecast based on the historical relationship

23   between kW and kWh. The following explains the forecasting process in more detail.

---

[1] MFR - Completed Appendix 2-IB; the customer and load forecast for the test year must be entered on RRWF, Tab 10
[2] MFR - Explanation of weather normalization methodology

1   The utility did not test the NAC method because NAC is generally seen as an alternative when

2   sound historical data is not available. [3]

3

4   ### 3.2.3 ECONOMIC OVERVIEW[4]

5   **Overview (as found on the Town of Halton Hills website (www.haltonhills.ca)**

6   The Town of Halton Hills is a unique combination of two urban areas, historic hamlets and rural

7   landscapes all within commuting distance of Toronto. Halton Hills grows in a way that embodies

8   its values of social, economic, fiscal, and environmental sustainability. With a population of over

9   61,160, Halton Hills has seen a 3.6% increase in its population since 2011. The population is

10   forecasted to grow to 95,300 by 2031 and to 120,400 by 2041. With an average age of 39.3 years,

11   Halton Hills has the 2nd lowest average age in Halton Region; and where 57% of the population

12   is married and there is an average of 3.1 people per household. Halton Hills harnesses its future

13   population and employment growth to provide new opportunities for residents, workers,

14   businesses, and visitors. Moving around Halton Hills is safe for residents of all ages through a

15   combination of traffic calming and active transport priority routes and trails.

16   Halton Hills works to ensure housing is accessible to all its residents at any age or stage in life.

17

18   **Climate Change**

19   The Town of Halton Hills has long been an advocate for climate change. The residents and

20   businesses of Halton Hills are responsible members of the global community, and are leaders in

21   the fight against climate change with a goal to be a Net-Zero Carbon Community by 2030. Halton

22   Hills communities prepare for coming changes while reducing their carbon footprint. The

---

[3] MFR - NAC Model - rationale for choice, data supporting NAC variables, description of accounting for CDM including license conditions, discussion of weather normalization considerations

[4] Explanation of causes, assumptions and adjustments for volume forecast, including economic assumptions and data sources for customer and load forecasts

1   municipality makes its landscape more climate resilient and beautiful through a lush tree canopy

2   and public open space.

3   Halton Hills is a leader in sustainability, climate action and the green economy. Halton Hills boasts

4   its clean tech economy and supports sustainability through its Strategic Plan, Official Plan,

5   Community Sustainability Strategy and numerous other Town strategies, plans and initiatives.

6   Halton Hills has received 14 Sustainability awards and has 636 Certified Green buildings.

7

8   **Business / Labour Force**

9   Halton Hills is a well-run municipality that maintains spending within its means and keeps tax

10 increases low and predictable. The municipality maintains services and service levels that support

11 the quality of life of its residents and a hospitable environment for businesses. Located within the

12 Greater Toronto Area, the economic engine of Canada, the Town of Halton Hills is famed for its

13 quality of life, open-for-business approach and leadership in sustainable development. Economic

14 Development provides high-quality support to the business community, fostering a prosperous

15 and sustainable economy to enhance quality of life.

16 The Town of Halton Hills harnesses its future population and employment growth to provide new

17 opportunities for residents, workers, businesses, and visitors. Over 60% of adults in Halton Hills

18 possess a post-secondary education - a higher rate than any OECD country. The proximity to

19 quality universities and colleges provide the business community with a stream of high-quality

20 talent.

21 People and goods move freely through Halton Hills on well-maintained transportation

22 infrastructure. The municipality has a transit plan that is suitable for moving its residents and

23 workers to where they want to go and advocates for greater regional connectivity for its residents

24 and businesses. Nearby air, rail freight, shipping, highways, and commuter rail provide convenient,

25 modern infrastructure for people and goods movement.

26 Halton Hills is an emerging hub for advanced manufacturing, with the share of jobs in this sector

27 being twice that of the national average. Employment growth in sub-sectors such as machinery,

1   computer and electronic products, and furniture are on the rise. Advanced manufacturing has

2   116 businesses employing 3,800 employees in Halton Hills.

3   Agri-business is a strong sector in Halton Hills, with 180 farms employing 700 employees and the

4   share of the workforce in this sector is 50% greater than the national average.

5   As one of the most beautiful rural communities in Ontario, Halton Hills understands the value of

6   it of its agricultural land base. The municipality protects the land base and system of infrastructure

7   that supports its agricultural community. The community is supported in looking for ways of

8   celebrating its rural character and drawing visitors from across the continent to enjoy its landscape

9   and produce.

10 Halton Hills has a well established and growing food and beverage processing sector, employing

11 over seven (7) times the Canadian average when adjusted for population size. Halton Hills has ten

12 (10) different food and beverage businesses with 870 employees.

13

14 ### 3.2.4 PURCHASED KWH LOAD FORECAST[5]

15 An equation to predict total system purchased energy is developed using a multivariate regression

16 model with the independent variables outlined below. The regression model uses monthly kWh

17 and monthly values of independent variables from January 2010 to December 2019 to determine

18 the monthly regression coefficients.

19 With regards to weather normalization, HHHI submits that it is appropriate to review the impact

20 of weather over the past ten (10) years, January 2010 to December 2019, since it is consistent with

21 a time period outlined in the filing requirements and it is reflective of more recent weather

22 conditions. The average weather conditions over this period are applied in the prediction formula

---

[5] MFR - Multivariate Regression Model - rationale for choice, regression statistics, explanation of weather normalization methodology, sources of data for endogenous and exogenous variables, any binary variables used to either account for individual data points or to account for seasonal or cyclical trends or for discontinuities in the historical data, explanation of any specific adjustments made; data used in load forecast must be provided in Excel format, including derivation of constructed variables

1   to determine a weather normalized forecast for 2021. In accordance with the filing requirement,

2   HHHI has also provided sensitivity analysis showing the impact on the 2021 forecast of purchases.

3   This analysis assumes weather normal conditions are based on a twenty (20) year trend of weather

4   data.

5   The multivariate regression model has determined the drivers of year-over-year changes in HHHI's

6   load growth are: weather (heating and cooling degree days); days in month, spring/fall flag,

7   number of peak hours, outlet mall flag, and CDM activity. These factors are captured within the

8   regression model.

9   The following outlines the predication model used by HHHI to predict weather normal purchases

10   for the 2021 Test Year.

11   HHHI Inc. Monthly Predicted kWh Purchases:

12   = Heating Degree Days * 10,085

13   + Cooling Degree Days * 70,367

14   + Number of Days in the Month * 976,516

15   + Spring Flag * (1,742,110)

16   + Number of Peak Hours * 17,624

17   + Fall Flag * (644,860)

18   + Outlet Mall Flag * 1,922,284

19   + CDM Activity * (1.5)

20   + Constant of 4,092,061

21   The monthly data used in the regression model and the resulting monthly prediction for the

22   actual and forecasted years are provided in the load forecast model filed in conjunction with this

23   application.

24   The sources of historical data from 2010 to 2019 for the various data points are:

25   a) Environment Canada website for monthly heating degree day and cooling degree

26   information. Weather data was obtained from the Toronto Pearson International Airport;

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1   b) The calendar provided information related to number of days in the month, number of

2   peak hours and the spring fall flag;

3   c) The outlet mall began to be operational on August 2013 which means all months for

4   August 2013 and onward were assigned a value of "1" to indicate the outlet mall was

5   operating. All other months prior to August 2013 were assigned a value of "0";

6   d) The CDM variable is an estimated level of monthly activity in CDM for all programs from

7   2006 to 2020 and their persistence. For each year the monthly values grow at constant

8   value over the year. The addition of the monthly values will equal the total annual CDM

9   results shown in the table below. In the first year of the program, the half year rule is

10   applied. The following table supports the level of annual CDM results and provides the

11   source of the annual program and persistence data by year which was used to develop the

12   monthly values shown in Appendix 3-1.

13   **Table 4 - CDM Variable Supporting Data with half year rule applied**

Year	OPA Annual CDM Results 2006 to 2010 programs (kWh)	IESO/OPA Annual CDM Results 2011 to 2014 programs (kWh)	IESO Annual CDM Results 2015 to 2017 programs (kWh)	2018 and 2019 Programs (kWh)	2020 Programs (kWh)	Total Annual CDM Results (kWh)
2006	941,452					941,452
2007	2,695,844					2,695,844
2008	3,577,650					3,577,650
2009	5,546,745					5,546,745
2010	6,299,391					6,299,391
2011	6,857,629	1,136,688				7,994,317
2012	6,700,963	3,369,718				10,070,681
2013	6,664,146	5,602,934				12,267,080
2014	6,390,918	8,236,494				14,627,412
2015	5,477,299	9,183,549	3,030,349			17,691,197
2016	5,181,446	8,932,323	9,178,126			23,291,895
2017	4,091,258	7,720,203	16,693,440			28,504,901
2018	2,814,460	7,462,787	19,821,653	1,372,972		31,471,871
2019	2,204,271	7,400,917	19,814,210	3,223,127		32,642,525
2020	1,527,184	7,153,897	19,583,145	3,700,311	813,319	32,777,855
2021	1,431,305	6,579,674	19,537,559	3,700,311	1,626,637	32,875,486

1   The prediction formula has the following statistical results which generally indicate the formula

2   has a very good fit to the actual data set.

3   **Table 5 - Statistical Results**

Statistical Results	
R Square	93.7%
Adjusted R Square	93.3%
F Test	207
MAPE (Monthly)	1.7%
T-stats by Coefficient	
Heating Degree Days	19.0
Cooling Degree Days	24.1
Number of Days in Month	8.2
Spring Flag	(7.1)
Number of Peak Hours	3.1
Fall Flag	(2.6)
Outlet Mall	7.1
CDM	(9.3)
Constant	1.3

4

5   The annual results of the above prediction formula compared to the actual annual purchases from

6   2010 to 2019 are shown below in Table 6 - Total System Purchases Excluding Wholesale Market

7   Participants along with the predicted total system purchases for HHHI for 2020 Bridge Year and

8   2021 Test Year on a weather normal basis. In addition, weather normal values for 2021 are

9   provided assuming a twenty (20) year trend for weather normalization as per the filing

10 requirements. Information is also provided to show the Weather Normal Conversion Factor which

11 is used to weather normalize actual 2010 to 2019 volume data. In Table 6 - Total System Purchases

12 Excluding Wholesale Market Participants, the Predicted Weather Normal values are similar to the

13 Predicted amounts but the weather normalized heating degree days and cooling degree days

14 used to determine the weather normal forecast for 2020 and 2021 are used in the prediction

15 formula in place of actual heating degree days and cooling degree days. The ratio of Predicted

16 Weather Normal to Predicted values results in a Weather Normal Conversion Factor. This factor

17 is applied to the Actual amount which results in the Actual Weather Normal value.

18

1   **Table 6 - Total System Purchases Excluding Wholesale Market Participants**

Year	Actual	Predicted	% Difference	Predicted Weather Normal	Weather Normal Conversion Factor	Actual Weather Normal
	Purchased Energy (GWh)					
2010	525.7	525.6	(0.0%)	525.0	0.9987	525.0
2011	524.3	524.0	(0.1%)	522.6	0.9975	523.0
2012	516.9	521.2	0.8%	520.4	0.9984	516.1
2013	523.4	520.2	(0.6%)	524.8	1.0088	528.0
2014	534.3	529.6	(0.9%)	535.2	1.0106	539.9
2015	528.8	527.5	(0.2%)	530.4	1.0055	531.7
2016	525.6	532.2	1.3%	523.0	0.9827	516.5
2017	499.0	507.7	1.7%	513.4	1.0113	504.6
2018	519.3	517.6	(0.3%)	508.8	0.9829	510.4
2019	513.3	505.0	(1.6%)	507.0	1.0040	515.3
2020 Bridge Year		508.6		508.6	1.0000	
2021 Test Year		507.2		507.2	1.0000	
2021 Test - 20 Yr Trend		507.9				

2

3   The weather normalized amount for 2021 is determined by using 2021 dependent variables in the

4   prediction formula on a monthly basis along with the average monthly heating degree days and

5   cooling degree days which have occurred from January 2010 to December 2019 (i.e. 10 years).

6   The 2021 weather normal twenty (20) year trend value reflects the trend in monthly heating degree

7   days and cooling degree days which have occurred from January 2000 to December 2019.

8

9   **3.2.5 BILLED KWH LOAD FORECAST**

10   To determine the total weather normalized energy billed forecast, the total system weather

11   normalized purchases forecast is adjusted by a historical loss factor. The historical loss factor used

12   is 5.16% which represents the average loss factor from 2010 to 2019. With this average loss factor,

13   the total weather normalized billed energy, before adjustment, discussed below will be 483.6

14   (GWh) for 2020 (i.e. 508.6/1.0516) and 482.3 (GWh) for 2021 (i.e. 507.2/1.0516)

1 **3.2.6 BILLED KWH LOAD FORECAST AND CUSTOMER/CONNECTION FORECAST BY**
2 **RATE CLASS**

3 Since the total weather normalized billed energy amount is known, this amount needs to be

4 distributed by rate class for rate design purposes taking into consideration the customer /

5 connection forecast and expected usage per customer by rate class.

6 The next step in the forecasting process is to determine a customer / connection forecast. The

7 customer/connection forecast is based on reviewing historical customer / connection data that is

8 available as shown in the following Table 7 - Historical Customer/Connection Year End Data.

9 **Table 7 - Historical Customer/Connection Year End Data**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads	Total
Number of Customers/Connections								
2010	18,867	1,606	168	11	328	4,362	138	25,478
2011	19,136	1,708	156	12	161	4,387	144	25,704
2012	19,194	1,710	200	12	153	4,417	151	25,837
2013	19,511	1,710	207	13	177	4,477	146	26,241
2014	19,623	1,701	198	13	170	4,477	147	26,330
2015	19,801	1,920	195	13	172	4,595	144	26,840
2016	20,057	1,844	198	13	170	4,680	148	27,110
2017	20,188	1,810	186	11	173	4,674	152	27,194
2018	20,332	1,895	205	10	175	4,778	185	27,580
2019	20,476	1,824	217	11	175	4,833	183	27,719

10

11 From the historical customer / connection data, the growth rate in customer/connection can be

12 evaluated and is provided on the following Table 8 - Growth Rate in Customer/Connections.

13

14

1   **Table 8 - Growth Rate in Customer/Connections**

Year	**Residential**	**General Service less than 50 kW**	**General Service 50 to 999 kW**	**General Service 1,000 to 4,999 kW**	**Sentinel Lights**	**Street - lighting**	**Unmetered Scattered Loads**
Growth Rate in Customers/Connections							
2010							
2011	1.4%	6.4%	(7.1%)	9.1%	(50.8%)	0.6%	4.7%
2012	0.3%	0.1%	28.2%	0.0%	(5.0%)	0.7%	4.9%
2013	1.7%	0.0%	3.5%	8.3%	15.7%	1.4%	(3.3%)
2014	0.6%	(0.5%)	(4.3%)	1.0%	(4.0%)	0.0%	1.0%
2015	0.9%	12.9%	(1.5%)	(1.0%)	1.2%	2.6%	(2.3%)
2016	1.3%	(4.0%)	1.5%	0.0%	(1.2%)	1.8%	2.8%
2017	0.7%	(1.8%)	(6.1%)	(15.4%)	1.8%	(0.1%)	2.7%
2018	0.7%	4.7%	10.2%	(9.1%)	1.2%	2.2%	21.7%
2019	0.7%	(3.7%)	5.9%	10.0%	0.0%	1.2%	(1.1%)
Geometric Mean	0.9%	1.4%	2.9%	0.0%	(6.7%)	1.1%	3.2%

2

3   For the Residential and General Service less than 50 kW classes, the growth factor resulting from

4   the geometric mean analysis from 2010 to 2019 is applied to the 2019 customer numbers to

5   determine the forecast of customer / connections for 2020. Then the factor is applied again to

6   2020 Bridge Year forecast to determine the 2021 Test Year forecast. For all other classes, HHHI

7   has assumed the number of customers / connections will remain at the 2019 level in 2020 and

8   2021. HHHI submits this is a reasonable assumption since HHHI is not aware of a reason for the

9   customer / connection numbers to increase or decrease over the forecast period especially with

10   the recent impact of COVID-19. Table 9 - Customer/Connection Forecast outlines the forecast of

11   customers / connections by rate class for the 2020 Bridge Year and 2021 Test Year.

12

13

1   **Table 9 - Customer/Connection Forecast**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads	Total
Forecast Number of Customers/Connections								
2020 Bridge Year	20,663	1,850	217	11	175	4,833	183	27,932
2021 Test Year	20,852	1,876	217	11	175	4,833	183	28,147

2

3   The next step in the process is to review the historical customer / connection usage and to reflect

4   this usage per customer in the forecast. Table 10 - 2019 Actual Annual Usage per Customer below

5   provides the average annual usage per customer by rate class for 2019.

6   **Table 10 - 2019 Actual Annual Usage per Customer**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads
Annual kWh Usage Per Customer/Connection							
2019	9,871	27,771	692,928	8,057,829	1,439	203	5,257

7

8   The 2020 Bridge Year and 2021 Test Year forecast of usage per customer / connection have been

9   held constant at the 2019 level since the usage per customer / connection has generally been

10   declining since 2010. To continue this declining pattern into the 2020 Bridge Year and 2021 Test

11   Year could cause double counting of CDM results which have been reflected with the inclusion of

12   the CDM variable in the regression analysis. The resulting usage forecast is as follows in Table 11

13   - Forecast Annual kWh Usage per Customer/Connection.

14

1   **Table 11 - Forecast Annual kWh Usage per Customer/Connection**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads
Forecast Annual kWh Usage per Customers/Connection							
2020 Bridge Year	9,871	27,771	692,928	8,057,829	1,439	203	5,257
2021 Test Year	9,871	27,771	692,928	8,057,829	1,439	203	5,257

2

3   The preceding information is used to determine the non-normalized weather billed energy

4   forecast by applying the forecast number of customer / connection from Table 9 -

5   Customer/Connection Forecast by the forecast of annual usage per customer / connection from

6   Table 11 - Forecast Annual kWh Usage per Customer/Connection. The resulting non-normalized

7   weather billed energy forecast is shown in the following Table 12 - Non-normalized Weather Billed

8   Energy Forecast.

9   **Table 12 - Non-normalized Weather Billed Energy Forecast**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads	Total
NON-normalized Weather Billed Energy Forecast (GWh)								
2020 Bridge Year	204.0	51.4	150.4	88.6	0.3	1.0	1.0	496.5
2021 Test Year	205.8	52.1	150.4	88.6	0.3	1.0	1.0	499.1

10

11   The non-normalized weather billed energy forecast has been determined but this needs to be

12   adjusted in order to align with the total weather normalized billed energy forecast mentioned

13   above of 483.6 (GWh) for 2020 Bridge Year and 482.3 (GWh) for 2021 Test Year.

14   The difference between the non-normalized and normalized forecast is assumed to be the

15   adjustment to move the forecast to a weather normal basis and this amount will be assigned to

16   those rate classes that are weather sensitive. Based on the weather normalization work completed

17   by Hydro One for 2004 for the original cost allocation informational study, it was determined that

1 the weather sensitivity by rate classes is as follows in Table 13 - Weather Sensitivity by Rate Class.

2 The values in the table are consistent with the rate class weather sensitivity percentages used in

3 the 2016 COS application (EB-2015-0074).

4 **Table 13 - Weather Sensitivity by Rate Class**

Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street Lights	Unmetered Scattered Loads
						Weather Sensitivity
80.0%	80.0%	60.0%	15.1%	0.0%	0.0%	0.0%

5

6 The difference between the non-normalized and normalized forecast has been assigned on a pro

7 rata basis to each rate class based on the above level of weather sensitivity.

8

9 **3.2.7 CDM ADJUSTMENT AND LRAMVA**

10 HHHI is not aware of any new CDM programs that will be initiated in 2021. As a result, there is no

11 manual CDM adjustment applied in 2021 and the 2021 LRAMVA threshold has been set to zero.

12 [678]

13

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[6] MFR - CDM Adjustment - If a distributor expects impacts from any CFF-related projects not deployed by April 2019 but for which a distributor is contractually obligated to complete, or for other programs delivered by the distributor after April 2019, a distributor may include these amounts as part of a CDM manual adjustment to the 2021 load forecast but must ensure that sufficient supporting evidence is provided for all estimated CDM savings

[7] MFR - If a distributor proposes a CDM adjustment to its 2021 load forecast, it should document the CDM savings to be used as the basis for the 2021 LRAMVA threshold. In addition, the allocation of the CDM savings for the LRAMVA and the load forecast adjustment should be provided by customer class and for both kWh and, as applicable to a customer class, kW. The distributor should document its proposal adequately

[8] MFR - Appendix 2-I - is provided as one approach for calculating the aggregate amounts for the LRAMVA and the corresponding CDM adjustment to the load forecast.

1 **3.1.8 ADJUSTMENT FOR REDUCTION IN USAGE FOR GENERAL SERVICE 1,000 TO**

2 **4,999 KW CUSTOMERS**[9]

3 There are three (3) General Service 1,000 to 4,999 kW customers that have reductions in usage

4 starting in 2020 and onward. The following Table 14 - Movement in General Service 1,000 to 4,999

5 kW Customers summarizes the movement in number of customers from the General Service 1,000

6 to 4,999 kW class to the General Service 50 to 999 class along with the movement in kWh and kW.

7 **Table 14 - Movement in General Service 1,000 to 4,999 kW Customers**

	Customer Movement from General Service 1,000 to 4,999 kW to General Service 50 to 999 kW	General Service 1,000 to 4,999 kW kWh Adjustment	General Service 50 to 999 kW kWh Adjustment	General Service 1,000 to 4,999 kW kW Adjustment	General Service 50 to 999 kW kW Adjustment
Customer 1	0	(3,169,000)	0	(9,108)	0
Customer 2	1	(5,595,003)	173,846	(16,946)	630
Customer 3	1	(844,744)	844,744	(3,146)	3,146
Total	2	(9,608,748)	1,018,590	(29,200)	3,776

8

9 The adjustment for Customer 1 reflects the 2020 implementation of a PSUP – CHP CDM program

10 which was not included in the CDM variable to ensure a double count did not occur. The

11 adjustment for Customer 2, a globally recognized supplier of systems and components for the

12 automotive industries, announced on January 15, 2020 it will be permanently closing its

13 Georgetown facility in July 2020. The adjustment for Customer 3 reflects the reduction in

14 operation for which occurred prior to COVID-19.

15

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[9] MFR - Quantification of any impacts arising from the persistence of historical CDM programs as well as the forecasted impacts arising from new programs in the bridge and test years through the current 6-year CDM framework.

1   ## 3.2.9 COVID-19 ADJUSTMENT

2   On page 14 of a presentation titled "An overview of COVID-19 impacts on electricity system

3   operations" from the IESO dated April 23, 2020 (Appendix 3-2) it indicated the following.

4   Residential demand:

5   • Peak demand has increased by 2%
6   • Energy consumption has increased by 4%

7   Small Commercial:

8   • Peak demand reduced by 17% (weekdays) and 14% (weekends)
9   • Energy has reduced by 12% (weekdays) and 8% (weekends) – Calculated weighted average
10   11% (i.e. (5 times 12% + 2 times 8%) / 7)

11   Distribution Connected Industrial/Commercial Customers

12   • Peak demand average reductions 17% (inclusive of holidays impacts)
13   • Energy has reduced by 17% (inclusive of holidays impacts)

14   Within the body of presentation, the IESO indicated the outlook over the next eighteen (18)

15   months would be driven by the depth and duration of the pandemic response measures.

16   On May 20, 2020 (Appendix 3-3), the IESO updated the demand and supply forecasts to reflect

17   post COVID-19 conditions.

18   Residential demand: (2nd Round of Closures)

19   • Peak demand has increased by 1% to 9%
20   • Energy consumption has increased by 1% to 14% (weekdays) and 1% to 7% (weekends)
21   • Daily minimums have increased 5% on average

22   Small Commercial: (2nd Round of Closures)

23   • Peak demand reduced between 18% to 24% (weekdays) and 10% to 20% (weekends)
24   • Energy has reduced between 11% to 19% (weekdays) and 5% to 14% (weekends)

25   Distribution Connected Industrial/Commercial Customers (2nd Round of Closures)

26   • Peak demand average reductions of between 11% to 22% (weekdays) and 10% to 23%
27   (weekends)

1   •   Energy has reduced between 10% to 25% (weekdays) and 8% to 25% (weekends)

2   At the time of preparing this evidence there was no indication that consumption levels would

3   return to the pre-COVID-19 levels within the test year and there was no other source of data

4   available to indicate the level of impact.

5   As a result of the IESO outlook, HHHI has used the May 20, 2020 forecast above to apply a COVID-

6   19 adjustment to the load forecast. Table 15 - COVID-19 Adjustment %outlines the assumed

7   COVID-19 percentage adjustment by rate class. Table 16 - COVID-19 Adjustment (GWh) provides

8   the GWh adjustment by rate class which is the percentages in Table 15 - COVID-19 Adjustment %

9   being applied to the GWh in Table 12 - Non-normalized Weather Billed Energy Forecast

10

Table 15 - COVID-19 Adjustment %

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads
2020 - From March 15th	5%	(6%)	(9%)	(9%)	0%	0%	0%
2021 - Full Year	5%	(6%)	(9%)	(9%)	0%	0%	0%

11

12

Table 16 - COVID-19 Adjustment (GWh)

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street Lights	Unmetered Scattered Loads	Total
2020 - From March 15th	8.1	(2.4)	(10.7)	(6.3)	0.0	0.0	0.0	(11.4)
2021 - Full Year	10.3	(3.1)	(13.5)	(8.0)	0.0	0.0	0.0	(14.3)

13

14   The following **Table 17 - Alignment of Non-normal to Weather Normal Forecast and Other**

15   **Adjustments** outlines how the classes have been adjusted to align the non-normalized forecast

16   with the normalized forecast. This table also reflects the adjustment for reduction in usage for

17   General Service 1,000 to 4,999 kW Customers and the COVID-19 adjustment.

1   **Table 17 - Alignment of Non-normal to Weather Normal Forecast and Other**

2   **Adjustments**

Year	Residential	General Service less than 50 kW	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Unmetered Scattered Loads	Total
Non-normalized Weather Billed Energy Forecast (GWh)								
2020 Bridge Year	204.0	51.4	150.4	88.6	0.3	1.0	1.0	496.5
2021 Test Year	205.8	52.1	150.4	88.6	0.3	1.0	1.0	499.1
Weather Adjustment (GWh)								
2020 Bridge Year	(6.8)	(1.7)	(3.8)	(0.6)	0.0	0.0	0.0	(12.9)
2021 Test Year	(8.9)	(2.3)	(4.9)	(0.7)	0.0	0.0	0.0	(16.8)
Adjustment for General Service 1,000 to 4,999 kW Customers (GWh)								
2020 Bridge Year	0.0	0.0	1.0	(9.6)	0.0	0.0	0.0	(8.6)
2021 Test Year	0.0	0.0	1.0	(9.6)	0.0	0.0	0.0	(8.6)
COVID-19 Adjustment								
2020 Bridge Year	8.1	(2.4)	(10.7)	(6.3)	0.0	0.0	0.0	(11.4)
2021 Test Year	10.3	(3.1)	(13.5)	(8.0)	0.0	0.0	0.0	(14.3)
Weather Normalized Billed Energy Forecast (GWh)								
2020 Bridge Year	205.2	47.2	136.9	72.2	0.3	1.0	1.0	463.7
2021 Test Year	207.2	46.7	133.0	70.3	0.3	1.0	1.0	459.4

3

1 ## 3.2.10 BILLED KW LOAD FORECAST

2 There are a number of HHHI customers / connections that are charged volumetric distribution on

3 a per kW basis.

4 For the General Service 50 to 999 kW, General Service 1,000 to 4,999 kW, Sentinel Lights and

5 Streetlighting classes, the energy forecast needs to be converted to a kW basis for rate setting

6 purposes. Consistent with the method of forecasting the usage per customer / connection in Table

7 11 - Forecast Annual kWh Usage per Customer/Connection, the 2019 ratio of kW to kWh is applied

8 the forecasted kWh to produce the required kW for 2020 Bridge Year and 2021 Test Year.

9 The following Table 18 - 2019 kW/KWh Ratio per Applicable Rate Class outlines the 2019 ratio of

10 kW to kWh.

11 **Table 18 - 2019 kW/KWh Ratio per Applicable Rate Class**

Year	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting
	Ratio of kW to kWh			
2019	0.2784%	0.2472%	0.2699%	0.3169%

12

13 The following Table 19 - kW Forecast by Applicable Rate Class outlines the forecast of kW for the

14 applicable rate classes which reflects the ratio in Table 18 - 2019 kW/KWh Ratio per Applicable

15 Rate Class being applied to the results in Table 17 - Alignment of Non-normal to Weather Normal

16 Forecast and Other Adjustments. In addition, the adjustments outlined in Table 14 - Movement in

17 General Service 1,000 to 4,999 kW Customers are included in the kW forecast.

18

19

1

Table 19 - kW Forecast by Applicable Rate Class

Year	General Service 50 to 999 kW	General Service 1,000 to 4,999 kW	Sentinel Lights	Street-lighting	Total
Predicted Billed kW					
2020 Bridge Year	382,053	172,893	680	3,105	558,730
2021 Test Year	371,084	168,373	680	3,105	543,241

2

1   Table 20 - Summary of Total Load Forecast provides a summary of the load forecast on a billing

2   determinant basis by rate class.

3   **Table 20 - Summary of Total Load Forecast**

	2016 Board Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year Weather Normal	2021 Test Year Weather Normal
Purchases							
Actual kWh Purchases		525,610,329	498,991,222	519,290,313	513,275,675		
Predicted kWh Purchases before CDM adjustment	546,431,631	532,204,316	507,662,739	517,633,362	504,967,169	508,606,870	507,197,275
% Difference between actual and predicted purchases		1.3%	1.7%	(0.3%)	(1.6%)		
Loss Factor						1.0516	1.0516
Total Billed Before CDM Adjustments						483,649,366	482,308,940
Adjustment for General Service 1,000 to 4,999 kW Customers						(8,590,157)	(8,590,157)
COVID-19 Adjustment						(11,395,979)	(14,345,751)
Total Billed After Adjustments	**516,203,452**	**503,249,243**	**481,228,433**	**499,443,012**	**493,960,561**	**463,663,230**	**459,373,031**
Billing Determinants							
Residential							
Customers	19,971	20,057	20,188	20,332	20,476	20,663	20,852
kWh	205,578,737	204,439,774	193,694,443	208,411,376	202,110,918	205,205,019	207,178,634
General Service < 50 kW							
Customers	1,967	1,844	1,810	1,895	1,824	1,850	1,876
kWh	58,991,538	51,296,823	50,527,239	51,979,121	50,654,668	47,217,968	46,722,885
General Service 50 to 999 kW							
Customers	206	198	186	205	217	219	219
kWh	136,566,740	137,289,389	135,373,696	144,914,027	150,365,345	136,896,088	132,955,988
kW	362,031	390,924	394,783	410,875	418,610	382,053	371,084
General Service 1,000 to 4,999 kW							
Customers	13	13	11	10	11	9	9
kWh	112,173,675	107,193,041	99,309,703	91,829,369	88,636,118	72,150,643	70,322,012
kW	302,644	273,610	262,132	248,453	219,091	172,893	168,373
Sentinel Lights							
Connections	175	170	173	175	175	175	175
kWh	461,109	273,180	260,238	261,914	251,879	251,879	251,879
kW	628	739	704	695	680	680	680
Street Lights							
Connections	4,649	4,680	4,674	4,778	4,833	4,833	4,833
kWh	1,535,681	1,832,979	1,128,400	1,093,732	979,604	979,604	979,604
kW	4,282	5,129	3,155	3,043	3,105	3,105	3,105
Unmetered Scattered Loads							
Connections	144	148	152	185	183	183	183
kWh	895,971	924,057	934,714	953,473	962,029	962,029	962,029
Total							
Customer/Connections	**27,124**	**27,110**	**27,194**	**27,580**	**27,719**	**27,932**	**28,147**
kWh	**516,203,452**	**503,249,243**	**481,228,433**	**499,443,012**	**493,960,561**	**463,663,230**	**459,373,031**
kW	**669,585**	**670,402**	**660,774**	**663,066**	**641,485**	**558,730**	**543,241**

4

1 3.2.11 REGRESSION RESULTS

2 Table 21 - Correlation/Regression Results below presents the regression results used to determine the load forecast. Additional regression

3 results are discussed earlier in this exhibit and can be found in the live Load Forecast Excel model filed with this application.

4 **Table 21 - Correlation/Regression Results**

5

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.96801964
R Square	0.937062023
Adjusted R Square	0.932525953
Standard Error	889358.0056
Observations	120

ANOVA

	df	SS	MS	F	Significance F
Regression	8	1.30717E+15	1.63396E+14	206.5801314	5.71788E-63
Residual	111	8.77963E+13	7.90958E+11		
Total	119	1.39497E+15			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4092061.181	3168225.866	1.291593893	0.19918082	-2185989.874	10370112.23	-2185989.87	10370112.23
Heating Degree Days	10084.96851	529.5561905	19.04418963	9.14237E-37	9035.617571	11134.31946	9035.61757	11134.31946
Cooling Degree Days	70366.86932	2915.079818	24.13891684	5.57536E-46	64590.44405	76143.29458	64590.4441	76143.29458
Number of Days in Month	976515.7786	119344.278	8.182342676	5.10743E-13	740027.1248	1213004.432	740027.125	1213004.432
Spring Flag	-1742110.17	245287.6915	-7.102313858	1.23937E-10	-2228164.106	-1256056.235	-2228164.11	-1256056.235
Number of Peak Hours	17624.31568	5619.835282	3.136091148	0.002191931	6488.236905	28760.39446	6488.23691	28760.39446
Fall Flag	-644859.6927	249151.0037	-2.588228356	0.010937309	-1138569.039	-151150.3463	-1138569.04	-151150.3463
Outlet Mall	1922283.825	272453.4668	7.055457385	1.56432E-10	1382399.092	2462168.557	1382399.09	2462168.557
CDM	-1.547573153	0.165959055	-9.325029907	1.28233E-15	-1.8764321	-1.218714206	-1.8764321	-1.218714206

6

3.3 ACCURACY OF LOAD FORECAST AND VARIANCE ANALYSIS

3.3.1 VARIANCE ANALYSIS OF LOAD FORECAST[10]

HHHI notes that customer / connection count is shown at year end. The average customer / connection count is used for rate design. Explanation of 2020 Bridge Year and 2021 Test Year forecasts for customer / connections is shown above. Explanation of 2020 Bridge Year and 2021 Test Year forecasts for kWh and kW is shown above. Distribution Revenue variance analysis is shown below Table 22 - Summary of Billing Determinants and Average Consumption with Variances of Actual and Forecast Data Consistent with Appendix 2-IB below shows, by rate class and year:

- Number of customer / connections;
- Actual kWhs;
- Weather normalized kWhs;
- Actual kWs (where applicable);
- Weather normalized kWs;
- Actual consumption (kWhs) per customer;
- Weather normalized consumption (kWhs) per customer;
- Actual demand (kWs) per customer (where applicable);
- Weather normalized demand (kWs) per customer (where applicable);
- Year over year variance of Actual kWhs;
- Year over year variance of Weather normalized kWhs;
- Year over year variance of Actual kWs;
- Year over year variance of Weather normalized kWs;

---

[10] MFR - For customer/connection counts - identification as to whether customer/connection count is shown in year-end or average format, year-over-year variances in changes of customer/connection counts with explanation of major changes, explanations of bridge and test year forecasts by rate class, for last rebasing variance analysis between last OEB-approved and actuals with explanations for material differences

1   **Table 22 - Summary of Billing Determinants and Average Consumption with Variances of Actual and Forecast Data Consistent with**

2   **Appendix 2-IB**

	2016 Board Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year	2021 Test Year
Residential							
Number of Customers	19,971	20,057	20,188	20,332	20,476	20,663	20,852
kWh -Actuals	205,578,737	204,439,774	193,694,443	208,411,376	202,110,918	205,205,019	207,178,634
kWh - Weather Normalized	205,578,737	200,906,007	195,882,339	204,857,068	202,922,076	205,205,019	207,178,634
Consumption (kWh) per Customer - Actual	10,294	10,193	9,595	10,250	9,871	9,931	9,936
Consumption (kWh) per Customer - Weather Normalized	10,294	10,017	9,703	10,076	9,910	9,931	9,936
Variance Analysis (Year over Year)							
Number of Customers		0.4%	0.7%	0.7%	0.7%	0.9%	0.9%
kWh -Actuals		(0.6%)	(5.3%)	7.6%	(3.0%)	1.5%	1.0%
kWh - Weather Normalized		(2.3%)	(2.5%)	4.6%	(0.9%)	1.1%	1.0%
General Service less than 50 kW							
Number of Customers	1,967	1,844	1,810	1,895	1,824	1,850	1,876
kWh -Actuals	58,991,538	51,296,823	50,527,239	51,979,121	50,654,668	47,217,968	46,722,885
kWh - Weather Normalized	58,991,538	50,410,151	51,097,975	51,092,654	50,857,967	47,217,968	46,722,885
Consumption (kWh) per Customer - Actual	29,995	27,818	27,916	27,430	27,771	25,523	24,899
Consumption (kWh) per Customer - Weather Normalized	29,995	27,337	28,231	26,962	27,883	25,523	24,899
Variance Analysis (Year over Year)							
Number of Customers		(6.2%)	(1.8%)	4.7%	(3.7%)	1.4%	1.4%
kWh -Actuals		(13.0%)	(1.5%)	2.9%	(2.5%)	(6.8%)	(1.0%)
kWh - Weather Normalized		(14.5%)	1.4%	0.0%	(0.5%)	(7.2%)	(1.0%)
General Service 50 to 999 kW							
Number of Customers	206	198	186	205	217	219	219
kWh -Actuals	136,566,740	137,289,389	135,373,696	144,914,027	150,365,345	136,896,088	132,955,988
kWh - Weather Normalized	136,566,740	134,916,325	136,902,824	142,442,621	150,968,826	136,896,088	132,955,988
kW -Actuals	362,031	390,924	394,783	410,875	418,610	382,053	371,084
kW - Weather Normalized	362,031	384,167	399,242	403,868	420,290	382,053	371,084
Consumption (kWh) per Customer - Actual	662,343	693,381	727,816	706,898	692,928	625,096	607,105

Consumption (kWh) per Customer - Weather Normalized	662,343	681,396	736,037	694,842	695,709	625,096	607,105
Consumption (kW) per Customer - Actual	3,212	3,502	3,913	3,448	3,193	2,854	2,772
Consumption (kW) per Customer - Weather Normalized	3,212	3,441	3,957	3,389	3,206	2,854	2,772
Variance Analysis (Year over Year)							
Number of Customers		(4.0%)	(6.1%)	10.2%	5.9%	0.9%	0.0%
kWh -Actuals		0.5%	(1.4%)	7.0%	3.8%	(9.0%)	(2.9%)
kWh - Weather Normalized		(1.2%)	1.5%	4.0%	6.0%	(9.3%)	(2.9%)
kW -Actuals		8.0%	1.0%	4.1%	1.9%	(8.7%)	(2.9%)
kW - Weather Normalized		6.1%	3.9%	1.2%	4.1%	(9.1%)	(2.9%)
General Service 1,000 to 4,999 kW							
Number of Customers	13	13	11	10	11	9	9
kWh -Actuals	112,173,675	107,193,041	99,309,703	91,829,369	88,636,118	72,150,643	70,322,012
kWh - Weather Normalized	112,173,675	105,340,196	100,431,466	90,263,284	88,991,853	72,150,643	70,322,012
kW -Actuals	302,644	273,610	262,132	248,453	219,091	172,893	168,373
kW - Weather Normalized	302,644	268,881	265,093	244,216	219,970	172,893	168,373
Consumption (kWh) per Customer - Actual	8,457,793	8,245,619	9,028,155	9,182,937	8,057,829	8,016,738	7,813,557
Consumption (kWh) per Customer - Weather Normalized	8,457,793	8,103,092	9,130,133	9,026,328	8,090,168	8,016,738	7,813,557
Consumption (kW) per Customer - Actual	637,710	634,278	820,741	918,294	732,530	890,749	868,173
Consumption (kW) per Customer - Weather Normalized	637,710	623,315	830,012	902,633	735,470	890,749	868,173
Variance Analysis (Year over Year)							
Number of Customers		(2.0%)	(15.4%)	(9.1%)	10.0%	(18.2%)	0.0%
kWh -Actuals		(4.4%)	(7.4%)	(7.5%)	(3.5%)	(18.6%)	(2.5%)
kWh - Weather Normalized		(6.1%)	(4.7%)	(10.1%)	(1.4%)	(18.9%)	(2.5%)
kW -Actuals		(9.6%)	(4.2%)	(5.2%)	(11.8%)	(21.1%)	(2.6%)
kW - Weather Normalized		(11.2%)	(1.4%)	(7.9%)	(9.9%)	(21.4%)	(2.6%)
Sentinel Lights							
Number of Customers	175	170	173	175	175	175	175
kWh -Actuals	461,109	273,180	260,238	261,914	251,879	251,879	251,879
kWh - Weather Normalized	461,109	268,458	263,178	257,447	252,890	251,879	251,879
kW -Actuals	628	739	704	695	680	680	680
kW - Weather Normalized	628	726	712	683	682	680	680

Consumption (kWh) per Customer - Actual	2,637	1,607	1,504	1,497	1,439	1,439	1,439
Consumption (kWh) per Customer - Weather Normalized	2,637	1,579	1,521	1,471	1,445	1,439	1,439
Consumption (kW) per Customer - Actual	15	9	9	9	8	8	8
Consumption (kW) per Customer - Weather Normalized	15	9	9	8	8	8	8
Variance Analysis (Year over Year)							
Number of Customers		(2.8%)	1.8%	1.2%	0.0%	0.0%	0.0%
kWh -Actuals		(40.8%)	(4.7%)	0.6%	(3.8%)	0.0%	0.0%
kWh - Weather Normalized		(41.8%)	(2.0%)	(2.2%)	(1.8%)	(0.4%)	0.0%
kW -Actuals		17.6%	(4.7%)	(1.3%)	(2.2%)	0.0%	0.0%
kW - Weather Normalized		15.6%	(2.0%)	(4.0%)	(0.1%)	(0.4%)	0.0%
Street Lighting							
Number of Connections	4,649	4,680	4,674	4,778	4,833	4,833	4,833
kWh -Actuals	1,535,681	1,832,979	1,128,400	1,093,732	979,604	979,604	979,604
kWh - Weather Normalized	1,535,681	1,801,296	1,141,146	1,075,079	983,535	979,604	979,604
kW -Actuals	4,282	5,129	3,155	3,043	3,105	3,105	3,105
kW - Weather Normalized	4,282	5,040	3,191	2,991	3,117	3,105	3,105
Consumption (kWh) per Connection - Actual	330	392	241	229	203	203	203
Consumption (kWh) per Connection - Weather Normalized	330	385	244	225	204	203	203
Consumption (kW) per Connection - Actual	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Consumption (kW) per Connection - Weather Normalized	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Variance Analysis (Year over Year)							
Number of Customers		0.7%	(0.1%)	2.2%	1.2%	0.0%	0.0%
kWh -Actuals		19.4%	(38.4%)	(3.1%)	(10.4%)	0.0%	0.0%
kWh - Weather Normalized		17.3%	(36.6%)	(5.8%)	(8.5%)	(0.4%)	0.0%
kW -Actuals		19.8%	(38.5%)	(3.5%)	2.0%	0.0%	0.0%
kW - Weather Normalized		17.7%	(36.7%)	(6.3%)	4.2%	(0.4%)	0.0%
Unmetered Scattered Load							
Number of Customers	144	148	152	185	183	183	183
kWh -Actuals	895,971	924,057	934,714	953,473	962,029	962,029	962,029
kWh - Weather Normalized	895,971	908,085	945,272	937,212	965,890	962,029	962,029

Consumption (kWh) per Customer - Actual	6,222	6,244	6,149	5,154	5,257	5,257	5,257
Consumption (kWh) per Customer - Weather Normalized	6,222	6,136	6,219	5,066	5,278	5,257	5,257
Variance Analysis (Year over Year)							
Number of Customers		2.8%	2.7%	21.7%	-1.1%	0.0%	0.0%
kWh -Actuals		3.1%	1.2%	2.0%	0.9%	0.0%	0.0%
kWh - Weather Normalized		1.4%	4.1%	-0.9%	3.1%	-0.4%	0.0%
Totals							
Number of Customers / Connections	27,124	27,110	27,194	27,580	27,719	27,932	28,147
kWh -Actuals	516,203,452	503,249,243	481,228,433	499,443,012	493,960,561	463,663,230	459,373,031
kWh - Weather Normalized	516,203,452	494,550,518	486,664,200	490,925,367	495,943,038	463,663,230	459,373,031
kW -Actuals	669,585	670,402	660,774	663,066	641,485	558,730	543,241
kW - Weather Normalized	669,585	658,814	668,238	651,758	644,060	558,730	543,241
Variance Analysis (Year over Year)							
Number of Customers		(0.1%)	0.3%	1.4%	0.5%	0.8%	0.8%
kWh -Actuals		(2.5%)	(4.4%)	3.8%	(1.1%)	(6.1%)	(0.9%)
kWh - Weather Normalized		(4.2%)	(1.6%)	0.9%	1.0%	(6.5%)	(0.9%)
kW -Actuals	-	0.1%	(1.4%)	0.3%	(3.3%)	(12.9%)	(2.8%)
kW - Weather Normalized	-	(1.6%)	1.4%	(2.5%)	(1.2%)	(13.2%)	(2.8%)

1

2

1   **Variance Analysis** [11]

2   HHHI has utilized a variance of greater than ten percent (10%) as a discussion threshold for the

3   year over year analysis. Variance percentages less than ten percent (10%) are deemed to be

4   immaterial.

5   **2016 ACTUAL TO 2016 BOARD APPROVED**

6   Customers / Connections - All rate classes were below a variance of ten percent (10%).

7   Consumption (kWhs) – The General Service less than 50 kW 2016 Board Approved as compared

8   to 2016 Actual variances of (13.0%) and (14.5%) for actual kWhs and weather normalized kWhs

9   respectively indicate a lower than expected consumption from existing customers and the lack of

10   consumption due to less actual customers in the class. In the Sentinel Light class, the actual 2016

11   kWhs for both actual and weather normalized were significantly less than Board Approved due to

12   a calculation error related to the expected move to monthly billing. The Street Lighting class saw

13   a 2016 Actual variance of 19.4% and 17.3% (actual and weather normalized respectively) over the

14   2016 Board Approved as a result of a slower than expected start to the Town of Halton Hills

15   streetlighting project involving the auditing of existing street lights and the beginning of the

16   replacement of high-pressure sodium bulbs with LED. All other rate classes were below a variance

17   of ten percent (10%).

18   Demand (kWs) – The General Service 1,000 to 4,999 kW class saw a decrease of 11.2% on weather

19   normalized kW for the 2016 actual over 2016 Board Approved. This decrease was the result of a

20   company beginning to close operations in Halton Hills. In the Sentinel Light class, the actual 2016

21   kWhs for both actual and weather normalized were more than Board Approved due to a

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[11] MFR - With respect to average consumption, for each rate class, distributors are to provide weather-actual and weather-normalized average annual consumption or demand per customer as applicable for the rate class for last OEB approved and historical, weather normalized average annual consumption or demand per customer for the bridge and test years, explanation of the net change in average consumption from last OEB-approved and actuals from historical, bridge and test years based on year-over-year variances and any apparent trends in data

1   calculation error related to the expected move to monthly billing. The Street Lighting class saw a

2   2016 Actual variance of 19.8% and 17.7% (actual and weather normalized respectively) over the

3   2016 Board Approved as a result of the slower than expected start to the Town of Halton Hills

4   streetlighting project involving the auditing of existing street lights and the beginning of the

5   replacement of high-pressure sodium bulbs with LED. All other rate classes were below a variance

6   of ten percent (10%).

7

2017 ACTUAL TO 2016 ACTUAL

9   Customer / connections - In 2017, two (2) customers in the General Service 1,000 to 4,999 kW

10 class ceased operations, reducing the number of customers in the class from thirteen (13) to

11 eleven (11). This change represented a decrease of fifteen percent (15%) in the class. All other

12 rate classes were below a variance of ten percent (10%).

13 Consumption (kWhs) – The Street Lighting class saw a 2017 Actual variance of (38.4%) and (36.6%)

14 (actual and weather normalized respectively) over the 2016 Actual as a result of the Town of

15 Halton Hills streetlighting project involving replacement of high-pressure sodium bulbs with LED.

16 All other rate classes were below a variance of ten percent (10%).

17 Demand (kWs) - The Street Lighting class saw a 2017 Actual variance of (38.5%) and (36.7%) (actual

18 and weather normalized respectively) over the 2016 Actual as a result of the Town of Halton Hills

19 streetlighting project involving the replacement of high-pressure sodium bulbs with LED. All other

20 rate classes were below a variance of ten percent (10%).

21

2018 ACTUAL TO 2017 ACTUAL

23 Customers / connections - In 2018, as part of the Town of Halton Hills lighting project, an inventory

24 of all park and walkway lights was conducted. As a result of the inventory, there was movement

25 between the Streetlighting and Unmetered Scattered Load classes resulting in an increase of 21%

1   in the Unmetered Scattered Load class. Additionally, in 2018, the second phase of the Toronto

2   Premium Outlet opened resulting in an increase of the customers in the General Service 50 to 999

3   kW class. This increase accounted for the 10% increase in 2018 over 2017. All other rate classes

4   were below a variance of ten percent (10%).

5   Consumption (kWhs) – One (1) customer in the General Service 1,000 to 4,999 class was

6   commencing a reduction in operating hours during 2018. This resulted in a decrease of 10.1% in

7   weather normalized consumption in 2018. All other rate classes were below a variance of ten

8   percent (10%).

9   Demand (kW) - All rate classes were below a variance of ten percent (10%).

10

2019 ACTUAL TO 2018 ACTUAL

12   Customers / connections - HHHI gained a bulk-metered commercial complex in the General

13   Service 1,000 to 4,999 kW class, resulting in an increase of 10% in 2019 when compared to 2018.

14   All other rate classes were below a variance of ten percent (10%).

15   Consumption (kWhs) – The Town of Halton Hills lighting project concluded; thus the Street

16   Lighting class experienced a decrease in 2019 Actual kWh over 2018 Actual in the amount of

17   10.4%. All other rate classes were below a variance of ten percent (10%).

18   Demand (kWs) - One (1) customer in the General Service 1,000 to 4,999 class was commencing a

19   reduction in operating hours during 2018. In 2019, this customer ceased operating at capacity

20   and transferred production to another location. This resulted in a decrease of 11.8% in actual

21   consumption in 2019. All other rate classes were below a variance of ten percent (10%).

22

2020 BRIDGE YEAR TO 2019 ACTUALS

1 Customers / connections – The General Service 1,000 to 4,999 rate class is forecasted to see a

2 decrease of 18.2% in customer numbers from 2019 to 2020. This is a result of the movement and

3 projects of Customers 1, 2 and 3 explained above. All other rate classes are forecasted to be below

4 a variance of ten percent (10%).

5 Consumptions (kWhs) - The General Service 1,000 to 4,999 rate class is forecasted to see a

6 decrease of 18.6% and 18.9% (actual and weather normalized respectively) in consumption from

7 2019 to 2020. This is a result of the movement and projects of Customers 1, 2 and 3 explained

8 above. All other rate classes are forecasted to be below a variance of ten percent (10%).

9 Demand (kWs) - The General Service 1,000 to 4,999 rate class is forecasted to see a decrease of

10 21.1% and 21.4% (actual and weather normalized respectively) in demand from 2019 to 2020. This

11 is a result of the movement and projects of Customers 1, 2 and 3 explained above. All other rate

12 classes are forecasted to be below a variance of ten percent (10%).

13

14 2021 TEST YEAR TO 2020 BRIDGE YEAR

15 Customers / connections - All rate classes are forecasted to be below a variance of ten percent

16 (10%).

17 Consumption (kWhs) - All rate classes are forecasted to be below a variance of ten percent

18 (10%).

19 Demand (kWs) - All rate classes are forecasted to be below a variance of ten percent (10%)..

20

21

1   **3.3.2 VARIANCE ANALYSIS OF DISTRIBUTION REVENUES[12]**

2   A summary of HHHI's operating revenues is presented in Table 23 - Summary of Operating

3   Revenue below.[13]

4   **Table 23 - Summary of Operating Revenue**

Rate Class	2016 Board Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year	2021 Test Year at Current Rates	2021 Test Year at Proposed Rates
Distribution Revenue								
Residential	$6,146,082	$6,041,377	$6,303,528	$6,707,211	$6,831,674	$6,918,151	$6,810,124	$9,292,387
General Service less than 50 kW	$1,233,774	$1,068,922	$1,181,592	$1,231,747	$1,230,024	$1,225,806	$1,152,171	$1,899,419
General Service 50 to 999 kW	$1,506,028	$1,643,020	$1,687,045	$1,768,826	$1,906,728	$2,025,505	$1,653,966	$2,952,052
General Service 1,000 to 4,999 kW	$878,110	$746,576	$738,011	$843,029	$707,680	$695,030	$501,463	$1,333,596
Sentinel Lighting	$41,173	$38,176	$44,318	$46,344	$46,399	$46,601	$45,848	$47,966
Street Lighting	$130,840	$237,078	$133,505	$57,704	$138,925	$146,077	$143,020	$161,526
Unmetered Scattered Load	$17,985	$17,361	$19,105	$21,799	$23,367	$23,910	$23,504	$65,536
MicroFIT	$0	$8,619	$9,054	$11,207	$11,838	$9,500	$0	$0
Total Distribution	**$9,953,992**	**$9,801,128**	**$10,116,159**	**$10,687,868**	**$10,896,635**	**$11,090,580**	**$10,330,095**	**$15,752,482**
%of Total Revenue	**91%**	**90%**	**88%**	**90%**	**91%**	**92%**	**89%**	**92%**
Other Revenue								
Late Payment	$120,000	$125,310	$136,401	$131,759	$141,769	$145,000	$145,000	$145,000
Specific Service Charge	$375,470	$437,071	$415,300	$361,731	$289,776	$274,500	$216,775	$216,775
Other Distribution Revenue	$463,674	$440,959	$443,448	$500,507	$524,247	$524,589	$727,025	$727,025
Other Income & Expenses	$0	$126,694	$363,554	$227,166	$118,233	$72,152	$204,583	$204,583
Total Revenue Offset	**$959,144**	**$1,130,034**	**$1,358,703**	**$1,221,162**	**$1,074,025**	**$1,016,241**	**$1,293,382**	**$1,293,382**
%of Total Revenue	**9%**	**10%**	**12%**	**10%**	**9%**	**8%**	**11%**	**8%**
Grand Total	**$10,913,136**	**$10,931,162**	**$11,474,862**	**$11,909,030**	**$11,970,660**	**$12,106,821**	**$11,623,478**	**$17,045,865**

5

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[12] MFR - For revenues - calculation of bridge year forecast of revenues at existing rates, calculation of test year forecasted revenues at existing and proposed rates, year-over-year variances in revenues comparing historical actuals and bridge and test year forecasts

[13] MFR - For consumption and demand - explanation to support how kWh are converted to kW for applicable demand-billed classes, year-over-year variances in kWh and kW by rate class and for system consumption overall (kWh) with explanations for material changes in the definition of or major changes over time (should be done for both historical actuals against each other and historical weather-normalized actuals over time), explanations of the bridge and test year forecasts by rate class, variance analysis between the last OEB-approved and the actual and weather-normalized actual results

1

Table 24 - Operating Revenue Variance

Rate Class	2016 Board Approved to 2016 Actual	2017 Actual to 2016 Actual	2018 Actual to 2017 Actual	2019 Actual to 2018 Actual	2020 Bridge Year to 2019 Actual	2021 Test Year to 2020 Bridge Year
Distribution Revenue						
Residential	(104,705)	262,151	403,683	124,462	86,477	2,374,236
General Service less than 50 kW	(164,852)	112,670	50,155	(1,723)	(4,218)	673,613
General Service 50 to 999 kW	136,992	44,026	81,780	137,902	118,777	926,547
General Service 1,000 to 4,999 kW	(131,534)	(8,565)	105,018	(135,349)	(12,650)	638,566
Sentinel Lighting	(2,997)	6,143	2,026	55	202	1,365
Street Lighting	106,238	(103,573)	(75,801)	81,221	7,152	15,449
Unmetered Scattered Load	(624)	1,744	2,695	1,568	543	41,626
MicroFIT	8,619	435	2,153	631	(2,338)	(9,500)
Total Distribution	(152,864)	315,031	571,709	208,767	193,945	4,661,902
Other Revenue						
Late Payment	5,310	11,091	(4,642)	10,010	3,231	-
Specific Service Charge	61,601	(21,771)	(53,569)	(71,954)	(15,276)	(57,725)
Other Distribution Revenue	(22,715)	2,488	57,059	23,740	342	202,436
Other Income & Expenses	126,694	236,860	(136,389)	(108,933)	(46,081)	132,431
Total Revenue Offset	170,890	228,669	(137,541)	(147,137)	(57,784)	277,141
Grand Total	18,026	543,700	434,168	61,630	136,161	4,939,044

2

DISTRIBUTION REVENUE

4 Operating Revenue Variances are shown in Table 24 - Operating Revenue Variance

5

2016 BOARD APPROVED

7 HHHI's 2016 Board Approved operating revenue was $10,913,136 as shown in Table 23 - Summary
8 of Operating Revenue, consisting of Distribution revenue $9,953,992 and other operating revenue
9 (net), accounts for the remaining revenue of $959,144.

10

2016 ACTUAL

12 HHHI's operating revenue in fiscal 2016 was $10,931,162. Distribution revenue totaled $9,801,128
13 or 90% of total revenues and other operating revenue (net) was $1,130, 034.

14 **2016 Actual vs. 2016 Board Approved**

15 The total 2016 actual operating revenue was $18,026 higher than the 2016 Board Approved.

1   The Distribution Revenue variance was $152,864 lower than the 2016 Board Approved.

2   The Other Revenue variance was $170,890 higher than the 2016 Board Approved. Other revenue

3   variance is explained in the section below.

4   Distribution Revenue Variance – ($152,864)

5   The main driver for the variance is the 2016 Actual consumption is lower than 2016 Board

6   Approved amount. The Table 25 - 2016 Actual vs. 2016 Board Approved below presents the

7   variance by customer class.

8   **Table 25 - 2016 Actual vs. 2016 Board Approved**

	Customer Connection		Volumes	
	2016 Board Approved	**2016**	**2016 Board Approved**	**2016**
Residential	19,971	20,057	205,578,737	204,439,774
General Service less than 50 kW	1,967	1,844	58,991,538	51,296,823
General Service 50 to 999 kW	206	198	362,031	390,924
General Service 1,000 to 4,999 kW	13	13	302,644	273,610
Sentinel Lights	175	170	628	739
Streetlighting	4,649	4,680	4,282	5,129
Unmetered Scattered Load	144	148	895,971	924,057
Variance				
Residential		86		(1,138,963)
General Service less than 50 kW		(123)		(7,694,715)
General Service 50 to 999 kW		(8)		28,893
General Service 1,000 to 4,999 kW		-		(29,034)
Sentinel Lights		(5)		111
Streetlighting		31		847
Unmetered Scattered Load		4		28,086

9

10   2017 ACTUAL

11   HHHI's operating revenue in fiscal 2017 was $11,474,862. Distribution Revenue was $10,116,159

12   or 88% of total revenues and Other Operating Revenue (net) accounted for the remaining revenue

13   of $1,358,703.

14   **2017 Actual vs. 2016 Actual**

15   The total 2017 Actual operating revenue was $543,700 higher than 2016 Actual.

16   The Distribution Revenue variance was $315,031 higher than 2016 Actual.

1 The Other Revenue variance was $228,669 higher than the 2016 Actual. Other revenue variance is
2 explained in the section below.

3 Distribution Revenue Variance – $315,031

4 The increase in distribution revenue in 2017 is a result of the following;

5   i. Distribution revenue rates increased by 1.9% in the 2017 IRM Rate Application;
6   ii. HHHI recorded $113,983 distribution as result of LRAM adjustment;
7   iii. The increase was partially offset by lower consumption in 2017 compare to 2016. The table
8   below presents the variance by customer class.

9 **Table 26 - 2017 Actual vs. 2016 Actual**

Rate Class	Customers/ Connections	Customers/ Connections	Units	Volume	Volume
	2016	**2017**		**2016**	**2017**
Residential	20,057	20,188	kWh	204,439,774	193,694,443
General Service less than 50 kW	1,844	1,810	kWh	51,296,823	50,527,239
General Service 50 to 999 kW	198	186	kW	390,924	394,783
General Service 1,000 to 4,999 kW	13	11	kW	273,610	262,132
Sentinel Lights	170	173	kW	739	704
Streetlighting	4,680	4,674	kW	5,129	3,155
Unmetered Scattered Load	148	152	kWh	924,057	934,714
Variance					
Residential	86	131		(1,138,963)	(10,745,331)
General Service less than 50 kW	(123)	(34)		(7,694,715)	(769,584)
General Service 50 to 999 kW	(8)	(12)		28,893	3,859
General Service 1,000 to 4,999 kW	-	(2)		(29,034)	(11,478)
Sentinel Lights	(5)	3		111	(35)
Streetlighting	31	(6)		847	(1,974)
Unmetered Scattered Load	4	4		28,086	10,657

10

11

1 **2018 ACTUAL**

2 HHHI's 2018 Actual operating revenue was $11,909,030.

3 The Distribution Revenue totaled $10,687,868 or 90% of total revenues and Other Operating
4 Revenue (net), accounted for the remaining revenue of $1,221,162.

5

6 **2018 Actual vs. 2017 Actual**

7 The total 2018 Actual operating revenue was $434,168 higher than 2017 Actual.

8 The Distribution Revenue variance was $571,709 higher than 2017 Actual.

9 The Other Revenue variance was $137,541 lower than the 2017 Actual. Other revenue variance is
10 explained in the section below.

11 Distribution Revenue Variance – $571,709

12 Distribution revenue in 2018 is a result of the following;

13   i. Distribution revenue rates increase by 1.2% in the 2018 IRM Rate Application;
14   ii. HHHI recorded $339,000 of distribution revenue in 2018 as a result of the OEB Approval
15   of HHHI Application EB-2017-0045, to correct the depreciation expense in it 2016 Cost of
16   Service Rate Application. Please refer to Exhibit 2, Section xxx for details;
17   iii. Increase in consumption in 2018 compare to 2017. The table below present the variance
18   by customer class.

19

1   **Table 27 - 2018 Actual vs. 2017 Actual**

Rate Class	Customers/ Connections 2017	Customers/ Connections 2018	Volume 2017	Volume 2018
Residential	20,188	20,332	193,694,443	208,411,376
General Service less than 50 kW	1,810	1,895	50,527,239	51,979,121
General Service 50 to 999 kW	186	205	394,783	410,875
General Service 1,000 to 4,999 kW	11	10	262,132	248,453
Sentinel Lights	173	175	704	695
Streetlighting	4,674	4,778	3,155	3,043
Unmetered Scattered Load	152	185	934,714	953,473
Variance				
Residential	131	144	(10,745,331)	14,716,933
General Service less than 50 kW	(34)	85	(769,584)	1,451,882
General Service 50 to 999 kW	(12)	19	3,859	16,092
General Service 1,000 to 4,999 kW	(2)	(1)	(11,478)	(13,679)
Sentinel Lights	3	2	(35)	(9)
Streetlighting	(6)	104	(1,974)	(112)
Unmetered Scattered Load	4	33	10,657	18,759

2

3   2019 ACTUAL

4   HHHI's 2019 Actual operating revenue was $11,970,660.

5   The Distribution Revenue totaled $10,896,635 or 91% of total revenues and Other Operating
6   Revenue (net), accounted for the remaining revenue of $1,074,025.

7   **2019 Actual vs. 2018 Actual**

8   The total 2019 Actual operating revenue was $61,630 higher than 2018 Actual.

9   The Distribution Revenue variance was $208,767 higher than 2018 Actual.

10   The Other Revenue variance was $147,137 lower than the 2018 Actual. Other revenue variance is
11   explained in the section below.

12

13   Distribution Revenue Variance – $208,767

14   Distribution revenue increase in 2019 is a result of the following;

15   (i)   Distribution revenue rates increased by 1.5% in the 2019 IRM Rate Application;

1   (ii)   Decrease in consumption in 2019 compare to 2018. The table below present the variance
2   by customer class.

3   **Table 28 - 2019 Actual vs. 2018 Actual**

Rate Class	Customers/ Connections	Customers/ Connections	Volume	Volume
	2018	**2019**	**2018**	**2019**
Residential	20,332	20,476	208,411,376	202,110,918
General Service less than 50 kW	1,895	1,824	51,979,121	50,654,668
General Service 50 to 999 kW	205	217	410,875	418,610
General Service 1,000 to 4,999 kW	10	11	248,453	219,091
Sentinel Lights	175	175	695	680
Streetlighting	4,778	4,833	3,043	3,105
Unmetered Scattered Load	185	183	953,473	962,029
Variance				
Residential	144	144	14,716,933	(6,300,458)
General Service less than 50 kW	85	(71)	1,451,882	(1,324,453)
General Service 50 to 999 kW	19	12	16,092	7,735
General Service 1,000 to 4,999 kW	(1)	1	(13,679)	(29,362)
Sentinel Lights	2	-	(9)	(15)
Streetlighting	104	55	(112)	62
Unmetered Scattered Load	33	(2)	18,759	8,556

4

5   **2020 BRIDGE YEAR**

6   HHHI's 2020 Bridge Year operating revenue budget is $12,106,821. The Distribution Revenue
7   budget is $11,090,580 or 92% of total revenues and Other Operating Revenue is forecasted to
8   account for the remaining revenue of $1,016,241.

9   **2020 Bridge Year vs. 2019 Actual**

10 The 2020 Bridge Year budget total operating revenue is expected to be $136,161 higher than 2019
11 Actual.

12 The Distribution Revenue variance is forecasted to $193,945 higher than 2019 Actual.

13 The Other Revenue is forecasted to be $57,784 lower than the 2019 Actual. Other revenue variance
14 is explained in Section xx below.

15 Distribution Revenue Variance – $193,945

16 Distribution revenue in 2020 is expected to be higher than 2019 as result of the following;

1 (i)   Distribution revenue rates increased by 2.0% in 2020 IRM Rate Application;

2 (ii)   Change in consumption in 2020 compare to 2019. The table below present the variance
3   by customer class.

4   **Table 29 - 2020 Bridge Year vs. 2019 Actual**

Rate Class	Customers/ Connections	Customers/ Connections	Units	Volume	Volume
	2019	2020 Bridge Year		2019	2020 Bridge Year
Residential	20,476	20,663	kWh	202,110,918	205,205,019
General Service less than 50 kW	1,824	1,850	kWh	50,654,668	47,217,968
General Service 50 to 999 kW	217	219	kW	418,610	382,053
General Service 1,000 to 4,999 kW	11	9	kW	219,091	172,893
Sentinel Lights	175	175	kW	680	680
Streetlighting	4,833	4,833	kW	3,105	3,105
Unmetered Scattered Load	183	183	kWh	962,029	962,029
Variance					
Residential	144	187		(6,300,458)	3,094,101
General Service less than 50 kW	(71)	26		(1,324,453)	(3,436,700)
General Service 50 to 999 kW	12	2		7,735	(36,557)
General Service 1,000 to 4,999 kW	1	(2)		(29,362)	(46,198)
Sentinel Lights	-	-		(15)	-
Streetlighting	55	-		62	-
Unmetered Scattered Load	(2)	-		8,556	-

5

6 **2021 TEST YEAR**

7 HHHI's 2021 Test Year operating revenue based on proposed rates is $17,045,865 consisting of
8 Distribution Revenue of $15,752,482 or 92% of total revenue and Other Operating Revenue of
9 $1,293,382. HHHI's 2021 Test Year distribution revenue has been calculated using the proposed
10 rates set out in the 2020 Proposed Tariff of Rates and Charges shown in Exhibit 8,

11 **2021 Test Year vs. 2020 Bridge Year**

12 The total forecasted 2021 Test Year operating revenue is expected to be $4,939,044 above the
13 2020 Bridge Year. Please see Exhibit 6 for further revenue deficiency details in the 2021Test Year.

14

15

1 **Transformer Allowance**

2 HHHI currently provides a Transformer Ownership Allowance Credit of $0.60 per kW of demand

3 per month for all customers who own their own transformer facilities. HHHI is proposing to

4 maintain the rate of ($0.60) per kW of demand per month for the 2021 Test Year for eligible

5 customers.

6 <center>**Table 30 - Operating Revenue Variance**</center>

Rate Class	2016 Board Approved to 2016 Actual	2017 Actual to 2016 Actual	2018 Actual to 2017 Actual	2019 Actual to 2018 Actual	2020 Bridge Year to 2019 Actual	2021 Test Year to 2020 Bridge Year
Distribution Revenue						
Residential	(104,705)	262,151	403,683	124,462	86,477	2,374,236
General Service less than 50 kW	(164,852)	112,670	50,155	(1,723)	(4,218)	673,613
General Service 50 to 999 kW	136,992	44,026	81,780	137,902	118,777	926,547
General Service 1,000 to 4,999 kW	(131,534)	(8,565)	105,018	(135,349)	(12,650)	638,566
Sentinel Lights	(2,997)	6,143	2,026	55	202	1,365
Streetlighting	106,238	(103,573)	(75,801)	81,221	7,152	15,449
Unmetered Scattered Load	(624)	1,744	2,695	1,568	543	41,626
MicroFit	8,619	435	2,153	631	(2,338)	(9,500)
Total Distribution	**(152,864)**	**315,031**	**571,709**	**208,767**	**193,945**	**4,661,902**
Other Revenue						
Late Payment	5,310	11,091	(4,642)	10,010	3,231	-
Specific Service Charge	61,601	(21,771)	(53,569)	(71,954)	(15,276)	(57,725)
Other Distribution Revenue	(22,715)	2,488	57,059	23,740	342	202,436
Other Income & Expenses	126,694	236,860	(136,389)	(108,933)	(46,081)	132,431
Total Revenue Offset	**170,890**	**228,669**	**(137,541)**	**(147,137)**	**(57,784)**	**277,141**
Grand Total	**18,026**	**543,700**	**434,168**	**61,630**	**136,161**	**4,939,044**

7

1 **3.4 OTHER REVENUES**

2 3.4.1 OVERVIEW OF OTHER REVENUE

3 Other Distribution revenues include such items as:

4 • Specific Service Charges
5 • Late Payment Charges
6 • Other Distribution Revenues
7 • Other Income and Expenses

8 Other revenues are deducted from HHHI's proposed revenue requirement. Further details on the

9 derivation of the Revenue Requirement are presented at Exhibit 6.

10 A detailed breakdown by USoA account is shown below in Table 31 - Board Appendix 2-H: Other

11 Operating Revenue.

12 **Table 31 - Board Appendix 2-H: Other Operating Revenue**

USoA	USoA Description	2016 OEB Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year	2021 Test Year
	Reporting Basis	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS
4235	Specific Service Charges	$375,470	$437,071	$415,300	$361,731	$289,776	$274,500	$266,651
4225	Late Payment Charges	$120,000	$125,310	$136,401	$131,759	$141,769	$145,000	$145,000
4210	Rent from Electric Property	$171,575	$191,536	$167,840	$193,924	$195,051	$171,908	$335,592
4245	Deferred Revenue	$292,099	$249,423	$275,608	$306,583	$329,196	$352,681	$380,273
4355	Gain on Disposition of Utility property		$13,898	$45,296	$15,487	$1,000	$0	$0
4375	Revenues from Non-Utility Operations	$331,697	$659,407	$1,738,745	$1,219,755	$1,096,492	$394,143	$413,850
4380	Expenses of Non-Utility Operations	($331,697)	($631,821)	($1,488,660)	($1,129,276)	($1,042,321)	($369,491)	($387,966)
4385	Rental of Property		$56,119	$35,874	$38,791	$39,175	$22,000	$33,322
4398	Foreign Exchange Gains and (Losses)		($402)	$3,826	$2,035	($812)	$0	$0
4405	Interest		$29,494	$28,473	$80,373	$24,699	$25,500	$25,500
	Specific Service Charges	$375,470	$437,071	$415,300	$361,731	$289,776	$274,500	$266,651
	Late Payment Charges	$120,000	$125,310	$136,401	$131,759	$141,769	$145,000	$145,000
	Other Operating Revenues	$463,674	$440,959	$443,448	$500,507	$524,247	$524,589	$715,865
	Other Income or Deductions	$0	$126,694	$363,554	$227,166	$118,233	$72,152	$84,706
	Total	$959,144	$1,130,035	$1,358,703	$1,221,163	$1,074,025	$1,016,241	$1,212,222

13

14

1   **Table 32 - Board Appendix 2-H - Other Operating Revenue (USofA 4235 details)[14]**

Account 4235 - Specific Service Charges

Description	2016 OEB Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year	2021 Test Year
Reporting Basis	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS
NSF	$10,000	$4,707	$3,214	$2,832	$3,210	$3,500	$3,355
Application Fee - Subdivision	$22,500	($5,775)	$7,500	$7,500	$0	$15,000	$7,500
Service layouts	$40,000	$10,000					
Sale of Scrap Materials	$65,000	$27,942	$99,158	$39,227	$45,402	$65,000	$49,876
Account set-up	$65,000	$69,840	$54,840	$49,230	$52,050	$55,000	$53,525
Miscellaneous-Specific service charges	$15,970	$51,363	$8,171	$15,619	$1,375	$50,000	$66,395
Miscellaneous-Affordability Trust Fund					$83,424		
Miscellaneous-WSIB rebate					$1,088		
Premium locate fee							
Collection	$137,000	$108,000	$55,745	$27,600	$20,325		
Reconnection	$20,000	$16,715	$8,085	$3,795	$3,220	$6,000	$6,000
Fire Department Billings		$49,586	$26,451	$34,944	$26,661	$30,000	$30,000
Other Utility Operating - Recoverable work		$104,693	$96,567	$81,554	$53,021	$50,000	$50,000
Other Utility Operating - Recoverable work - Customer owned			$12,130				
Other Utility Operating - Recoverable work - Customer owned			$29,689				
Other Utility Operating - New York Restoration (March 2018)					$81,194		
Recovery Administrative Costs			$13,750	$18,235			
Total	**$375,470**	**$437,071**	**$415,300**	**$361,731**	**$289,776**	**$274,500**	**$266,651**

2

3   **Table 33 - Board Appendix 2-H - Other Operating Revenue**

Other Operating Revenues   4080, 4082, 4084, 4086, 4090, 4205, 4210, 4215, 4220, 4240, 4245

Description	2016 OEB Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year	2021 Test Year
Reporting Basis	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS
Rent from Electric Property (4210) -Pole Rental	$171,575	$191,536	$167,840	$193,924	$195,051	$171,908	$335,592
Deferred Rev/Contributed Capital (4245)	$292,099	$249,423	$275,608	$306,583	$329,196	$352,681	$380,273
Total	**$463,674**	**$440,959**	**$443,448**	**$500,507**	**$524,247**	**$524,589**	**$715,865**

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[14] MFR - Completed Appendix 2-H

1   **Table 34 - Board Appendix 2-H - Other Operating Revenue**

Other Income and Expenses: 4305, 4310, 4315, 4320, 4325, 4330, 4335, 4340, 4345, 4350, 4355, 4360, 4365, 4370, 4375, 4380, 4385, 4390, 4395, 4398, 4405, 4415

Description	2016 OEB Approved	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Bridge Year	2021 Test Year	
Reporting Basis	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	
Gain (Loss) on disposition of Utility Property (4355)		$13,898	$45,296	$15,487	$1,000	$0	$0	
CDM Revenue (4375)		$300,125	$1,161,766	$773,681	$686,726	$0	$0	
OPA CDM Consulting (4375)		$27,585	$232,050	$69,205	$32,645	$0	$0	
OM&A-CDM Costs (4380)		($300,125)	($1,161,766)	($773,681)	($686,726)	$0	$0	
Inter-Company SWE (4375)	$331,697	$331,697	$326,894	$355,595	$355,595	$369,491	$387,966	
Inter-Company QTS (4375)			$12,023	$14,184	$14,376	$16,435	$17,256	
Inter-Company HHCEC (4375)			$6,012	$7,090	$7,151	$8,217	$8,628	
OM&A-Water billing (4380)	($331,697)	($331,697)	($326,894)	($355,595)	($355,595)	($369,491)	($387,966)	
Rental of Property (4385)		$56,119	$35,874	$38,791	$39,175	$22,000	$33,322	
Foreign Exchange Gain (Loss) (4398)		-$402	$3,826	$2,035	-$812	$0	$0	
Interest Revenue -Deferred Variance Accounts (DVAs) (4405)	$0	$27,313	$27,309	$79,721	$23,134	$24,300	$24,300	
Miscellaneous Interest Revenue (4405)		$2,181	$1,164	$653	$1,564	$1,200	$1,200	
Total	**$0**	**$126,694**	**$363,554**	**$227,166**	**$118,233**	**$72,152**	**$84,706**	

2

3   ## VARIANCE ANALYSIS OF OTHER OPERATING REVENUE[15]

4   A year over year variance analysis has been provided based on HHHI's materiality of $80,000; the

5   materiality calculation provided in Exhibits 2 and 4. Revenue from affiliate transactions, shared

6   services, corporate cost allocation are shown and explain in Exhibit 4. [16]

7

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[15] MFR - Variance analysis - year over year, historical, bridge and test
[16] Revenue from affiliate transactions, shared services, corporate cost allocation. For each affiliate transaction, identification of the service, the nature of the service provided to affiliate entities, accounts used to record the revenue and associated costs (Appendix 2-N)

1 **2016 BOARD APPROVED VS. 2016 ACTUAL**

2 **Table 35 - Other Operating Revenue -2016 Board Approved vs. 2016 Actual**

Description	2016 OEB Approved	Actual Year	Variance
	2016	2016	
Specific Service Charges	$375,470	$437,071	($61,601)
Late Payment Charges	$120,000	$125,310	($5,310)
Other Operating Revenues	$463,674	$440,959	$22,715
Other Income or Deductions	$0	$126,694	($126,694)
Total	**$959,144**	**$1,130,035**	**($170,891)**

3

4 The 2016 Actual is $170,891 higher than 2016 Board Approved amount. A detailed breakdown of

5 the revenues in each of the category is presented in

6 Table 35 - Other Operating Revenue -2016 Board Approved vs. 2016 Actual above. Specific Service

7 Charge includes $104,693 billed for customer requested jobs. The increase of $126,694 Other

8 Income and Deductions includes $56,119 rental income, $27,585 incentive earned from the CDM

9 program, and $27,313 interest income from Deferral and Variance Accounts

10

11 **2017 ACTUAL VS. 2016 ACTUAL**

12 **Table 36 - Other Operating Revenue -2017 Actual vs. 2016 Actual**

Description	2017 Actual	2016 Actual	Variance
Specific Service Charges	$415,300	$437,071	($21,771)
Late Payment Charges	$136,401	$125,310	$11,091
Other Operating Revenues	$443,448	$440,959	$2,488
Other Income or Deductions	$363,554	$126,694	$236,860
Total	**$1,358,703**	**$1,130,035**	**$228,668**

13

1   The 2017 Actual is $228,668 higher than 2016 Actuals. A detailed breakdown of the revenues in

2   each of the categories is presented in Table 36 - Other Operating Revenue -2017 Actual vs. 2016

3   Actual above. The main driver for the increase of $236,860 in Other Income and Deductions is

4   $204,465 of incentive earned from the CDM program, $31,398 Gains on Disposal of property and

5   $20,245 increase in rental income.

6

7   **2018 ACTUAL VS. 2017 ACTUAL**

8   **Table 37 - Other Operating Revenue -2018 Actual vs. 2017 Actual**

Description	2018 Actual	2017 Actual	Variance
Specific Service Charges	$361,731	$415,300	($53,569)
Late Payment Charges	$131,759	$136,401	($4,642)
Other Operating Revenues	$500,507	$443,448	$57,060
Other Income or Deductions	$227,166	$363,554	($136,389)
Total	**$1,221,163**	**$1,358,703**	**($137,540)**

9   The 2018 Actual is $137,540 lower than 2017 Actuals. A detailed breakdown of the revenues in

10   each of the categories is presented in Table 37 - Other Operating Revenue -2018 Actual vs. 2017

11   Actual above. Specific Service Charges includes $81,194 for a trip to New York to assist in restoring

12   power. Other Income and Deductions is lower by $136,389, this includes $204,465 reduction in

13   CDM incentive earned offset by $69,205 of administrative costs recovered from CDM program,

14   $29,810 reduction on Gain/Loss on the Sale of Property, offset by $52,412 increase in interest

15   income from Deferral and Variance Accounts.

16   **2019 ACTUAL VS. 2018 ACTUAL**

17   **Table 38 - Other Operating Revenue -2019 Actual vs. 2018 Actual**

Description	2019 Actual	2018 Actual	Variance
Specific Service Charges	$289,776	$361,731	($71,954)
Late Payment Charges	$141,769	$131,759	$10,010

Other Operating Revenues	$524,247	$500,507	$23,740
Other Income or Deductions	$118,233	$227,166	($108,933)
Total	**$1,074,025**	**$1,221,163**	**-$147,137**

1

2 The 2019 Actual is $147,137 lower than 2018 Actuals. A detailed breakdown of the revenues in

3 each of the categories is presented in Table 38 - Other Operating Revenue -2019 Actual vs. 2018

4 Actual above. Specific Service Charges includes $83,424 of administrative costs recovered from

5 Hydro One to administer the Affordability Trust Fund, the increase was offset by the reduction of

6 the one-time revenue from the New York trip in 2018 explained above.   Reduction of $108,933

7 in Other Income and Deductions consists of $14,487 reduction on Gain/Loss on the Sale of

8 Property, $36,560 reduction in administrative costs recovered from CDM program, and $56,587

9 reduction in interest income on Deferral and Variance Accounts.

10

11 **2020 BRIDGE YEAR VS. 2019 ACTUAL**

12   **Table 39 - Other Operating Revenue -2020 Bridge Year vs. 2019 Actual**

Description	2020 Bridge Year	2019 Actual	Variance
Specific Service Charges	$274,500	$289,776	($15,276)
Late Payment Charges	$145,000	$141,769	$3,231
Other Operating Revenues	$524,589	$524,247	$342
Other Income or Deductions	$72,152	$118,233	($46,081)
Total	**$1,016,241**	**$1,074,025**	**($57,784)**

13 The 2020 Bridge Year is forecasted to be $57,784 lower than 2019 Actual. A detailed breakdown

14 of the revenues in each of the categories is presented in Table 39 - Other Operating Revenue -

15 2020 Bridge Year vs. 2019 Actual above. The reduction of $46,081 in Other Income and Deductions

16 consist of $32,645 reduction in administrative costs recovered from CDM program and $17,175

17 reduction of rental income.

18

1   **2021 TEST YEAR VS. 2020 BRIDGE YEAR**

2   **Table 40 - Other Operating Revenue -2021 Test Year vs. 2020 Bridge Year**

Description	2021 Test Year	2020 Bridge Year	Variance
Specific Service Charges	$266,651	$274,500	($7,849)
Late Payment Charges	$145,000	$145,000	$0
Other Operating Revenues	$715,865	$524,589	$191,276
Other Income or Deductions	$84,706	$72,152	$12,554
Total	**$1,212,222**	**$1,016,241**	**$195,981**

3   The 2021 Test Year is forecasted to be $195,981 higher than the 2020 Bridge Year. The increase

4   in Other Revenue is a result of HHHI recognizing $163,684 as revenue in 2021, which is the

5   increase in pole rental fees which was transferred to Deferral and Variance Account 1508 in

6   previous years.

7

8   ### 3.4.3 PROPOSED SPECIFIC SERVICE CHARGES[17]

9   HHHI discusses proposed specific service charges in Exhibit 8 – Rate Design.

10 There are no classes or discrete customer groups that may be materially impacted by changes to

11 other rates and charges.[18] HHHI further discusses Standby / Capacity Reserve Charges in Exhibit

12 8 – Rate Design.

13

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[17] MFR – Any new proposed specific service charges
[18] MFR - Distributors must identify any discrete customer groups that may be materially impacted by changes to other rates and charges

1   3.4.4 REVENUE FROM AFFILIATE TRANSACTIONS, SHARED SERVICES, CORPORATE

2   COST ALLOCATION.

3   HHHI discusses the revenue from affiliate transactions, shared services and corporate cost

4   allocation in Exhibit 4 – Operating Costs.

5   **APPENDICES**

6

7   **APPENDIX 3-1**   OEB APPENDIX 2-IB

8   **APPENDIX 3-2**   IESO PRESENTATION – APRIL 23, 2020

9   **APPENDIX 3-3**   IESO PRESENTATION – MAY 20, 2020

10

1 **APPENDIX 3-1 OEB APPENDIX 2-IB**

2

File Number: EB-2020-0026
Exhibit:
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Schedule:
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Date:

Appendix 2-IB
Customer, Connections, Load Forecast and Revenues Data and Analysis

This sheet is to be filled in accordance with the instructions documented in section 2.3.2 of Chapter 2 of the Filing Requirements for Distribution Rate Applications, in terms of one set of tables per customer class.

Color coding for Cells: Data input   Drop-down List

         No data entry required   Blank or calculated value

Distribution System (Total)

	Calendar Year (for 2021 Cost of Service			Consumption (kWh) [3]			Weather-normalized
				Actual (Weather actual)	Weather-normalized		
Historical	2015		Actual	510,232,246	513,023,595		
Historical	2016		Actual	516,203,452	516,203,452	OEB-approved	
Historical	2017		Actual	481,228,433	486,664,200		
Historical	2018		Actual	499,443,012	490,925,367		
Historical	2019		Actual	493,960,561	495,943,038		
Bridge Year	2020		Forecast		463,663,230		
Test Year	2021		Forecast		459,373,031		

Variance Analysis		Year	Year-over-year		Versus OEB-approved
		2015			
		2016	1.2%	0.6%	
		2017	-6.8%	-5.7%	
		2018	3.8%	0.9%	
		2019	-1.1%	1.0%	
		2020		-6.5%	
		2021		-0.9%	
		Geometric Mean	-1.1%	-2.2%	

Customer Class Analysis (one for each Customer Class, excluding MicroFIT and Standby)

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1 **Customer Class:** Residential   Is the customer class billed on consumption (kWh) or demand (kW or kVA)?   kWh

	Calendar Year (for 2021 Cost of Service)	Customers				Consumption (kWh) [3]					Consumption (kWh) per Customer			
							Actual (Weather actual)	Weather-normalized		Weather-normalized		Actual (Weather actual)	Weather-normalized	Weather-normalized
Historical	2015	Actual	19,801			Actual	203,353,342	204,465,836			Actual	10,270	10,326	
Historical	2016	Actual	19,971	OEB-approved		Actual	205,578,737	205,578,737	OEB-approved		Actual	10,294	10,294 OEB-approved	
Historical	2017	Actual	20,188			Actual	193,694,443	195,882,339			Actual	9,595	9,703	
Historical	2018	Actual	20,332			Actual	208,411,376	204,857,068			Actual	10,250	10,076	
Historical	2019	Actual	20,476			Actual	202,110,918	202,922,076			Actual	9,871	9,910	
Bridge Year	2020	Forecast	20,663			Forecast		205,205,019			Forecast	0	9,931	
Test Year	2021	Forecast	20,852			Forecast		207,178,634			Forecast	0	9,936	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved
	2015			2015				2015			
	2016	0.9%		2016	1.1%	0.5%		2016	0.2%	-0.3%	
	2017	1.1%		2017	-5.8%	-4.7%		2017	-6.8%	-5.7%	
	2018	0.7%		2018	7.6%	4.6%		2018	6.8%	3.8%	
	2019	0.7%		2019	-3.0%	-0.9%		2019	-3.7%	-1.6%	
	2020	0.9%		2020		1.1%		2020		0.2%	
	2021	0.9%		2021		1.0%		2021		0.0%	
	Geometric Mean	1.0%		Geometric Mean	-0.2%	0.3%		Geometric Mean	-1.3%	-0.8%	

	Calendar Year (for 2021 Cost of Service)	Revenues	
Historical	2015	Actual	$ 5,811,065
Historical	2016	Actual	$ 6,146,082 OEB-approved
Historical	2017	Actual	$ 6,303,528
Historical	2018	Actual	$ 6,707,211
Historical	2019	Actual	$ 6,831,674
Bridge Year (Foreca	2020	Forecast	$ 6,918,151
Test Year (Forecast)	2021	Forecast	$ 9,292,387

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved
	2015		
	2016	5.8%	
	2017	2.6%	
	2018	6.4%	
	2019	1.9%	
	2020	1.3%	
	2021	34.3%	
	Geometric Mean	9.8%	

2 Customer Class: | General Service less than 50 kW | | Is the customer class billed on consumption (kWh) or demand (kW or kVA)? | kWh

	Calendar Year (for 2021 Cost of Service)	Customers			Consumption (kWh) [3]			Consumption (kWh) per Customer	
					Actual (Weather actual)	Weather-normalized	Weather-normalized	Actual (Weather actual)	Weather-normalized	Weather-normalized
Historical	2015	Actual	1,920		Actual	50,702,250	50,979,629		Actual	26,407	26,552
Historical	2016	Actual	1,967 OEB-approved		Actual	58,991,538	58,991,538 OEB-approved		Actual	29,995	29,995 OEB-approved
Historical	2017	Actual	1,810		Actual	50,527,239	51,097,975		Actual	27,916	28,231
Historical	2018	Actual	1,895		Actual	51,979,121	51,092,654		Actual	27,430	26,962
Historical	2019	Actual	1,824		Actual	50,654,668	50,857,967		Actual	27,771	27,883
Bridge Year	2020	Forecast	1,850		Forecast		47,217,968		Forecast	0	25,523
Test Year	2021	Forecast	1,876		Forecast		46,722,885		Forecast	0	24,899

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved
	2015			2015				2015			
	2016	2.4%		2016	16.3%	15.7%		2016	13.6%	13.0%	
	2017	-8.0%		2017	-14.3%	-13.4%		2017	-6.9%	-5.9%	
	2018	4.7%		2018	2.9%	0.0%		2018	-1.7%	-4.5%	
	2019	-3.7%		2019	-2.5%	-0.5%		2019	1.2%	3.4%	
	2020	1.4%		2020		-7.2%		2020		-8.5%	
	2021	1.4%		2021		-1.0%		2021		-2.4%	
	Geometric Mean	-0.5%		Geometric Mean	0.0%	-1.7%		Geometric Mean	1.7%	-1.3%	

	Calendar Year (for 2021 Cost of Service)	Revenues
Historical	2015	Actual $ 1,062,063
Historical	2016	Actual $ 1,233,774 OEB-approved
Historical	2017	Actual $ 1,181,592
Historical	2018	Actual $ 1,231,747
Historical	2019	Actual $ 1,230,024
Bridge Year (Forecast)	2020	Forecast $ 1,225,806
Test Year (Forecast)	2021	Forecast $ 1,899,419

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved
	2015		
	2016	16.2%	
	2017	-4.2%	
	2018	4.2%	
	2019	-0.1%	
	2020	-0.3%	
	2021	55.0%	
	Geometric Mean	12.3%	

3 **Customer Class:** | General Service 50 to 999 kW | Is the customer class billed on consumption (kWh) or demand (kW or kVA)? | kW

	Calendar Year (for 2021 Cost of Service)	Customers				Consumption (kWh) [3]						Consumption (kWh) per Customer			
							Actual (Weather actual)	Weather-normalized		Weather-normalized			Actual (Weather actual)	Weather-normalized	Weather-normalized
Historical	2015	Actual	195			Actual	140,066,367	140,832,634				Actual	718,289	722,219	
Historical	2016	Actual	206	OEB-approved		Actual	136,566,740	136,566,740	OEB-approved			Actual	662,343	662,343 OEB-approved	
Historical	2017	Actual	186			Actual	135,373,696	136,902,824				Actual	727,816	736,037	
Historical	2018	Actual	205			Actual	144,914,027	142,442,621				Actual	706,898	694,842	
Historical	2019	Actual	217			Actual	150,365,345	150,968,826				Actual	692,928	695,709	
Bridge Year	2020	Forecast	219			Forecast		136,896,088				Forecast	0	625,096	
Test Year	2021	Forecast	219			Forecast		132,955,988				Forecast	0	607,105	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved
	2015			2015				2015			
	2016	5.7%		2016	-2.5%	-3.0%		2016	-7.8%	-8.3%	
	2017	-9.8%		2017	-0.9%	0.2%		2017	9.9%	11.1%	
	2018	10.2%		2018	7.0%	4.0%		2018	-2.9%	-5.6%	
	2019	5.9%		2019	3.8%	6.0%		2019	-2.0%	0.1%	
	2020	0.9%		2020		-9.3%		2020		-10.1%	
	2021	0.0%		2021		-2.9%		2021		-2.9%	
	Geometric Mean	2.3%		Geometric Mean	2.4%	-1.1%		Geometric Mean	-1.2%	-3.4%	

	Calendar Year (for 2021 Cost of Service)	Revenues		
Historical	2015	Actual	$ 1,474,333	
Historical	2016	Actual	$ 1,506,028	OEB-approved
Historical	2017	Actual	$ 1,687,045	
Historical	2018	Actual	$ 1,768,826	
Historical	2019	Actual	$ 1,906,728	
Bridge Year (Forecast)	2020	Forecast	$ 2,025,505	
Test Year (Forecast)	2021	Forecast	$ 2,952,052	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved
	2015		
	2016	2.1%	
	2017	12.0%	
	2018	4.8%	
	2019	7.8%	
	2020	6.2%	
	2021	45.7%	
	Geometric Mean	14.9%	

4 Customer Class: General Service 1,000 to 4,999 kW   Is the customer class billed on consumption (kWh) or demand (kW or kVA)?   kW

Customers

	Calendar Year (for 2021 Cost of Service)		Customers	
Historical	2015	Actual	13	
Historical	2016	Actual	13	OEB-approved
Historical	2017	Actual	11	
Historical	2018	Actual	10	
Historical	2019	Actual	11	
Bridge Year	2020	Forecast	9	
Test Year	2021	Forecast	9	

Consumption (kWh) [3]

	Calendar Year (for 2021 Cost of Service)		Actual (Weather actual)	Weather-normalized		Weather-normalized
Historical	2015	Actual	112,112,962	112,726,303		
Historical	2016	Actual	112,173,675	112,173,675	OEB-approved	
Historical	2017	Actual	99,309,703	100,431,466		
Historical	2018	Actual	91,829,369	90,263,284		
Historical	2019	Actual	88,636,118	88,991,853		
Bridge Year	2020	Forecast		72,150,643		
Test Year	2021	Forecast		70,322,012		

Consumption (kWh) per Customer

	Calendar Year (for 2021 Cost of Service)		Actual (Weather actual)	Weather-normalized		Weather-normalized
Historical	2015	Actual	8,624,074	8,671,254		
Historical	2016	Actual	8,457,793	8,457,793	OEB-approved	
Historical	2017	Actual	9,028,155	9,130,133		
Historical	2018	Actual	9,182,937	9,026,328		
Historical	2019	Actual	8,057,829	8,090,168		
Bridge Year	2020	Forecast	0	8,016,738		
Test Year	2021	Forecast	0	7,813,557		

Variance Analysis — Customers

Year	Year-over-year	Test Year Versus OEB-approved
2015		
2016	2.0%	
2017	-17.1%	
2018	-9.1%	
2019	10.0%	
2020	-18.2%	
2021	0.0%	
Geometric Mean	-7.1%	

Variance Analysis — Consumption

Year	Year-over-year		Test Year Versus OEB-approved
2015			
2016	0.1%	-0.5%	
2017	-11.5%	-10.5%	
2018	-7.5%	-10.1%	
2019	-3.5%	-1.4%	
2020		-18.9%	
2021		-2.5%	
Geometric Mean	-7.5%	-9.0%	

Variance Analysis — Consumption per Customer

Year	Year-over-year		Test Year Versus OEB-approved
2015			
2016	-1.9%	-2.5%	
2017	6.7%	7.9%	
2018	1.7%	-1.1%	
2019	-12.3%	-10.4%	
2020		-0.9%	
2021		-2.5%	
Geometric Mean	-2.2%	-2.1%	

Revenues

	Calendar Year (for 2021 Cost of Service)		Revenues	
Historical	2015	Actual	$ 809,176	
Historical	2016	Actual	$ 878,110	OEB-approved
Historical	2017	Actual	$ 738,011	
Historical	2018	Actual	$ 843,029	
Historical	2019	Actual	$ 707,680	
Bridge Year (Forecast)	2020	Forecast	$ 695,030	
Test Year (Forecast)	2021	Forecast	$ 1,333,596	

Variance Analysis — Revenues

Year	Year-over-year	Test Year Versus OEB-approved
2015		
2016	8.5%	
2017	-16.0%	
2018	14.2%	
2019	-16.1%	
2020	-1.8%	
2021	91.9%	
Geometric Mean	10.5%	

5 Customer Class: | Sentinel Lights | | Is the customer class billed on consumption (kWh) or demand (kW or kVA)? | kW

	Calendar Year (for 2021 Cost of Service		Customers			Consumption (kWh) [3]					Consumption (kWh) per Customer			
							Actual (Weather actual)	Weather-normalized		Weather-normalized		Actual (Weather actual)	Weather-normalized	Weather-normalized
Historical	2015	Actual	172			Actual	326,944	328,733			Actual	1,901	1,911	
Historical	2016	Actual	175	OEB-approved		Actual	461,109	461,109	OEB-approved		Actual	2,637	2,637 OEB-approved	
Historical	2017	Actual	173			Actual	260,238	263,178			Actual	1,504	1,521	
Historical	2018	Actual	175			Actual	261,914	257,447			Actual	1,497	1,471	
Historical	2019	Actual	175			Actual	251,879	252,890			Actual	1,439	1,445	
Bridge Year	2020	Forecast	175			Forecast		251,879			Forecast	0	1,439	
Test Year	2021	Forecast	175			Forecast		251,879			Forecast	0	1,439	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved
	2015			2015				2015			
	2016	1.7%		2016	41.0%	40.3%		2016	38.7%	38.0%	
	2017	-1.1%		2017	-43.6%	-42.9%		2017	-43.0%	-42.3%	
	2018	1.2%		2018	0.6%	-2.2%		2018	-0.5%	-3.3%	
	2019	0.0%		2019	-3.8%	-1.8%		2019	-3.8%	-1.8%	
	2020	0.0%		2020		-0.4%		2020		-0.4%	
	2021	0.0%		2021		0.0%		2021		0.0%	
	Geometric Mean	0.3%		Geometric Mean	-8.3%	-5.2%		Geometric Mean	-8.9%	-5.5%	

	Calendar Year (for 2021 Cost of Service		Revenues	
Historical	2015	Actual	$ 25,265	
Historical	2016	Actual	$ 41,173	OEB-approved
Historical	2017	Actual	$ 44,318	
Historical	2018	Actual	$ 46,344	
Historical	2019	Actual	$ 46,399	
Bridge Year (Foreca	2020	Forecast	$ 46,601	
Test Year (Forecast)	2021	Forecast	$ 47,966	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved
	2015		
	2016	63.0%	
	2017	7.6%	
	2018	4.6%	
	2019	0.1%	
	2020	0.4%	
	2021	2.9%	
	Geometric Mean	13.7%	

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6 Customer Class: Street Lighting   Is the customer class billed on consumption (kWh) or demand (kW or kVA)?   kW

	Calendar Year (for 2021 Cost of Service)	Customers				Consumption (kWh) [3]					Consumption (kWh) per Customer			
							Actual (Weather actual)	Weather-normalized		Weather-normalized		Actual (Weather actual)	Weather-normalized	Weather-normalized
Historical	2015	Actual	4,595			Actual	2,765,164	2,780,291			Actual	602	605	
Historical	2016	Actual	4,649	OEB-approved		Actual	1,535,681	1,535,681	OEB-approved		Actual	330	330 OEB-approved	
Historical	2017	Actual	4,674			Actual	1,128,400	1,141,146			Actual	241	244	
Historical	2018	Actual	4,778			Actual	1,093,732	1,075,079			Actual	229	225	
Historical	2019	Actual	4,833			Actual	979,604	983,535			Actual	203	204	
Bridge Year	2020	Forecast	4,833			Forecast		979,604			Forecast	0	203	
Test Year	2021	Forecast	4,833			Forecast		979,604			Forecast	0	203	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved
	2015			2015				2015			
	2016	1.2%		2016	-44.5%	-44.8%		2016	-45.1%	-45.4%	
	2017	0.5%		2017	-26.5%	-25.7%		2017	-26.9%	-26.1%	
	2018	2.2%		2018	-3.1%	-5.8%		2018	-5.2%	-7.8%	
	2019	1.2%		2019	-10.4%	-8.5%		2019	-11.5%	-9.6%	
	2020	0.0%		2020		-0.4%		2020		-0.4%	
	2021	0.0%		2021		0.0%		2021		0.0%	
	Geometric Mean	1.0%		Geometric Mean	-29.2%	-18.8%		Geometric Mean	-30.4%	-19.6%	

	Calendar Year (for 2021 Cost of Service)	Revenues		
Historical	2015	Actual	$ 351,898	
Historical	2016	Actual	$ 130,840	OEB-approved
Historical	2017	Actual	$ 133,505	
Historical	2018	Actual	$ 57,704	
Historical	2019	Actual	$ 138,925	
Bridge Year (Forecast)	2020	Forecast	$ 146,077	
Test Year (Forecast)	2021	Forecast	$ 161,526	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved
	2015		
	2016	-62.8%	
	2017	2.0%	
	2018	-56.8%	
	2019	140.8%	
	2020	5.1%	
	2021	10.6%	
	Geometric Mean	-14.4%	

7 Customer Class: Unmetered Scattered Load   Is the customer class billed on consumption (kWh) or demand (kW or kVA)?   kWh

	Calendar Year (for 2021 Cost of Service)	Customers				Consumption (kWh) [3]					Consumption (kWh) per Customer			
							Actual (Weather actual)	Weather-normalized		Weather-normalized		Actual (Weather actual)	Weather-normalized	Weather-normalized
Historical	2015	Actual	144			Actual	905,217	910,169			Actual	6,286	6,321	
Historical	2016	Actual	144	OEB-approved		Actual	895,971	895,971	OEB-approved		Actual	6,222	6,222 OEB-approved	
Historical	2017	Actual	152			Actual	934,714	945,272			Actual	6,149	6,219	
Historical	2018	Actual	185			Actual	953,473	937,212			Actual	5,154	5,066	
Historical	2019	Actual	183			Actual	962,029	965,890			Actual	5,257	5,278	
Bridge Year	2020	Forecast	183			Forecast		962,029			Forecast	0	5,257	
Test Year	2021	Forecast	183			Forecast		962,029			Forecast	0	5,257	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved	Year	Year-over-year		Test Year Versus OEB-approved
	2015			2015				2015			
	2016	0.0%		2016	-1.0%	-1.6%		2016	-1.0%	-1.6%	
	2017	5.6%		2017	4.3%	5.5%		2017	-1.2%	-0.1%	
	2018	21.7%		2018	2.0%	-0.9%		2018	-16.2%	-18.5%	
	2019	-1.1%		2019	0.9%	3.1%		2019	2.0%	4.2%	
	2020	0.0%		2020		-0.4%		2020		-0.4%	
	2021	0.0%		2021		0.0%		2021		0.0%	
	Geometric Mean	4.9%		Geometric Mean	2.0%	1.1%		Geometric Mean	-5.8%	-3.6%	

	Calendar Year (for 2021 Cost of Service)	Revenues		
Historical	2015	Actual	$ 15,602	
Historical	2016	Actual	$ 17,985	OEB-approved
Historical	2017	Actual	$ 19,105	
Historical	2018	Actual	$ 21,799	
Historical	2019	Actual	$ 23,367	
Bridge Year (Forecast)	2020	Forecast	$ 23,910	
Test Year (Forecast)	2021	Forecast	$ 65,536	

Variance Analysis	Year	Year-over-year	Test Year Versus OEB-approved
	2015		
	2016	15.3%	
	2017	6.2%	
	2018	14.1%	
	2019	7.2%	
	2020	2.3%	
	2021	174.1%	
	Geometric Mean	33.2%	

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1 **APPENDIX 3-2   IESO PRESENTATION – APRIL 23, 2020**

2

An overview of COVID-19 impacts on electricity system operations

Webinar

April 23, 2020

1

Today's Webinar Presenters

- **Terry Young,** Vice President of Policy, Engagement and Innovation

- **Leonard Kula,** Vice President of Planning, Acquisition and Operations

- **Chuck Farmer,** Sr. Director of Power System Planning

- **Kausar Ashraf,** Manager, Demand & Conservation Planning

- **David Robitaille,** Sr. Director, Market Operations

- **Tam Wagner,** Sr. Manager, Operational Effectiveness

- **Jordan Penic,** Sr. Manager, Engagement and Indigenous Relations

Overview

- Ontario's electricity system is reliable, with enough supply available to meet demand under a variety of risk scenarios

- IESO and stakeholders have been limiting staff on-site, deferring non-essential work, and focusing on core operations

- COVID-19 has disrupted many businesses, resulting in reduced provincial demand and creating significant uncertainty in supply and demand forecasts

  – Demand reductions in all hours ranging from 800 – 3,000 MW, which is 6 -18% of typical demand for this time of year

- Ongoing dialogue is especially important during periods of uncertainty to ensure we can maintain the reliable operation of the grid

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PANDEMIC OPERATIONS PREPAREDNESS

System Operations During Pandemic

- The health and safety of staff remains the sector's top priority during the pandemic

- The need to maintain reliability under these circumstances has required the sector to re-evaluate its normal operations

- IESO initiated a number of stakeholder forums to ensure coordination across the sector, even prior to a state of emergency being declared across the province

- Managing workforce attendance risks and demand uncertainty changed the day-to-day operations of energy sector organizations, as well as power system operations

- The IESO is in continuous contact with other reliability coordinators to discuss pandemic planning tactics and strategies

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Pandemic Preparations at IESO

- The IESO's internal pandemic plans were executed to safeguard essential staff and maintain reliability, all other IESO staff are working from home

- Control room operator teams are physically separated with day shifts operating at the IESO's primary control centre, and the night shifts operating from the back-up control centre
  - A third control room was built and successfully deployed in 10 days, which can be used to further maintain physical separation of control room operators

- All individuals that come on site at the IESO's control centres are monitored with temperature and health screenings

- IESO is prepared to have control room operators and other essential staff remain at the primary control centre 24/7 should the need arise

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Pandemic Preparations with Stakeholders

- Emergency Preparedness Task Force (EPTF) began regular meetings to discuss preparations for the emerging pandemic on February 19

- The Crisis Management Support Team (CMST) was activated on March 26 as the situation continued to escalate with indications of community spread, and the EPTF was stood down

- The activation of CMST transitioned the focus from crisis planning to crisis response, with a focus on potential risks to grid operations

- The CMST continues to meet twice weekly to gather, communicate and analyse information related to the situation and to monitor for potential impacts on the power system, public health and safety, and the environment

- IESO will continue to issue regular communications to stakeholders through the Bulletin, social media channels, and ieso.ca

EPTF: A stakeholder-represented group for emergency planning initiatives, chaired by the IESO
CMST: forum for key Ontario electricity industry representatives to provide early warnings of events that may affect the reliability of the electricity

Early Operational Response to Pandemic

- Uncertainty in demand patterns and the need to respond to unanticipated events caused by potential workforce limitations, led to close coordination with market participants to develop revised operational plans to maintain system resilience

- This resulted in:

  - returning of critical power system elements to service that were on outage

  - enabling outages to proceed to reduce the risk of potential forced outages in the near future

  - allowing outages to proceed that did not have significant impact on the power system

- As system conditions normalize, the IESO will be working with market participants to transition back to regular outage planning and operational practices

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Increase in Surplus Baseload Generation
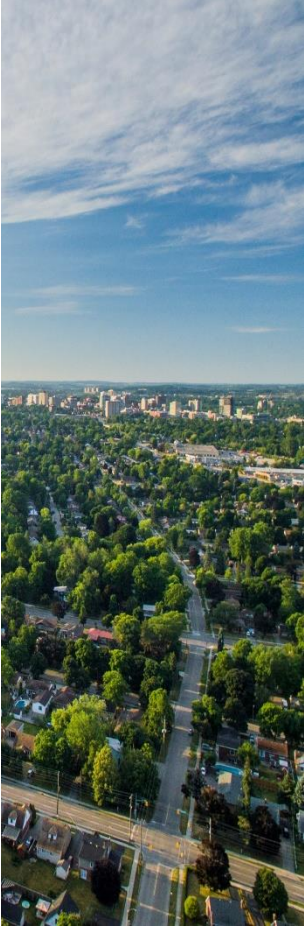
- High surplus baseload generation (SBG) conditions are often observed in the spring when demand is low and there are large amounts of energy from hydroelectric resources caused by higher water levels

- As COVID-19 measures were put in place, it was anticipated that demand would decrease and SBG this spring would be exacerbated

- The IESO continues to update its assessment of SBG conditions and SBG management options through spring/early summer

- Neighbouring jurisdictions do not typically experience the same levels of SBG as Ontario – however, this is being closely monitored as demands continue to trend lower

Questions?

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SYSTEM IMPACTS

Overall Impact on Demand for Electricity

- System demand reductions in all hours ranging from 800 – 3,000 MW, which is 6 -18% of typical demand for this time of year

- System peak demand has been reduced by approximately 10-15%

- Overall energy consumption to date continues to be approximately 10-12% lower than normal

- Demand is expected to continue to decrease through April and May when warmer weather materializes

System Snapshot: April 14, 2020

Similar Day Comparisons - Demand Profiles for Tuesday April 14, 2020
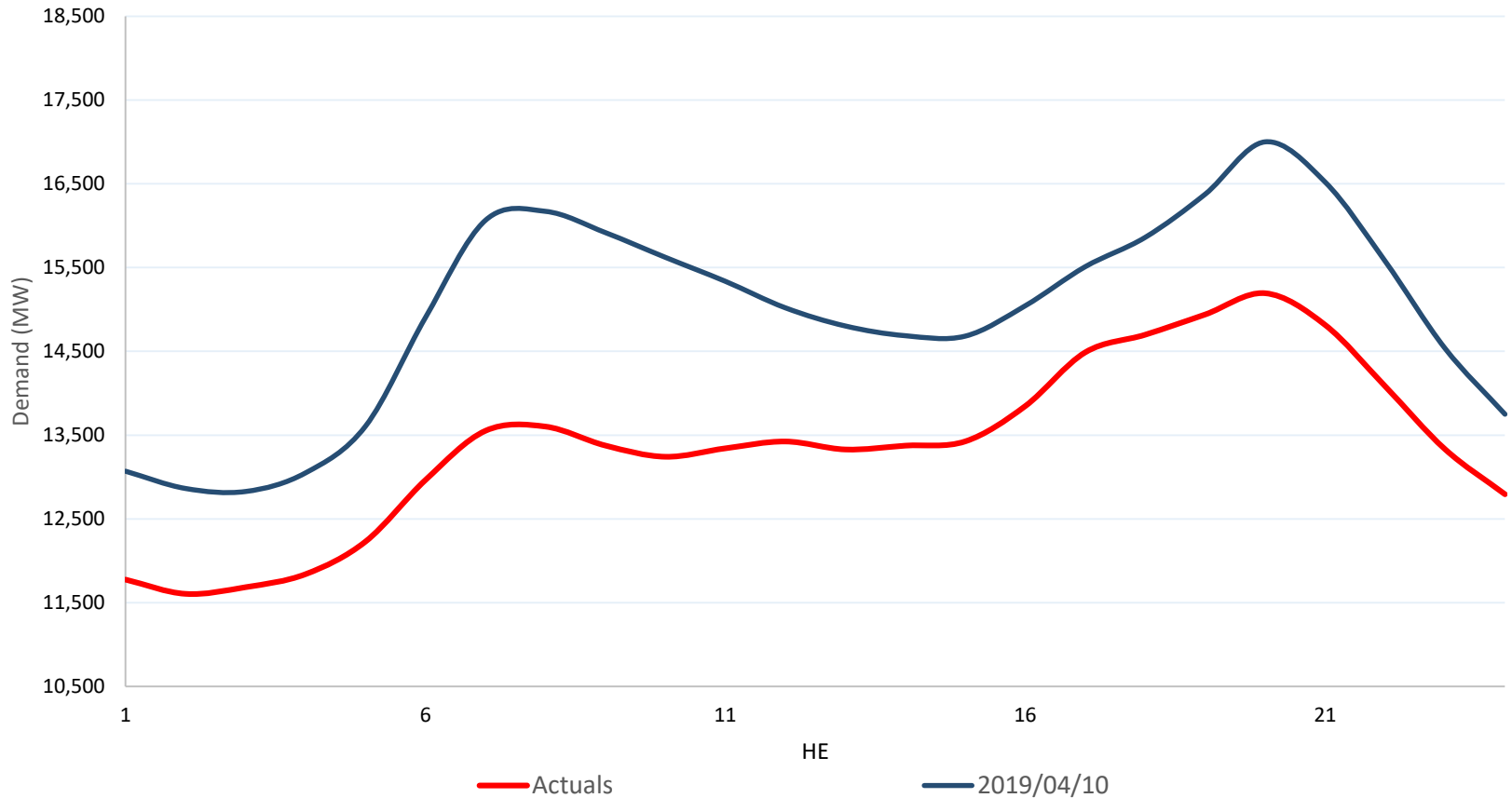
Demand Observations By Consumer Group

Residential demand:

- Peak demand has increased by 2%
- Energy consumption has increased by 4%

Small Commercial (<50kW)

- Peak demand reduced by 17% (weekdays)
   14% (weekends)
- Energy has reduced by 12% (weekdays) and 8% (weekends)

Distribution Connected Industrial/Commercial Customers

- Peak demand average reductions 17% (inclusive of holidays impacts)
- Energy has reduced by 17% (inclusive of holidays impacts)

Transmission Connected Wholesale Customer Demand

- Peak demand average reduction 16% (inclusive of holidays impacts)
- Energy has decreased on average 16% (inclusive of holidays)

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Ontario Demand March 16- April 17, 2020

March 16-April 17 2020 Hourly Demand vs. Similar Days
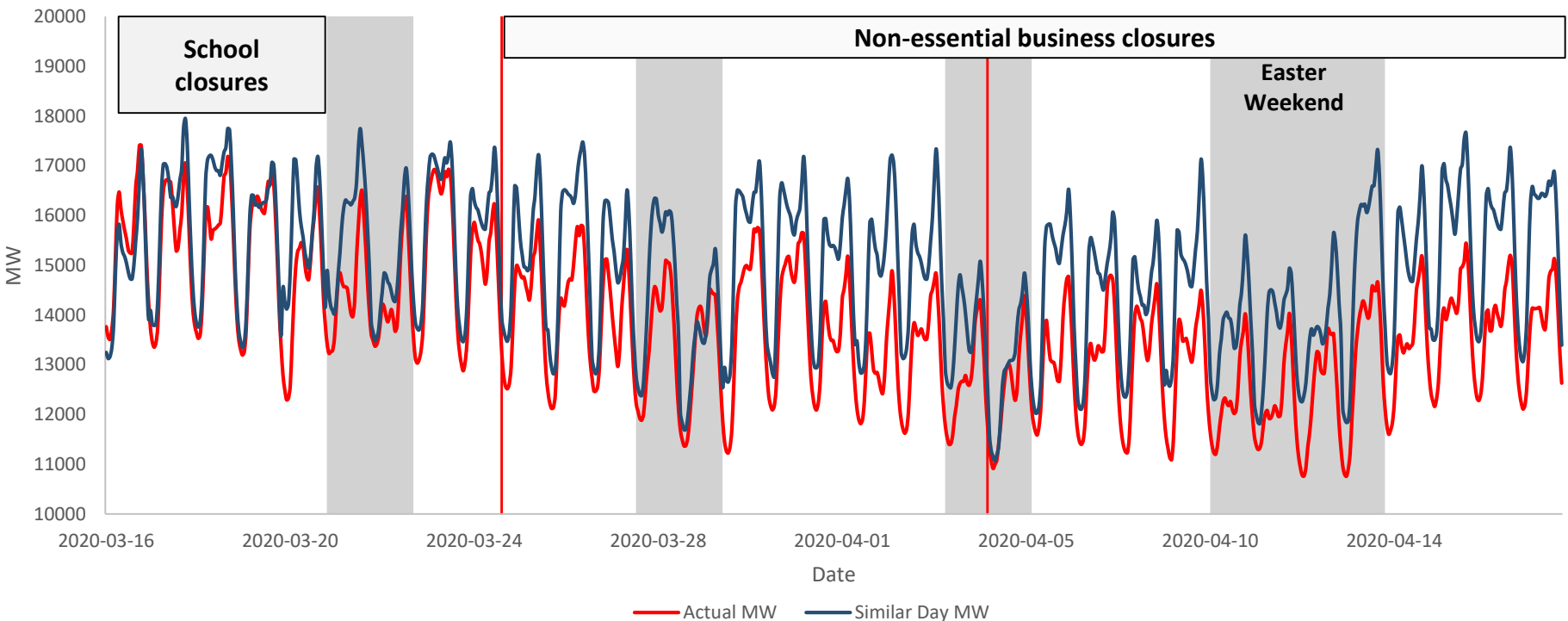
Ontario Daily Energy Use is Down 10-12%

March 16 – April 17, 2020 Daily Energy vs Similar Days

Non-essential business closures

Legend: ■ Actual Energy ■ Similar Day Energy

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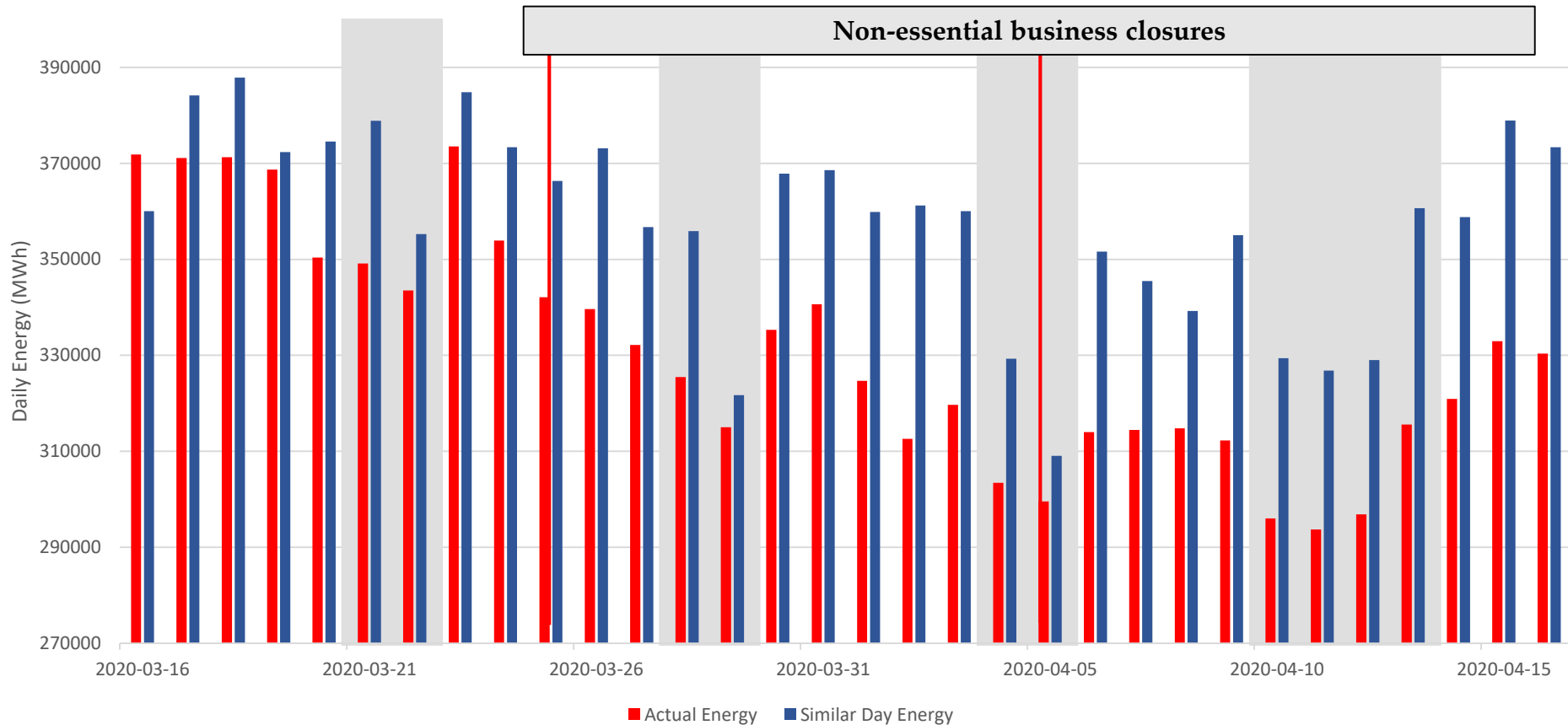
Peak Demand is Down by 10-15 %

March 16 – April 17, 2020 Peaks vs Similar Days

Non-essential business closures

Legend: ■ Actual Peak ■ Similar Day Peak

Y-axis: Peak NW (13000–19000)

X-axis: 2020-03-16, 2020-03-21, 2020-03-26, 2020-03-31, 2020-04-05, 2020-04-10, 2020-04-15

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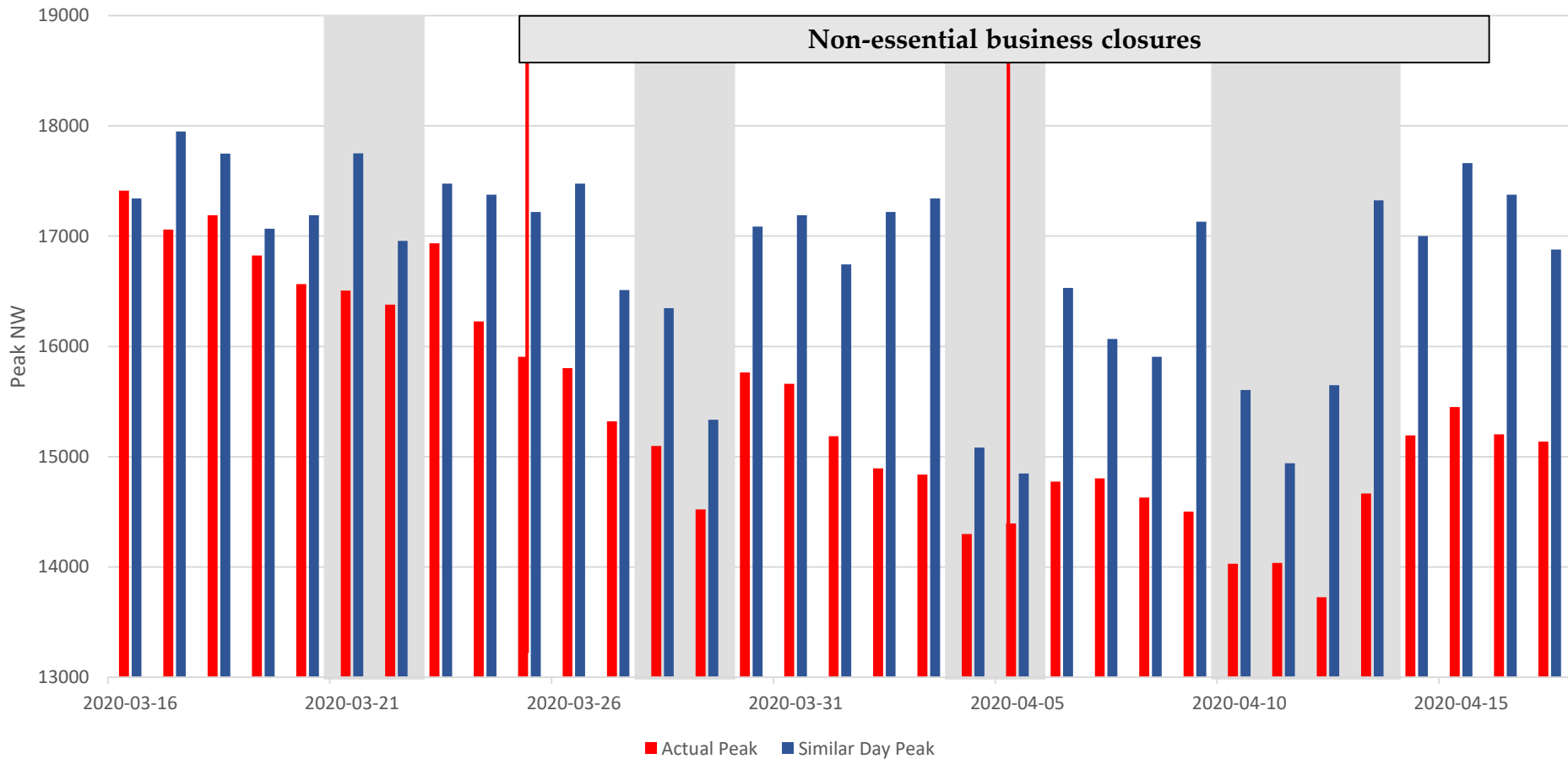
Residential Consumer Behavior

- shifted to working from home, coupled with province-wide school closures, resulting in a 1-3 % increase in load

- morning peak ramping up slower as residents gradually shift into their new routine

- If a warm spring, there may be additional air conditioning load to consider

Detached	Multi Residential	Seasonal
• Overall – 2-8% increase in daily peaks • Weekdays – 4-8% increase in energy • Weekend –1-5% increase in energy	• Overall – 1-5% increase in daily peaks • Weekdays 1-7% increase in energy • Weekend – 1-4% increase in energy	• Overall – 5-24% increase in daily peaks • Weekdays – 10-24% increase in energy • Weekends -8-15% increase in energy • Daily min – 7-28% increase

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Commercial Consumer Behavior

- Impacted by the mandatory closures of non-essential business, and many shut down or initiated 'care & maintenance' procedures

- Nearly 80% of commercial load will be impacted by measures taken to combat COVID-19

- Specifically the small commercial sector (<50kW) impacts are:
  - Weekday peaks reduced by 15-21%, weekend 8-15%
  - Weekday energy reduced by 10-16%, weekend 3-13%

- Distribution connected industrial/commercial (malls, community, retail, office, small industrial) has seen the greatest reductions
  - Overall peak reductions ranging 10-23%
  - Overall energy reduction ranging 14-22%

Commercial customers consist of: Small commercial <50 MW and Dx connected commercial/industrial load

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Wholesale Consumer Behavior

- IESO has visibility into approx. 1,500-2,000 MW of customers that are directly connected to the transmission system

- current reductions in this consumer segment are on average between 250-300MW

- government has urged manufacturing to consider producing essential goods to help combat COVID-19, this may result in a marginal bounce-back in load, however this may take time to materialize

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Wholesale Consumers Demand Down 13-26%

Wholesale Consumption

Non-essential business closures

Easter Weekend
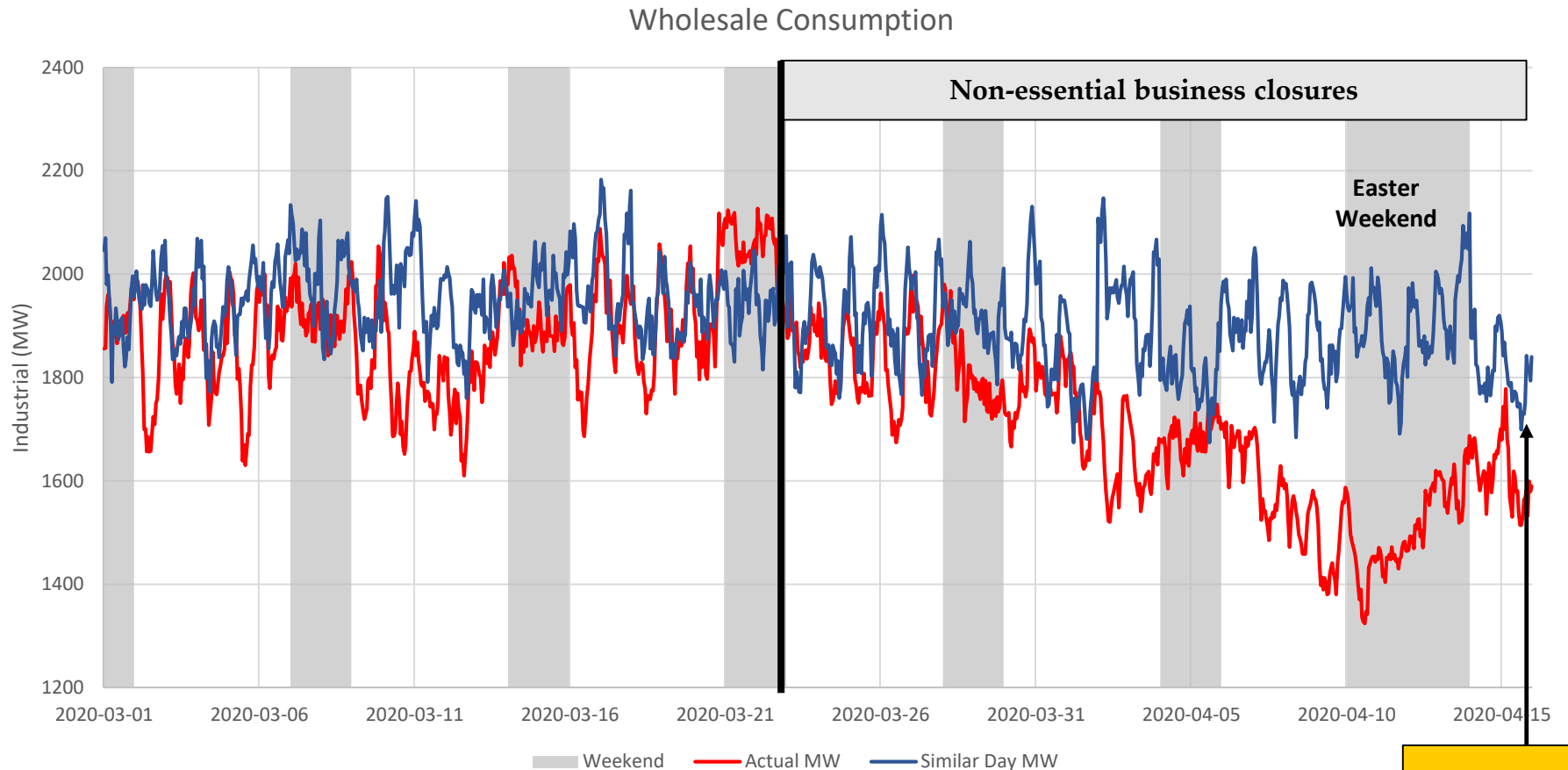
Demand returning to pre-Easter levels

Legend: Weekend — Actual MW — Similar Day MW

Y-axis: Industrial (MW), range 1200–2400

X-axis dates: 2020-03-01, 2020-03-06, 2020-03-11, 2020-03-16, 2020-03-21, 2020-03-26, 2020-03-31, 2020-04-05, 2020-04-10, 2020-04-15

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LOOKING FORWARD

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Significant Uncertainty to Both Supply and Demand

COVID-19 impacts have created significant uncertainty in forecasts:

- Demand has declined significantly (both daily peaks and energy)

- Demand forecasts for the next 5 years are very uncertain depending on the length and depth of the downturn and the nature of the recovery

- The nuclear refurbishment schedule has been delayed with further changes expected

- Other generation facilities may experience difficulty performing regular maintenance, which may in the future lead to higher forced-outage rates

- Transmission development (new projects) is delayed

Demand Uncertainties

- As a result of pandemic response measures, daily peak demands are down by as much as 18%, energy use is down by about 15%

- The outlook for demand over the next 5 years will be driven by the depth and duration of the pandemic response measures
  - A shorter event has a higher probability of a recovery of economic activity in 2021 leading to a return to normal demand trends over the next 18 months
  - A longer event or a second wave with a second set of business closures may cause significant economic restructuring and a lengthy recession

- Economic forecasts are mixed, but there is increasing sentiment that a global recession is likely

- Historically, following major recessions there has been a lag in economic recovery versus system impacts

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Supply Uncertainties

- COVID-19 has the potential to impact major investments currently underway in supply

- Nuclear refurbishment is the biggest source of new supply over the next 10 years
  - Refurbishment schedules are likely to be impacted and delays are expected
  - Other generators may experience difficulty completing routine maintenance, this may lead to high forced outage rates in the future

- Access to capital, debt and to supply chains could limit the entry of new resources to the system and potentially cause existing resources requiring sustaining capital to shut down

System Costs

- It is too early to assess any impacts on system costs resulting from measures put in place to manage COVID-19

- However, total system costs are unlikely to change materially in the near-term

- Most system costs are fixed – if demand declines, then average unit rates (cents per kWh) may increase

- The IESO will continue to assess any short and long-term system cost impacts once further data is available

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Planning Outlook

- The next Annual Planning Outlook will be ready for Q4, 2020 and will incorporate the most up to date information available
  - Market Participants are urged to provide updated outage plans to the IESO to support the assessment process

- In the near-term, IESO will release updated information through the next Reliability Outlook in June to inform system operations and outage management

- IESO is also exploring other means to keep the sector informed as we manage through the COVID-19 situation

Questions?

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ENGAGING WITH STAKEHOLDERS

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Understanding Customers and Stakeholders

- Adjusting to customer needs:
  - Seeking to identify early impacts and information needed to adapt system and market operations
  - listening to understand business continuity outlook across all major sectors – clearly focused on immediate priorities
  - Measuring stakeholder capacity and prioritizing IESO activities accordingly

- Adapting stakeholder engagement activities
  - Engagement activities moved to webinar and are being recorded
  - Feedback periods extended to a minimum of three weeks
  - Prioritizing active engagement

Looking Ahead

- Energy Sector online survey closes April 24
  - Feedback will guide the IESO as it prioritizes activities, conducts outreach and works to better understand how it can continue to support the sector

- Peak Tracker enhancements go live on May 1
  - Two additional data points, earlier, to help Class A participants make business decisions earlier

- Monthly Stakeholder Engagement Days on May 20-22
  - Monthly, more predictable and efficient
  - Open to all stakeholders
  - Will include next update on sector impact of COVID-19

A Final Question

- What information would you like to see in the next IESO update on the impacts of COVID-19 pandemic?

Please submit your response using the 'Ask a Question' feature.

Staying connected

@IESO_Tweets

engagement@ieso.ca

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Customer.relations@ieso.ca

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Appendix

Key Dates in the Pandemic Response

Date	Changes
March 11, 2020	COVID-19 was declared as a pandemic by WHO
March 16, 2020	Start of March Break and first day of mandatory work-from-home
March 17, 2020	Ontario declared a state of emergency
March 22, 2020	End of March Break, but schools remained closed with the possibility of further extensions
March 24, 2020	Mandatory closures of non-essential businesses in Ontario as of 11:59pm.
April 4, 2020	Additional non-essential businesses were asked to close as of 11:59pm.

Overnight Lows are Reduced by 9-13%

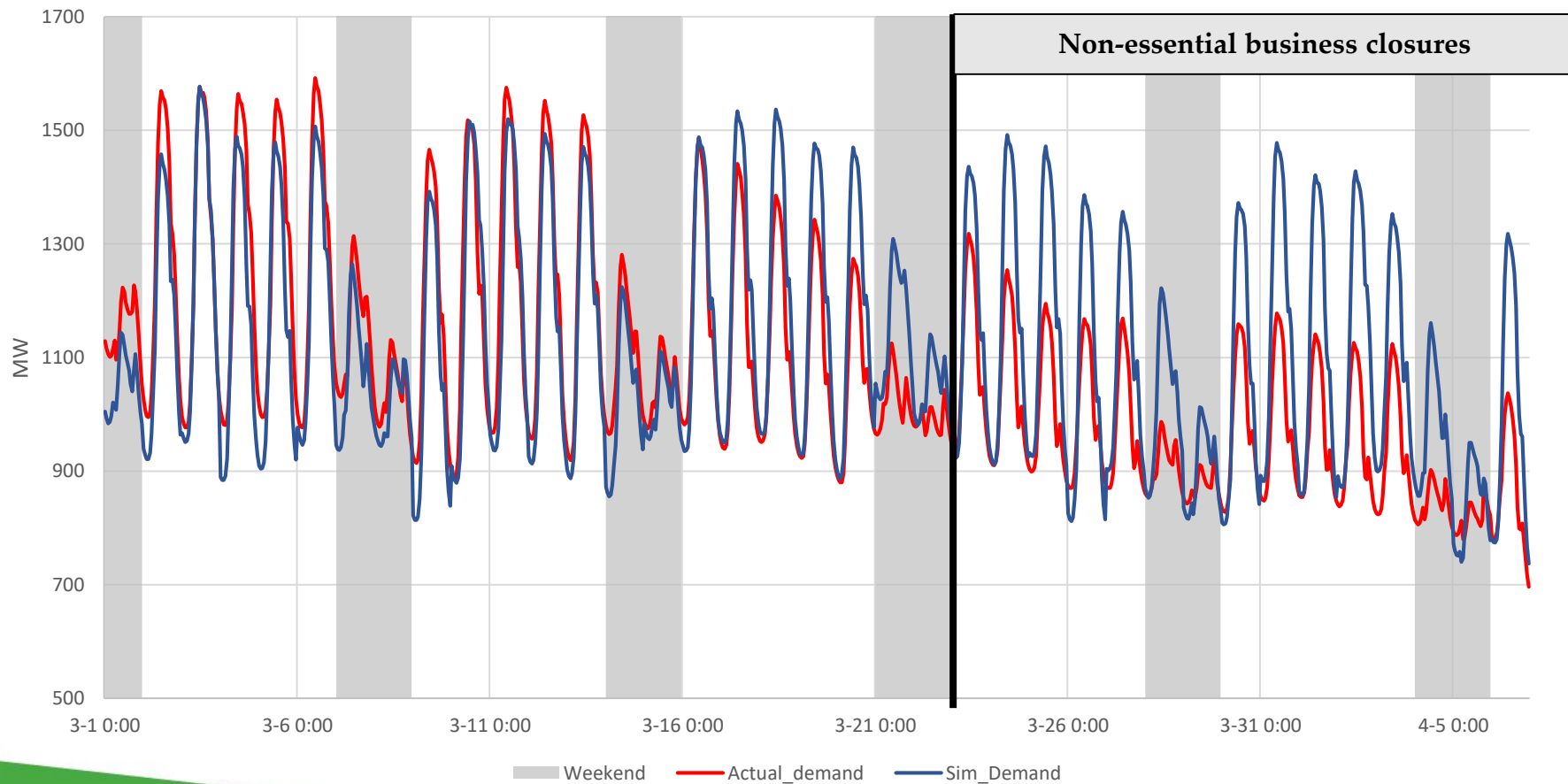March 16 – April 17, 2020 Overnight Minimums vs Similar Days
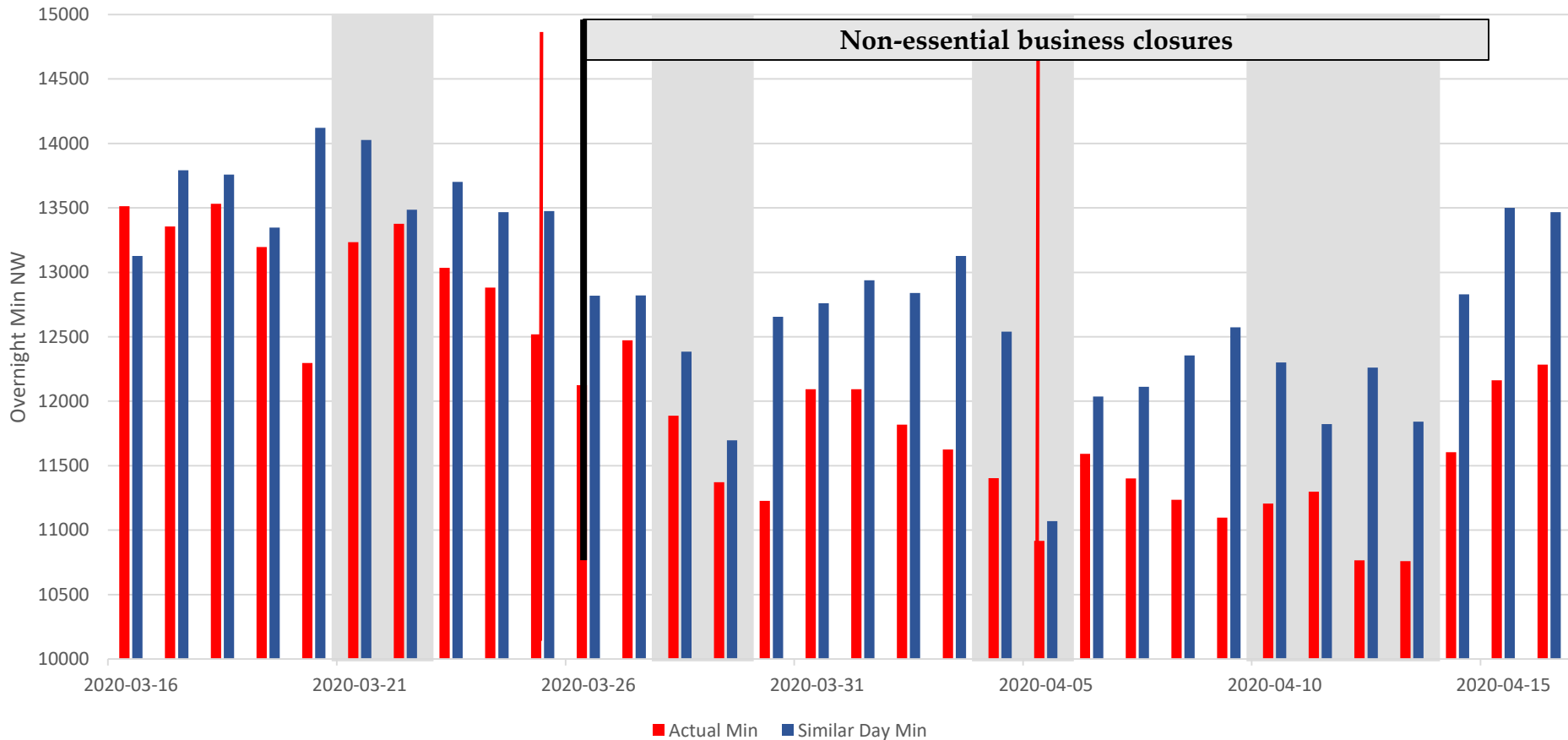
Residential Consumption Shows Slight Increase
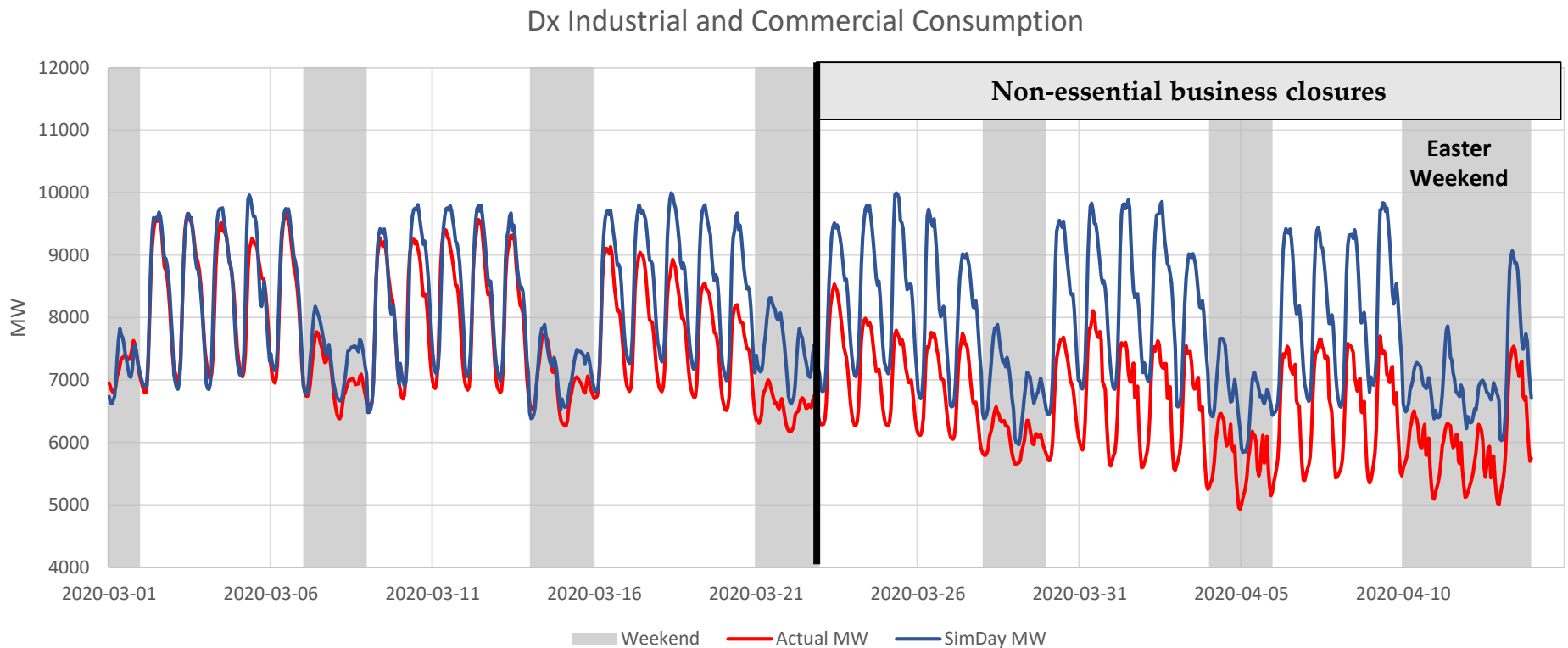
Residential Consumption March and April 2020

38
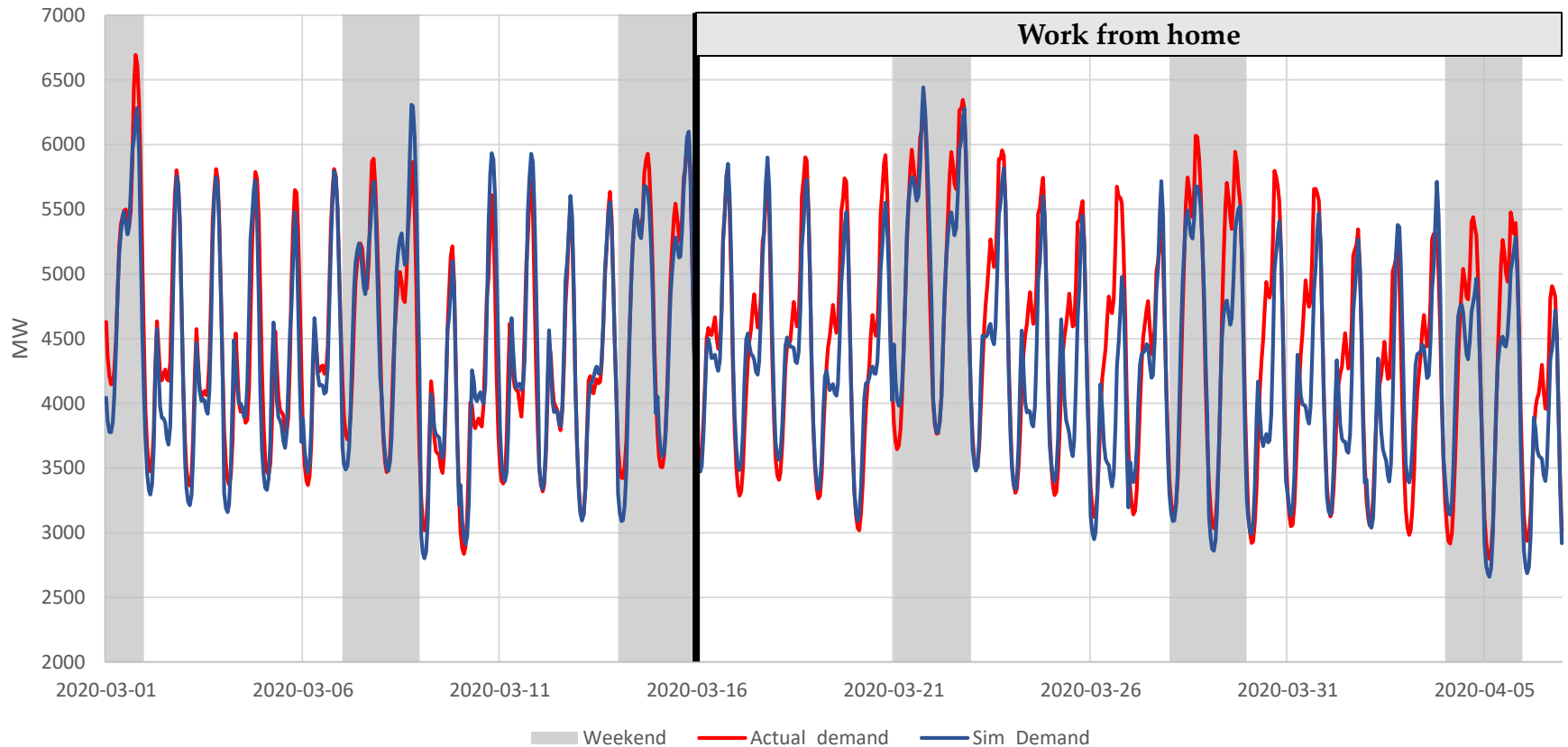
Small Commercial Peaks Down 14-17%

Small Commercial - March and April 2020

Distribution Connected Industrial/Commercial Peaks Down 10-23%

Dx Industrial and Commercial Consumption

40

1   **APPENDIX 3-3   IESO PRESENTATION – MAY 20, 2020**

2

Electricity System Impact of COVID-19

May 20, 2020

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COVID-19 DEMAND IMPACTS

COVID-19 Impacts on Demand

The stay in place policies in conjunction with the closure of non-essential business have had the following **system wide** impacts on grid demand:

	Avg. Daily Energy Reductions		Avg. Daily Peak Reductions	
	Weekday	Weekend	Weekday	Weekend
Overall System Impacts	7-14%	6-10%	8-14%	5-10%
1st Round of Closures	3 -11%	2-8%	3-13%	4-7%
2nd Round of Closures	7-14%	6-10%	8-14%	5-10%

Overall, we expect energy, minimum and peak demands to be lower

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Residential Demand Impacts

	Avg. Daily Energy Increases		Avg. Daily Peak Increases	
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	1-8%	1-8%	1-7%	1-6%
2nd Round of Closures	1-14%	1-7%	1-9%	1-9%

- Increased consumption during mid-day

- Delayed morning peak and using on average 13% more electricity during morning peak vs. pre-COVID-19 levels

- Daily minimums have increased 5% on average

- Impacts vary depending on weather trends

- Looking forward: returning to pre-COVID residential demand will be gradual

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Small Commercial (<50kW) Demand Impacts

	Avg. Daily Energy Reductions		Avg. Daily Peak Reductions	
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	6-15%	5-12%	7-21%	9-18%
2nd Round of Closures	11-19%	5-14%	18-24%	10-20%

- Reduced consumption in all hours

- Contribution to morning peak has been reduced by 15%

- Greatest reductions occurred during the week following Easter

- Looking forward: the longer lockdown measures are in place, there is a likelihood that a portion of this load may not recover

- This segment is a weather sensitive load, therefore impacts will range depending on weather forecasts

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Distribution Connected Industrial/Commercial Customers

	Avg. Daily Energy Reductions		Avg. Daily Peak Reductions	
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	9-19%	10-14%	9-22%	12-16%
2nd Round of Closures	18-22%	13-18%	17-23%	10-16%

- Contribution to morning peak has been reduced by 15%

- Greatest reductions occurred during the week following Easter

- Looking forward: Similar to small commercial, the duration of the lock down measures will have enduring impacts on their ability to return to pre-COVID-19 levels

- Majority of commercial load is weather sensitive, therefore impacts will range depending on weather forecasts
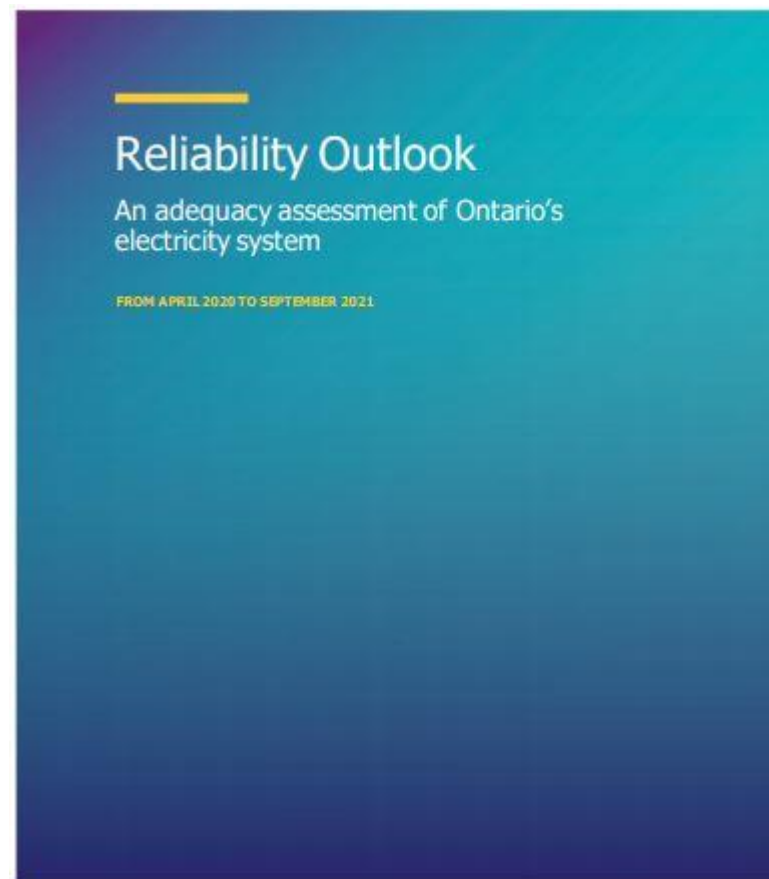
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Transmission Connected Wholesale Customer Demand

	Avg. Daily Energy Reductions		Avg. Daily Peak Reductions	
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	1-12%	1-6%	1-14%	1-9%
2nd Round of Closures	10-25%	8-25%	11-22%	10-23%

- The automotive sector has been hit the hardest

- Minimal impacts to the majority of the industrial load

- Looking forward: supply chain demand and transportation networks will have a high impact on the ability of these loads to return to pre-COVID-19 levels

- This load is typically not very weather sensitive

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Q1 INTERIM RELIABILITY OUTLOOK

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# Q1 Interim Reliability Outlook

- Historically, an 'interim' update reflects the latest actual and weather corrected demand

- The Q1 Interim update will contain an updated demand forecast for the outlook period

- For this iteration we are updating the information beginning May 2020

Reliability Outlook

An adequacy assessment of Ontario's electricity system

FROM APRIL 2020 TO SEPTEMBER 2021

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Summary

- The IESO has updated the demand and supply forecast to reflect post COVID-19 conditions

- The pandemic has had an impact on demand across all customer segments, these impacts have been reflected in the RO forecast

  - **Energy Consumption**: Decrease by 4.6% in 2020 and 4.1% in 2021
  - **Peak Demand**: Decrease by 6.6% in 2020 and 3.2% in 2021

- IESO expects decreasing demand will put upward pressure on Global Adjustment costs

- While assumptions have been made for economic recovery, the forecast does not account for changes in future government policy, which may have an impact on economic recovery

- Expect Ontario's electricity system to be adequate under both the normal weather and extreme weather scenarios over the outlook period
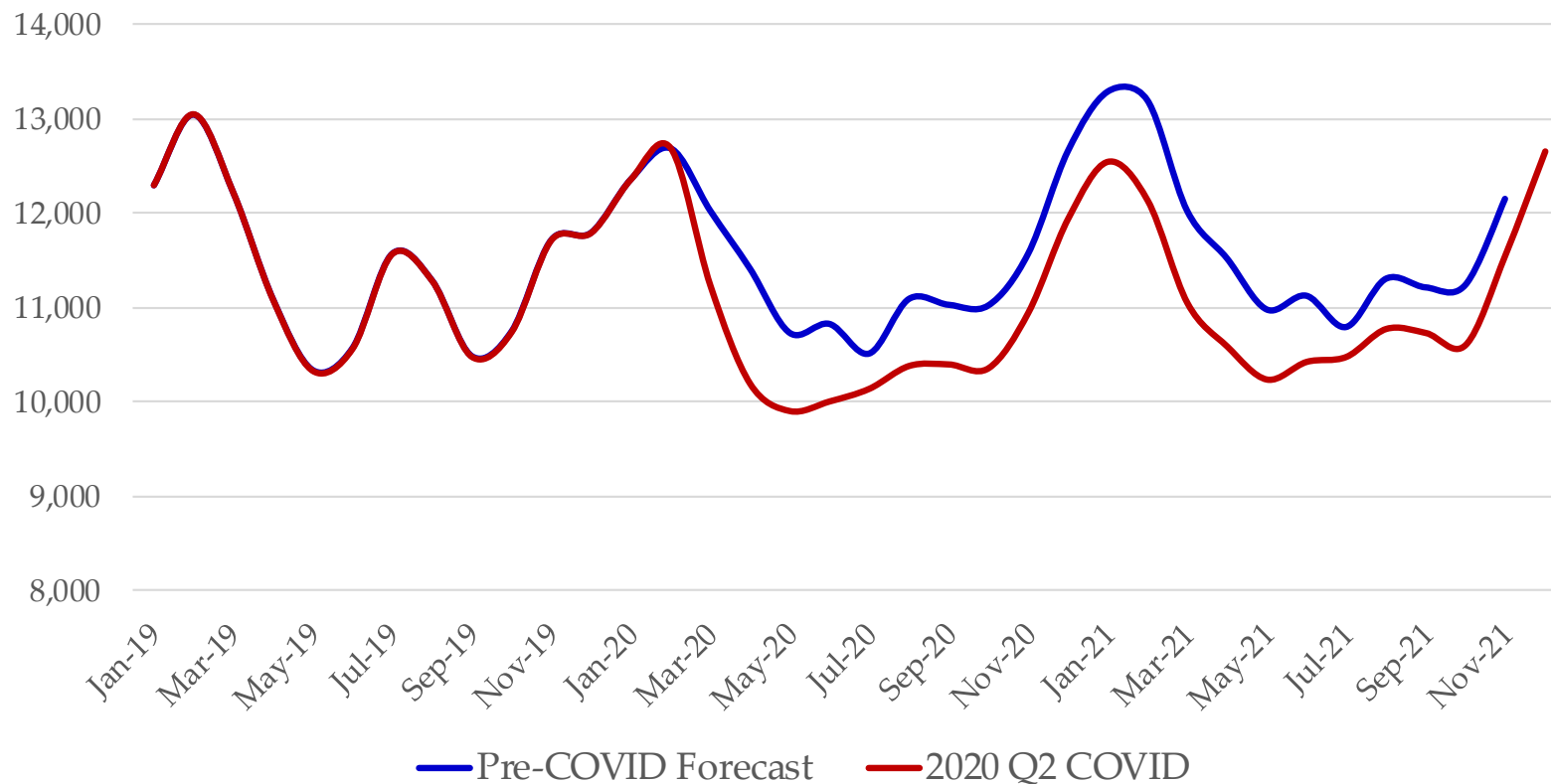
Monthly Energy
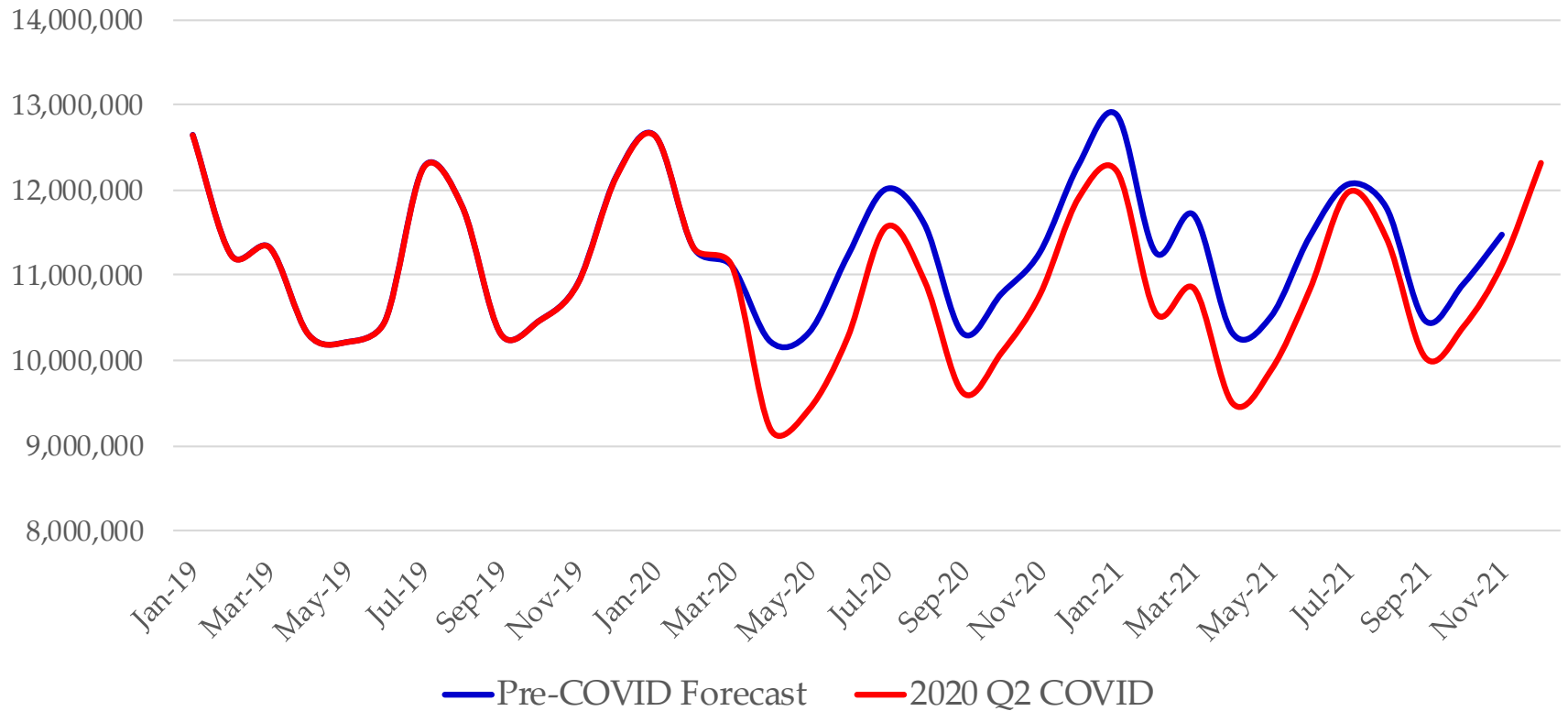
Energy	Q1 Forecast (TWh)	Interim Q1 (TWh)	Forecast Change (% ,TWh)
2020	135.1	128.9	-4.6%, (-6.2 TWh)
2021	136.8	131.2	-4.1%, -(5.6 TWh)

Monthly Peaks
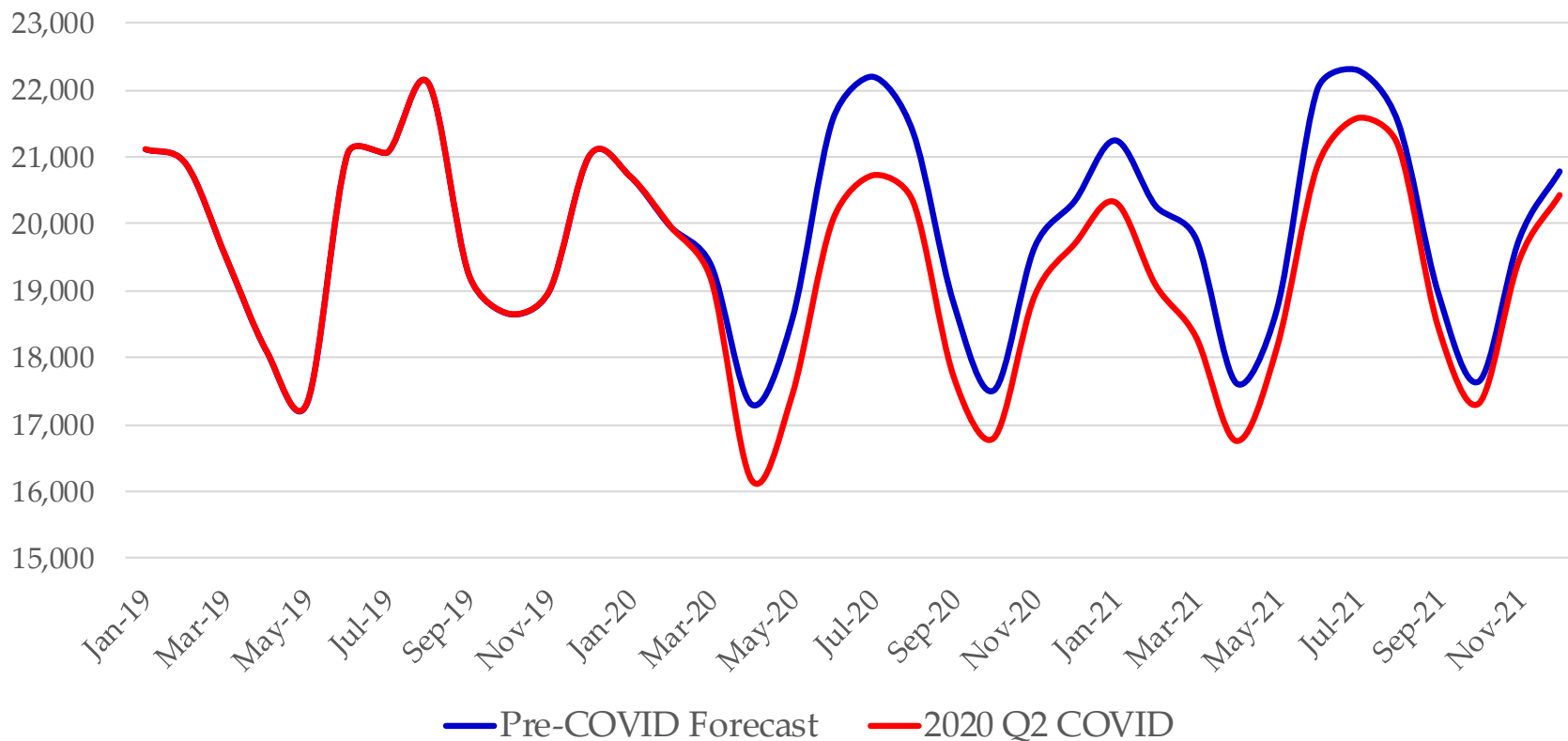
Peak	Q1 Forecast (MWh)	Interim Q1 (MWh)	Forecast Change (%, MW)
2020	22,195	20,722	-6.6%, (-1,473 MW)
2021	22,293	21,577	-3.2%, (-716 MW)

Monthly Minimums

Minimums	Q1 Forecast (MWh)	Interim Q1 (MWh)	Forecast Change (%, MW)
2020	10,505	9,904	-5.7%, (-601 MW)
2021	10,786	10,237	-5.1%, (-549 MW)

Reserve Above Requirement – Normal Weather

Normal Weather: Firm Scenario RAR
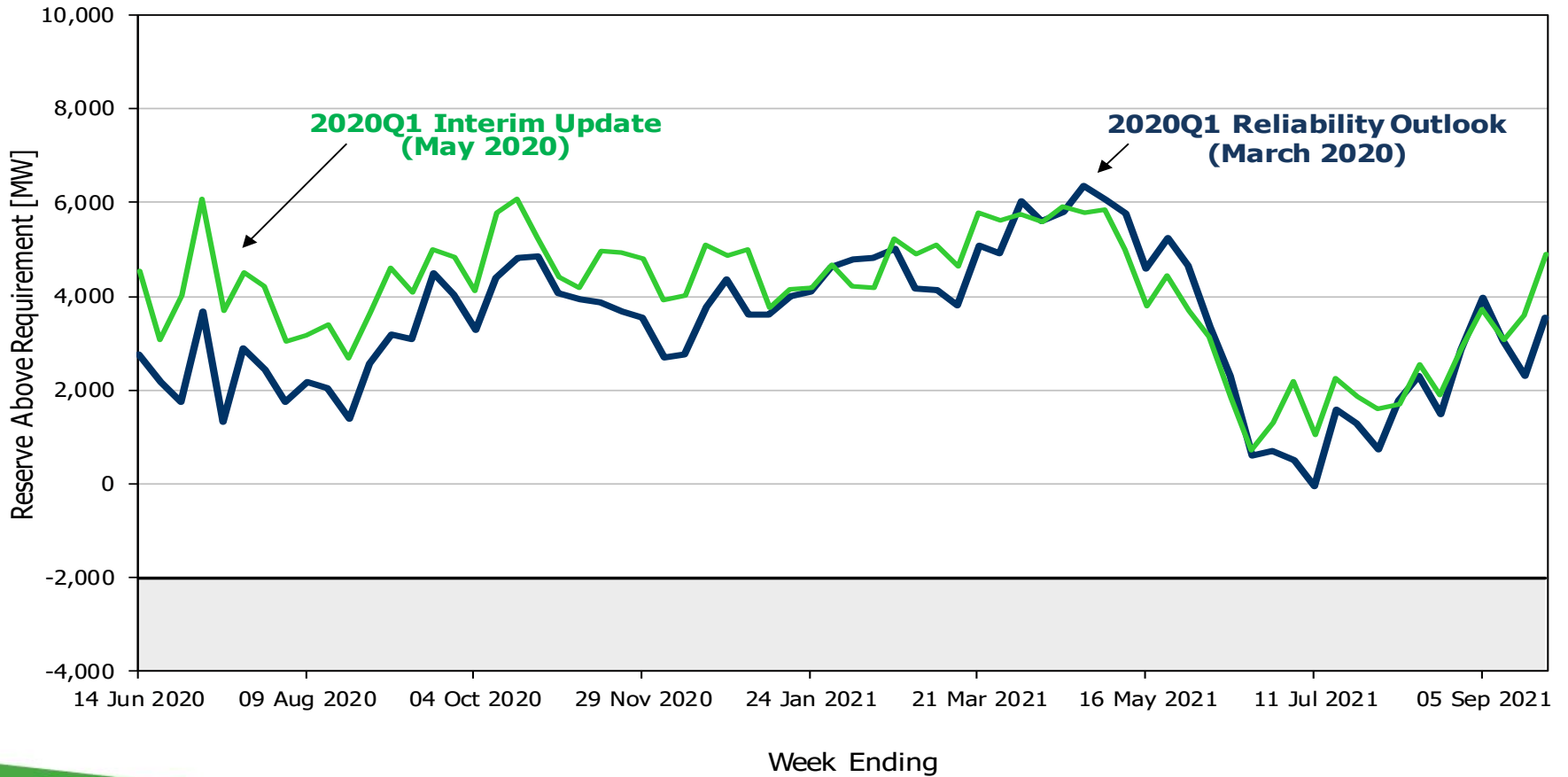
Reserve Above Requirement – Extreme Weather

Extreme Weather: Firm Scenario RAR