RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

M2-CCMBC-1

Reference: BOMA evidence, Page 3

Preamble: "BOMA Toronto's members represent over 85% of the Commercial Real Estate (CRE) Industry (which includes mainly condominium and apartment buildings, office space, retail and light industrial buildings) in the Toronto Hydro service area."

Questions:

a) Please explain what is Enerlife and what is its relationship with BOMA.
b) In this proceeding, EB-2023-0195, is Enerlife an independent consultant assisting the OEB in reaching its decision or is Enerlife a consultant representing BOMA's positions on issues in the EB-2023-0195 proceeding and its evidence is pre-filed argument submission?
c) Please file the engagement letter from BOMA to Enerlife that sets out the terms of reference or any other instructions from BOMA for this evidence. If no such document(s) exist, please explain why not.
d) Did BOMA review and approve Enerlife Expert Evidence, Building towards a sustainable future, prior to filing? If the answer is yes, please provide the title(s) and position(s) of the person(s) who reviewed this evidence prior to filing.
e) Does BOMA agree with the findings of the Enerlife Expert Evidence, Building towards a sustainable future? If the answer is no, please list the areas of disagreement.
f) Please file a table showing the types of heating and cooling systems currently used by BOMA's Toronto members, with number of buildings using each system. In particular please list the number of buildings using each type of heat pump, electric baseboard heating and hybrid systems that use both electricity and gas.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

Responses:

a) Enerlife Consulting Inc is a specialized energy management consulting company retained by BOMA to represent them in regulatory proceedings.
b) In this proceeding, Enerlife serves two roles. Clement Li, Director of Policy and Regulatory Development, is the lead representing BOMA's positions and interests throughout the proceeding, providing input in areas of concern to BOMA members. Ian Jarvis, President, serves as an independent expert witness, providing evidence on subject matter of relevance to the proceeding.
c) Enerlife prepared this evidence as proposed to and approved by the OEB. No additional direction was provided by BOMA.
d) The Senior Director, Sustainability and Stakeholder Relations for BOMA has been provided with a copy of the evidence.
e) BOMA has made no statement agreeing or disagreeing with the specific evidence in this proceeding. BOMA is informed of positions taken through quarterly regulatory updates, which discuss its participation in OEB proceedings and working groups.
f) This information is not available.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

M2-CCMBC-2

Reference: Exhibit M2, Page 5

Preamble: "In its prefiled evidence, and further confirmed in the Technical Conference, Toronto Hydro indicated that the potential load impacts of electrification in commercial buildings, such as heat pumps, installation of heat recovery chillers and connection to district energy, are not incorporated in its 2025 – 2029 load forecast. Enerlife believes that significant electrification of commercial buildings will occur during this period and recommends that Toronto Hydro should review the analysis provided in this report and assess its potential impact on the proposed load forecast, capital investment plan and revenue requirement in Toronto Hydro's current and future rate applications."

Questions:

a) Based on the above quoted paragraph, does Enerlife believe that Toronto Hydro's load forecast is too low and should be higher?

b) If the answer to the above question is yes, by how much should the load forecast be increased for each rate class and for each year of the forecast period? If the answer is no, please explain why not.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

Responses:

a) Toronto Hydro did not include the impact of electrification in its billing/revenue related load forecast. As such, Enerlife believes the impact should be added to Toronto Hydro's billing/revenue related load forecast, resulting in a higher forecast.

b) In Section 4.1.2 of Exhibit M2, pages 25 to 26, the impact of electrification in multi-residential and commercial buildings expected in the 2025-2029 period is shown in Tables 4-1, 4-2 and 4-3. Since Toronto Hydro did not include the impact of electrification in this load forecast, Enerlife believes that Toronto Hydro's load forecast should be increased by the incremental percentages shown in Tables 4-1, 4-2 and 4-3 to reflect the impact of electrification in multi-residential and commercial buildings.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

M2-CCMBC-3

Reference: Exhibit M2, Page 11, Table 2-2 2024 to 2029 Expected CDM Cumulative Savings (Electricity Consumption) by Commercial Building Type

Question:
Please explain how the numbers in the table shown for Multi-Residential (Condo/Apartment) buildings and Warehouses were determined listing all assumptions sources of data and showing all calculations with formulas.

Responses:
An excel file "BOMA_M2-CCMBC-3-1_20240523.xlsx" has been provided with sources of data and calculations with formulas.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

M2-CCMBC-4

Reference: Exhibit M2, Page 12, Figure 2-2 Toronto Office Building's Progression to Electrification and Pages 39 to 43, Appendix B "Electrification Archetypes".

Questions:

a) What is "energy use intensity" (EUI) and how is it determined and measured?
b) Are the "Archetype Office Building" in Figure 2-2 and "a representative small size office building" discussed in the text the same or different buildings?
c) Is the "Archetype Office Building" the same building in 2010 and 2019 that has been retrofitted, or do the results for 2010 and 2019 show different buildings?
d) Please list all assumptions and sources of data and show all calculations including formulas that support the numerical quantities shown in Fig 2-2.
e) Considering that 2019 was 5 years ago why has BOMA not used more recent information?

Response:

a) Energy use intensity (EUI) is a measure of the energy use by a building or site expressed in common units of kWh or ekWh divided by the total area of the building or site. Total EUI refers to electrical and thermal energy use combined whereas Electricity EUI includes only the electrical energy use and thermal EUI includes only the fuel/gas energy use, all divided by the corresponding building/site area as applicable.
b) Archetype office building and small size office building are used interchangeably in Enerlife's expert evidence and refer to the same small size office building. Appendix B in our evidence includes electricity and demand charts for both small and large office buildings.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

c) Figure 2.2 represents the same archetype office building since 2010 that was subject to continuous optimization and electromechanical systems' upgrade.

d) Reference to figure 2.2, data presented for 2010 and 2019 are based on actual building energy use. Energy efficiency target is forecast 2023 building energy use with further efficiency measures including LED lighting retrofit, outdoor air optimization based on actual occupancies, and optimization of boiler and chiller plant sequences of operations.

Heat recovery refers to exhaust air heat recovery through use of water-source heat pumps, and tenant cooling tower energy recovery through use of water-source heat pumps.

The final measure is installation of ASHP boilers which will cater for most of the heating load except where capacity cannot be met due to low outdoor temperatures.

All the above have been simulated in an 8,760 hourly model, using actual utility interval data with trended capacities and efficiencies from supplier data for the different equipment.

The working model used to generate related data has been included. Please refer to response to M2-TH-007 part b. This is a working file which has been anonymized to remove client data, with notes added to help explain the logic flow.

e) 2019 was adopted since EWRB latest publicly available data is 2022, and years ranging from 2020 to 2022 have been affected by the pandemic and are not considered representative.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

M2-CCMBC-5

Reference: Exhibit M2, Page 11, and Page 13, Figure 2-3

Preamble: "While there are significant differences between commercial building types, most differ from residential buildings (single family homes) in two major ways:

- Large ventilation systems, which account for as much as half of building heating loads (natural gas) and have the potential for highly efficient heat reclaim from exhaust air to preheat outside air makeup where feasible, or boost it to a higher heat grade through the use of water source heat pump for use in building heating, which can significantly and cost effectively reduce peak as well as annual natural gas demand.

- Large internal process heat gains which are currently rejected to atmosphere but are increasingly being recycled to offset heating requirements (natural gas) in winter. For example, there is a large-scale national program underway for retrofitting arena facilities to displace fossil fuels used for space and water heating with heat recovered from the ice plant condensers."

Questions:

a) These passages reference water source heat pumps (WSHPs). How do these differ from ground source heat pumps?
b) Could any existing commercial building be adapted to use a WSHP, or is significant foundation, structure, or other groundwork required making WSHP only suitable for new construction?

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

c) Can you provide more examples of commercial buildings that use WSHPs today and how they are using WSHPs in both summer and winter?

d) How many commercial buildings use WSHPs in Toronto?

e) Where are WSHPs located inside commercial buildings? Could they be installed in spaces currently occupied by existing underground parking garages?

f) How does the efficiency of a typical WSHP used in a commercial building compare with an air source heat pump (ASHP) sized for the same building?

g) Why would a commercial building choose to use a WSHP instead of an ASHP, or vice-versa?

Responses:

a) Ground source heat pumps (GSHPs) and water source heat pumps (WSHPs) are both types of heat pump systems used for heating and cooling buildings, but they differ in their heat exchange methods and the heat sink/source of heat they utilize. GSHPs extract heat from the ground, typically through a loop system buried underground. This loop circulates typically glycol that absorbs heat from the ground in the winter and transfers heat to the ground in the summer. WSHPs typically recover heat from existing chilled water systems which would otherwise be rejected from the building through cooling towers, condensers or a district energy system. The system in the model uses a coil located in the exhaust air stream in one of the heat recovery measures, and diverts the tenant IT equipment condenser loop waste heat, currently rejected in winter through cooling towers to WSHPs in the second heat recovery measure.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

b) WSHPs are heavy and could necessitate structural strengthening depending on existing slabs/roofs design loading. Since this varies from building to building, a structural assessment is required to find the best economic alternative.

c) Applications of WSHPs in the commercial sector include offices and hotels. WSHPs are often used in office buildings to provide both heating and cooling and are typically part of a larger HVAC system where each zone or office space has its own heat pump unit. WSHPs transfer heat to/from a central water loop, which is connected to a cooling tower and a boiler to maintain the water temperature within an optimal range. Hotels utilize WSHPs to provide individualized climate control for each room or suite. The central water loop can recover heat from areas that require cooling and use it in areas that need heating, improving overall energy efficiency.

d) Information not available.

e) WSHPs in commercial buildings are typically located in mechanical rooms or dedicated equipment rooms, close to chilled water lines and heating pumps. WSHPs could be installed in underground parking garages subject to compliance with codes and regulations.

f) In general, WSHPs are more efficient than ASHPs, especially in colder weather conditions. This is because WSHPs exchange heat with a relatively stable source, which maintains a more consistent temperature compared to ambient air.

g) The optimal type of heat recovery depends on each building’s operations, existing systems, and techno-economic feasibility. The WSHP is preferred where there are sufficient internal heat sources, typically in large commercial buildings, hospitals, grocery stores and arena facilities.

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

M2-CCMBC-6

Reference: Exhibit M2, Page 25

Preamble: "In hybrid electrification, natural gas heating remains as a supplementary heating source, with electric heat pumps and heaters displacing a large share of previous fossil fuel consumption, but gas-fired boilers or furnaces continuing to provide a significant part of demand during peak heating periods. The hybrid solution is generally the most cost effective for all types of commercial buildings with current utility rates. For most commercial buildings, it also avoids major costs for electrical service upgrades and associated upstream electrical capacity investments. In most cases, commercial buildings' electrical infrastructure is sized for the air conditioning load in the summer. Since the impact of electrification is primarily seen in winter (natural gas heating replaced by electric heat pumps), existing electrical infrastructure provides enough capacity for hybrid electrification. Therefore, significant investment in electrical infrastructure upgrade on site or upstream at the electric utility level is not required. A summer peaking distributor's (e.g., Toronto Hydro) overall system peak is not substantively impacted."

Questions:

a) If the cost of natural gas increases, or the cost of electricity decreases, such that running a purely electrified heat pump heating solution in winter becomes more desirable for commercial buildings from a cost perspective, or if a future government mandates such a change, what are the considerations or obstacles facing a commercial building in migrating to such a solution?

RESPONSES TO THE COALITION OF CONCERNED MANUFACTURERS AND BUSINESSES OF CANADA INTERROGATORIES

b) Please describe what upstream electrical capacity investment upgrades would be needed if a significant number of commercial buildings migrated to purely electric heat pump heating solutions for winter?

Responses:

a) Enerlife considers the main obstacles to full electrification of commercial buildings in cold climates such as Ontario to be the costs and practicalities of upgrading internal and external electrical infrastructure, including generation capacity, to handle peak heating demand on the few coldest days of the year.

b) We have not attempted to quantify the scale or cost of the electricity infrastructure increases that would be required for full electrification of commercial buildings.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-1

Toronto Hydro noted large data centres as a future significant incremental demand and Enerlife recognized the relevance of data centres over 1MW.

a) What is the magnitude of opportunity for Toronto Hydro (or in partnership with others such as IESO, City of Toronto, BOMA, etc.) to mitigate net demand and net energy from future data centres?
b) What metrics and targets or requirements would make sense for the OEB to include for Toronto Hydro to ensure that future data centres are built in the most efficient manner and that peak load (including DER options) and waste heat (locally or through district heating) are optimized within the Toronto Hydro service territory?
c) What responsibility does Toronto Hydro have to support the energy transition proactively rather than responding to energy transition demands (such as data centres and CDM opportunities in general) reactively?
d) Based on BOMA/Enerlife experience what are the areas where Toronto Hydro is providing high customer value and areas lacking (requiring increased effort) in relation to supporting energy transition needs, net zero objectives and customer conservation and demand side management?

Responses:

a) Enerlife has not studied the potential for reducing the electrical requirements of future data centres. We consider recovery of the generated heat to be an important contributor to the energy transition.
b) The electricity consumed by data centres should provide a steady and reliable source of heat to displace fossil fuel combustion, especially if they are located close to district

RESPONSES TO POLLUTION PROBE INTERROGATORIES

heating systems and/or major buildings with high thermal energy demand such as hospitals. Targets and requirements should consider siting, heat recovery and collaboration with other parties including the City of Toronto, Enwave and the IESO.

c) Enerlife believes the scale of the challenges presented by the energy transition places a collective responsibility on all parties to work closely together on mitigating risks and achieving the best outcomes. This begins with clarity in government policy, which flows down to major players, including Toronto Hydro and BOMA, enabling building owners and citizens to play their own parts.

d) Enerlife has consistently positive experience working with Toronto Hydro and its customers on CDM projects and programs. We look forward to continued collaboration on integrated energy transition initiatives, involving multiple building owners and other stakeholders, which will require better customer and electricity system information to identify and implement high impact opportunities.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-2

Reference: "Toronto Hydro indicated that the potential load impacts of electrification in commercial buildings, such as heat pumps, installation of heat recovery chillers and connection to district energy, are not incorporated in its 2025 – 2029 load forecast. [Enerlife Evidence, Page 5]

Toronto Hydro confirmed that their plan and system is flexible to handle electrification and energy transition activities under any of the scenarios (as summarized in Exhibit 2B/D4 Appendix A, Figure 1 which includes Net Zero by 2040) over the 2025-2029 period and that it provides the foundation to deliver on any of the scenarios beyond 2029.

This appears to contradict Enerlife's statement above. Please reconcile and explain what would be impacted in Enerlife's evidence if the Toronto Hydro Plan and system can already meet the most aggressive scenario (Net Zero by 2040).

Response:

After reviewing Toronto Hydro's evidence and the technical conference transcript[1], Enerlife believes the impact of electrification in commercial buildings are NOT incorporated in Toronto Hydro's 2025-2029 forecast related to <u>electricity consumption and the billing-related demand</u>. However, a significant amount of demand growth, such as hyperscale datacentre connections (which appear to be not included in the billing/revenue load forecast) has been incorporated in the system peak demand forecast, which was used as a driver for the capital plan. Enerlife also noticed that there is a significant amount of building heating decarbonization included in all

[1] Technical Conference Day 4 transcript page 144 lines 22 to 27; page 152 lines 11 to 28

RESPONSES TO POLLUTION PROBE INTERROGATORIES

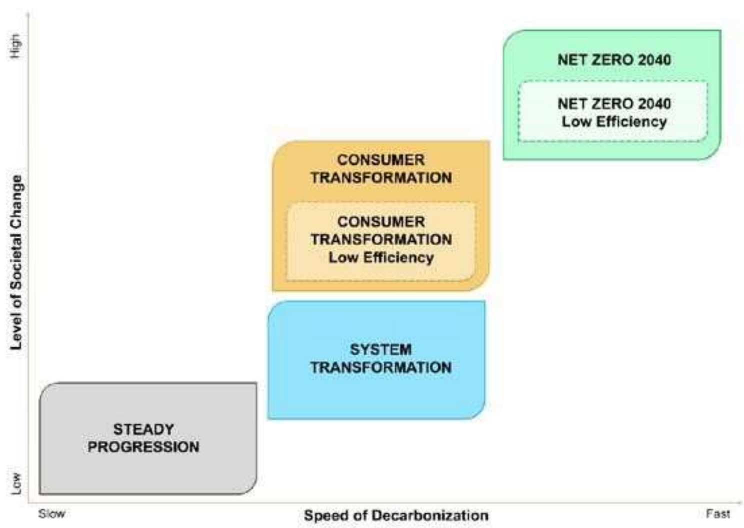
Toronto Hydro's future energy scenarios (see our response to M2-PP-9 part b), which are used to guide its capital plan. We have been unable to correlate the load forecasts provided for revenue and capital purposes.

It appears that there is no direct link between Toronto Hydro's billing/revenue related load forecast and system peak demand forecast. Therefore, Enerlife does not believe its evidence would be impacted if the Toronto Hydro Plan and system can already meet the most aggressive scenario (net zero by 2040).

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-3

Please explain how to calibrate and compare Enerlife's Alternative Load Forecast Scenario One and Alternative Load Forecast Scenario Two against the four scenarios Toronto Hydro identifies in the Future Energy Scenarios (as summarized in Toronto Hydro evidence Exhibit 2B/D4 Appendix A, Figure 1 replicated below for convenience).



Response:

See responses to M2-PP-2 and M2-PP-9.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-4

Enerlife identifies operational savings as one of the most important and best practice areas to save energy.

a) Please confirm that the Independent Electricity System Operator's (IESO) 2019 Achievable Potential Study (2019 APS), its subsequent 2022 APS Refresh and the 2024 Annual Planning Outlook do not include the full potential to reduce electricity through best practice operational practices.

b) Please provide an estimate of the annual savings that could be achieved if education, programs and incentives were implemented for best practice operational programs.

Response:

a) Enerlife participated in the 2019 joint IESO/Enbridge APS where there was considerable discussion about the nature and magnitude of both the electricity and natural gas savings potential due to operational improvements. An attempt was made at that time by the APS consultant to run a parallel savings estimate to their traditional model using energy use data for hospitals from Ontario's BPS public reporting database. We consider benchmarking and target-setting using empirical (utility billing) data to be the most reliable way to identify operational savings potential, which yields considerably higher estimates than traditional APS engineering assumptions and calculations. The 2019 exercise led to modest increases in the savings potential forecasts for "recommissioning" and "advanced recommissioning" measures. We have not studied the 2022 APS Refresh or the 2024 Annual Planning Outlook.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

b) The CDM estimates we used for our evidence in this proceeding are based on top-quartile energy targets for each building type from Enerlife’s database. They are similar to the numbers in both Toronto Hydro’s evidence and the 2019 IESO APS report (and its subsequent 2022 refresh), and we consider them reasonable for the 2024-2029 rebasing period. We note that the natural gas savings potential due to operational improvements is considerably higher than for electricity.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-5

Reference: M2 Figure 2-1 2020 – 2021 Electricity use (kWh/sqft/year) for Toronto K-12 Schools

Please estimate the total KWh/year and relative (percent of total energy) that would be achieved if the average K-12 school in the sample for the Figure was reduced to equal:

- Top Quartile performance
- Top Decile performance

Response:

Median to Top Quartile Estimated Savings: 24.5%

Median to Top Decile Estimated Savings: 38.8%

Total Areas (sf)	Estimated Savings (median to top quartile) – kWh/year	Estimated Savings (median to top decile) – kWh/year
52,574,792	63,089,751	99,892,105

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-6

Toronto Hydro indicates that the provincial grid intensity continues to increase based on greater use of natural gas generation in what was traditionally a clean grid [1B-PP-15b]. What impact does this have on leveraging electrification in support of Net Zero goals and what mitigation options are available to decrease emissions.

Response:

We only speak to the commercial buildings' sector. Rising emissions intensity of the electricity grid is a drag on net zero planning. Owners that we work with understand the uncertainties but are relying on federal government forecasts of future reductions and elimination of fossil fuel-fired generation. They continue to focus on energy efficiency now while planning for conversion to heat pump technology over time. We consider the best mitigation options to be energy efficiency, demand response and DER including energy storage and solar PV.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-7

Reference: M2 Figure 2-3 Impact of CDM, Heat Recovery, and ASHPs on Electricity Winter and Summer Peak Demands

Toronto Hydro confirmed that they have no concern during the 2025-2029 term with electrification of heating loads and that the Toronto Hydro system will continue to be summer peaking over that period. Please explain the relevance of Figure 2-3 given this confirmation by Toronto Hydro (i.e. is it just to illustrate the emission reductions).

Responses:

Figure 2-3 aims to provide a rational, integrated forecast of the effects of CDM and electrification in commercial buildings over the 2024-2029 period. Our model validates that the impact on summer peak is small, and indicates that, in many cases, electrification does not require significant investment in electrical infrastructure upgrade on site or upstream at the electric utility level, which is one of the key findings of this evidence.

While Toronto Hydro has confirmed that they have no concern during the 2025-2029 term with electrification of heating loads, and that the Toronto Hydro system will continue to be summer peaking over that period, it is unclear to Enerlife how electrification plays out in Toronto Hydro's revenue and capital planning forecasts. Please also see responses to M2-PP-2.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-8

Enerlife identifies some of the benefits of a hybrid heating system where natural gas use is decreased or only used as back-up. Enerlife is likely aware that as consumers exit the natural gas system the costs to remain connected will increase for those that remain or where natural gas infrastructure will need to be systematically dismantled, natural gas may not longer be a viable option in the decades ahead.

a) Please explain if that would simply result in customers leveraging their non-gas heating solutions or if different hybrid options would take the place of natural gas.

b) What provisions should be taken in the 2025-2029 period to ensure that customer investments are future proof and do not become stranded assets?

Responses:

Please refer to Enerlife's response to M2-CCMBC-6 parts a) and b). As well, Enerlife acknowledges the great uncertainties associated with the energy transition over the coming decades, and the challenges faced by building owners in making the best investment decisions today. One of the greatest uncertainties is "the last mile" of meeting heating demand on the few coldest days of the year, when every known solution is likely to be unavailable or extremely costly. For this reason, we recommend that owners and regulators give special consideration to measures which reduce heating demand as well as energy use on those coldest days, including exhaust air heat recovery, WSHPs and geothermal heating systems.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

a) In the short-term, the most cost effective approach to electrification is to supplement existing heating systems with heat pump technology. As presented in our evidence, this will eliminate a significant amount of commercial buildings' fossil fuel consumption, which will indeed drive up the cost of the residual gas use, further improving the economic case for energy efficiency and electrification. We see owners working to improve efficiency and extend the life of existing heating plants rather than exiting the gas system altogether.

b) Owners are aware of the risk of stranded assets, and working on a case by case basis to make the best capital decisions despite the uncertainties.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-9

Toronto Hydro is using a Gross demand forecast that does not include net benefits of DERs including CDM, storage or other options to peak shave or reduce customer bills. Toronto Hydro also confirmed that its definition of DER includes all the elements listed under the NSPM definition of DER [per 1A-PP-3].

a) Please explain what the impact/benefits would be if Toronto Hydro were to use a Net Demand forecast instead of the Gross forecast.

b) Please provide Enerlife's assessment on whether the Net Demand forecast Toronto Hydro modelled in the Future Energy Model [per JT2.1] is reasonable. If not, please indicate what is DER or other elements are missing and the related impacts.

c) Does Enerlife/BOMA see additional opportunity to leverage DERs beyond what Toronto Hydro has identified?

Responses:

a) Enerlife expects that if Toronto Hydro were to use a net system demand forecast (not the billing/revenue related load forecast as described in Exhibit 3) as one of the drivers to develop its capital plan, the lower figures would result in a lower capital plan (compared to the current proposed capital plan).
b) Enerlife's assessment is limited as the focus of its expert evidence is on the impact of CDM and building heating electrification activities in commercial buildings from 2024 to 2029. The impact of EV, storage and generation was not assessed in Enerlife's expert evidence.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

CDM impact: Per JT2.1 Tables 1 to 12, it is unclear to Enerlife whether the impact of CDM/Demand Response activities has been included.

Decarbonized Heating: Per JT2.1 Tables 1 to 12, the 2029 impact ranges from 31MW to 79MW in the summer and 386MW to 1,236MW in the winter. Enerlife's modeling indicates the impact of building heating electrification in commercial building to be around 9MW in the summer and 85MW in the winter (the difference between Table 3-10 and Table 3-7 in Enerlife's evidence). It is unclear how much of the impact listed in JT2.1 comes from residential, commercial and other sectors and therefore Enerlife is not able to comment on whether these figures are reasonable or comparable to its own estimates. We also note that while a fairly significant amount of decarbonization heating has been included in all Toronto Hydro's future energy scenarios, none has been included in its billing/revenue related load forecast.

c) As indicated in its response in M2-PP-6, Enerlife believes energy efficiency (CDM), together with DERs such as demand response, energy storage and solar photovoltaics, are the best mitigation options to reduce carbon emission while limiting the electric infrastructure upgrade requirements (both at customer site and at electric utility level).

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-10

The OEB has endorsed unlocking the benefits of DERs that are not owned by LDCs. Toronto Hydro does not track DERs that are not load controlled by Toronto Hydro. This provides a large resource of customer funded DERs that are not being fully leveraged for the benefit of the grid. Please provide Enerlife's advice on how to resolve this lost opportunity over the 2025-2029 rate term.

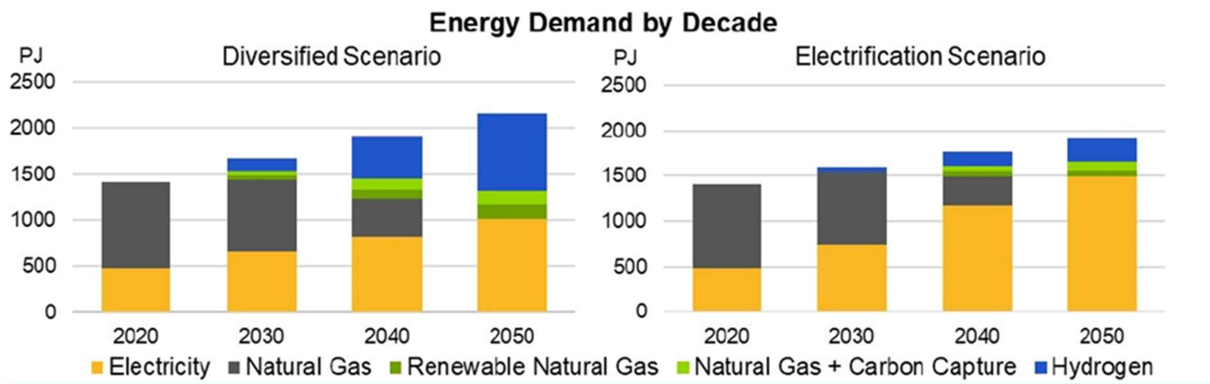
Response:

See Enerlife's response to M2-PP-6 and M2-PP-9 part c.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

M2-PP-11

Reference: Figure 1: Pathways to Net Zero Emissions for Ontario [EB-2022-0200 Exhibit 1.10.5.2_Pathways to Net-Zero Emissions for Ontario_BLACKLINE_20230421]



The Enbridge Net Zero Emissions for Ontario Report included the above figure summarizing the Diversified (natural gas bullish) and Electrification (electricity bullish) scenarios. Both these scenarios show natural gas use in Ontario going to zero prior to 2050, except for a small number of large industrial customers that would be able to use carbon capture and storage to mitigate residual emissions.

a) What additional actions are required by Toronto Hydro and customers under the scenarios of decreasing natural gas access and use noted above?

b) How do the Net Zero scenarios above affect customer choices over the 2025-2029 rate term?

c) Which of these scenarios does Enerlife believe is more credible to occur?

RESPONSES TO POLLUTION PROBE INTERROGATORIES

Responses:

a) These scenarios take us right through the period of political, economic, market and technology uncertainty referenced above. Commercial buildings are an important part of the equation, especially in Toronto, and Toronto Hydro is an important player in helping owners make better decisions despite uncertainty. Additional actions recommended in our evidence are strategic collaboration with other stakeholders, including the City, Enbridge and Enwave, to identify and implement big decarbonization opportunities such as heat recovery from data centres, together with better customer intelligence, including AMI, to enable targeting of measures for optimizing CDM and electrical demand.

b) The market drives decision-making by owners, and the resulting manner and rate at which natural gas consumption declines. Toronto Hydro has limited influence over market conditions.

c) Either Enbridge scenario is plausible, but likely to change substantially as these factors unfold over time.

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

M2-TH-001

References:

Enerlife Report, p. [page 5: "Section 1.3.3 Commercial Customer Information"]

Enerlife Report, p. [page 9: "Section 2.2 Empirical Data - Gaining Insight into Commercial Building Energy Usage"]

Enerlife Report, p. [page 12: "Section 2.2.3 Impact of Electrification in Commercial Buildings"]

Preamble 1: "There are also great differences between commercial building types, where, for example, office buildings, grocery stores, community centres, hospitals and schools have entirely different ownership, building systems, energy profiles and decarbonization opportunities. Conservation and electrification planning and forecasting for this broad and diverse sector require in-depth, disaggregated customer information, including customer connections, commercial building types, and interval meter data. BOMA requested some of this information in interrogatories, which was not provided. The analysis for this report has been limited by the lack of reliable and consistent commercial customer information, including customer breakdown by rate class, sector and building types."

a) On pages 5, 9 and 12, the report references data collected from numerous commercial buildings. Please provide all the data utilized by Enerlife to construct the model, including a breakdown of customers by rate class, sector, and building types.

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

Response:

We have provided data sources throughout our evidence, much of which is publicly available. We are also providing in our responses to interrogatories some of our modeling to show data used and the logic flow of the analysis. Some customer information is confidential. We have previously requested from Toronto Hydro, but not received the breakdown of customers by rate class, sector, and building types. For the model request, please refer to response to M2-TH-007 b).

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

M2-TH-002

Reference: Enerlife Report, p. [page 7: "Section 2.1 Conservation and Electrification in Commercial Buildings – Myths and Facts"]

Preamble 1: "Electrification Facts: In most commercial buildings, hybrid electrification can reduce fossil fuel consumption and related emissions by 90% or more without costly in-building and upstream electrical service upgrades."

a) Please provide the study that verifies the 90% assertion.

b) Please confirm the 90% assertion is accurate across all building types.

Responses:

a) After revisiting additional models, Enerlife revises the statement in evidence as follows: "Electrification Facts: In most commercial buildings, CDM followed by hybrid electrification can reduce fossil fuel consumption and related emissions by between 50% and 90% without costly in-building and upstream electrical service upgrades." The estimate is based on Enerlife's experience and modeling of dozens of office, school, hospital, community centre, multi-residential and higher education buildings.

b) Our work is only in commercial buildings. We have not modeled all commercial building types, such as hospitality or small retail.

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

M2-TH-003

Reference: Enerlife Report, p. [pages 8-9: "Section 2.2.1 CDM Potential in Commercial Buildings"]

Preamble 1: "Enerlife applies data-driven performance-based conservation to estimate achievable electricity savings potential for individual buildings, portfolios and sectors. Empirical targets are set, typically at the top-quartile level of the benchmark charts. Target adjustments are applied to account for material differences between individual buildings, including weather and heating/cooling system types. Achievable savings are then determined for each building as the difference between its actual and target electricity use. The methodology is applied by commercial landlords and large-scale programs in Ontario's hospital, municipal, K-12 schools, multi-residential and post-secondary sectors for planning and directing energy efficiency programs…."

a) Please provide all supporting evidence, including a schedule (working excel file), that sets out the calculations used to estimate achievable electricity savings including breakdown of empirical targets and target adjustments, for each building type.

Response:

See Enerlife's response to M2-CCMBC-3.

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

M2-TH-004

Reference: Enerlife Report, p. [“pages 9-11: Section 2.2.2 Expected CDM Savings in Commercial Buildings – 2025 to 2029 Period”]

Preamble 1: “Drawing from this direct experience with many commercial building owners/managers, Enerlife forecasts that, in the Toronto Hydro service area, 50% of this electricity consumption savings potential shown in Table 2-1 will be achieved by the end of this proceeding’s period (i.e. by the end of 2029)…”
“The expected CDM electricity consumption cumulative savings during the 2024 to 2029 period are listed in Table 2-2 below, based on 50% of the potential savings shown in Table 2-1 being achieved by 2029. Enerlife’s projected average commercial sector CDM savings of 1.7% (annual reduction) is generally consistent with what was included in the Toronto Hydro load forecast and the APS targets.”

a) Please provide all supporting evidence, including a schedule (working Excel file), that:
    i. Sets out the derivation of the 50% of electricity consumption savings potential shown in Table 2-1
    ii. Sets out the calculations of projected average commercial sector CDM savings of 1.7% from individual 2024-2029 commercial building types in Table 2-2. Please provide the calculations including the weighted kWh share by building type used to derive to average of 1.7% and the related number of buildings this related load represents.

Response:
See Enerlife’s response to M2-CCMBC-3.

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M2-TH-005

References: Enerlife Report, p. [page 11: Section 2.2.3 "Impact of Electrification in Commercial Buildings"]

Enerlife Report, p. [page 16: Section 2.2.4 "Electrification Adoption in Commercial Buildings – 2025 to 2029 Period"]

Enerlife Report, p. [page 4: Section 1.3.2 "Electrification in Commercial Buildings"]

Preamble 1: "Electrification in commercial buildings has already started. A growing number of new buildings including CIBC Square and Humber River Hospital have heat recovery chillers and other heat pump technology. Many public- and private-sector commercial building owners are planning, setting targets and taking action towards net zero greenhouse gas emissions. The strategies, methods and market dynamics of the low carbon energy transition in the commercial sector are very different from the residential or industrial sectors."

Preamble 2: "Based on discussions with a number of clients, Enerlife expects a steady increase in market penetration over the 2024-2029 period, averaging 2% per year, for commercial buildings in Toronto, predominantly "hybrid" electrification with existing fossil-fuel-fired heating continuing in use during peak demand periods."

Preamble 3: "Enerlife estimated the adoption of electrification (primarily switching from natural gas heating to electric heat pump technology) and its impact on commercial buildings in Toronto during the 2025-2029 period based on its knowledge of installations already in operation or development and involvement in energy transition planning for a number of major owners. In commercial buildings, almost all current electrification installations and planning use "hybrid"

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solutions (with natural gas backup), and Enerlife expects this trend to continue during the 2025-2029 period.

(discussed in Section 2)."

a) How did Enerlife factor into its forecast the diverse range of buildings in Toronto Hydro's territory (e.g. spanning from multi-units residential buildings ("MURBs") to various commercial properties), in determining the adoption rate of electrification?

b) How did Enerlife factor into its forecast the varied strategies, methodologies, and market dynamics of the low-carbon energy transition in the commercial sector? How did it incorporate rate classes into that assessment?

c) Please specify the number of commercial buildings among BOMA Toronto members that have completed their building electrification transition plans by Q1, 2024, for (1) Heat Recovery and (2) Electrification (e.g., ASHP) installations, which were utilized in calculating the electrification adoption rates for 2025-2029 as detailed in Sections 1.3 and 2.2.

d) Please complete the tables below according to BOMA customers' building development known plans, along with supportive evidence.

BOMA Member Energy Transition Projects: Small Size Buildings

	units	2025	2026	2027	2028	2029
Heat Recovery	# of projects					
	Electrification kWh Impact					
	Electrification kW Impact					

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Electrification	# of projects					
	Electrification kWh Impact					
	Electrification kW Impact					

BOMA Member Energy Transition Projects: Large Size Buildings

	units	2025	2026	2027	2028	2029
Heat Recovery	# of projects					
	Electrification kWh Impact					
	Electrification kW Impact					
Electrification	# of projects					
	Electrification kWh Impact					
	Electrification kW Impact					

BOMA Member Energy Transition Projects: All Buildings

	units	2025	2026	2027	2028	2029
Heat Recovery	# of projects					
	Electrification kWh Impact					
	Electrification kW Impact					
Electrification	# of projects					
	Electrification kWh Impact					
	Electrification kW Impact					

Responses:

a) Enerlife has not conducted this type of market research. We requested from Toronto Hydro, but have not received, market information which is important for stakeholders to manage the energy transition. Instead, we relied upon anecdotal information from a number of large building owners.

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

b) Absent market information from other sources, Enerlife relied upon our experience with commercial building owners. We received no information from Toronto Hydro on commercial customer breakdown between rate classes.

c) Neither BOMA nor Enerlife has conducted this type of member survey. Instead, we relied upon anecdotal information from a number of large building owners.

d) See responses to M2-TH-005 a), b) and c).

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M2-TH-006

Reference: Enerlife Report, p. [page 12: "Section 2.2.3 Impact of Electrification in Commercial Buildings"]

Preamble 1: "Figure 2-2 below presents the progression of natural gas and electricity energy use intensities (EUIs) for a representative small size office building in Toronto from its 2010 baseline, through its 2018-19 performance, to the cost-effective energy efficient target (improved from median to top quartile performance through operation and management optimization). The final two decarbonization steps are then application of ventilation and process heat recovery. In this case, 50% energy reductions come from CDM."

a) How did Enerlife determine that the building used for the baseline was representative of all commercial buildings in Toronto? If it is not representative of all commercial buildings, what is it representative of, and how did Enerlife come to that conclusion? Please provide supporting evidence with respect to determining its status as a representative building.

b) Please provide all supporting evidence, including a schedule (working excel file), that sets out the calculations used to derive the information shown in Figure 2-2.

Responses:

a) The building was selected since its 2010 energy use (EUI) was similar to the current office building median determined from the latest government EWRB reporting. It is also a building with a decarbonization plan which lent itself to archetypal modeling.

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b) The working Excel files has been provided as “BOMA_M2-TH-007-1_20240523.xlsx” & “BOMA_M2-TH-007-2_20240523.xlsx”. Note that the files have been anonymized and are working rather than presentation version. Refer to reply to M2-TH-007 b) for high-level descriptions and further details on what the files include.

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M2-TH-007

Reference: Enerlife Report, p. [pages 12-13: "Section 2.2.3 Impact of Electrification in Commercial Buildings"]

Preamble 1: "…shows the corresponding impacts of CDM, heat recovery and heat pumps on electricity demand in the winter and summer (i.e. winter peak and summer peak), showing a modest increase in annual peak demand. Importantly, Figure 2-4 highlights the >95% reduction in natural gas use and associated emissions for this example, with the residual occurring in the coldest occupied hours of the year."

a) What is the source of the "Original Demand" shown in Figure 2-3?

b) Please provide all supporting evidence, including a schedule (working excel file), that sets out the calculations used to derive the information shown in Figure 2-3 and 2-4.

Responses:

a) Interval metered data.

b) The presented chart is a summary of the results of an 8,760-hr model that covers the CDM and electrification measures and savings. A working sample model for the small office building has been included under the files titled "BOMA_M2-TH-007-1_20240523.xlsx" & "BOMA_M2-TH-007-2_20240523.xlsx". Note that the files have been anonymized and are working rather than presentation version. These files encompass the following:

- Hourly weather data

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- Hydro and gas meters hourly interval data (refer to "BOMA_M2-TH-007-1_20240523.xlsx" workbook).
- Gas use equation based on the operation optimization under CDM (refer to "Gas Interval Data" tab where the gas use based on optimized operation has been included).
- Tenant loop heat recovery included under "Energy Recovery Total" tab. Efficiencies and capacity assumptions are listed under "Tenant Loop" tab.
- Exhaust air heat recovery included under "Energy Recovery Total" tab. Efficiencies and capacity assumptions are listed under "Exhaust HR – WSHP" tab.
- ASHP contribution included under "Energy Recovery Total" tab. Electricity consumption equations derived from manufacturers' published information and trended to allow hourly calculations. Refer to "ASHP" tab.
- On an hourly basis, actual gas use is checked vs. available capacities from heat recovery first (tenant + exhaust air), and ASHPs secondly, to calculate actual electricity use variations, demands, and gas use offset.
- The file "BOMA_M2-TH-007-2_20240523.xlsx" includes the summary table and charts referenced in the report.

The calculations account for occupied/unoccupied periods and consider exhaust heat recovery is not available in unoccupied hours (exhaust fans are off). A working file for the small office building archetype is shared for information. It is also representative of other archetype models.

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M2-TH-008

References: Enerlife Report, p. [Page 14: "Section 2.2.3 Impact of Electrification in Commercial Buildings"]

Enerlife Report, p. [Pages 39-43: Appendix B]

Preamble: "While absolute electricity and natural gas intensities vary, and the type of equipment used to recover waste heat also varies (e.g. while roof-top air-source heat pumps are commonly used in schools and smaller buildings, heat recovery chillers and ASHP boilers are used in large buildings and hospitals), the same electrification progression steps and results are appliable to most commercial building types."

"Analyses for representative office buildings, K-12 schools and hospitals are provided in Appendix B. Table 2-3 below summarizes the results of these analyses and shows the electrification progression steps and their impact on electricity and natural gas usage (consumption and peak demand) for different commercial building types."

a) How did Enerlife determine that these equipment types are most common among all commercial buildings in Toronto? If it is not most common among all commercial buildings, what is the subset, and how did Enerlife come to that conclusion? Please provide supporting evidence with respect to determining these equipment types are most common, and how common "most" is (i.e. percentage of all buildings in Toronto by type).

b) For each building type, what are the sources or assumptions used to derive consumption and demand for:

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

i. Original electricity usage and peak demand
ii. Electricity usage and peak demand with heat recovery
iii. Electricity usage and peak demand with air source heat pumps (ASHPs)

c) Please provide a detailed description and the explanation of the difference between 1st Stage Heat Recovery and Final Stage Recovery outlined in Table 2-3.

d) Please indicate the sample size used for building category to determine archetypes in Table 2-2.

e) Please provide all supporting evidence by building category including the customer load data including a schedule (working excel file), that sets out the calculations used to derive the information shown in Table 2-3 and Appendix B.

Responses:

a) For the purpose of Table 2-3, Enerlife determined from prior experience the appropriate electrification measures for the different building types included.

b) Data sources for each archetype building are:

i. Monthly (12) and interval (8,760) metered electricity.
ii. Hourly calculations of energy savings/increases for energy recovery measures adopted for the archetype buildings, considering manufacturers' technical data provided over the operating temperature range. These discrete data were trended to generate capacities, savings, and energy use by heat recovery systems for the 8,760-hr models.
iii. Same strategy adopted as for ii., applied to ASHPs and heat recovery chillers.

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c) The first stage of heat recovery refers to relatively less capital-intensive heat recovery measures similar to enthalpy wheels, water-source heat pumps, runaround coils, heat pipes and the like. The second stage includes more capital-intensive heat recovery measures similar to ASHPs and heat recovery chillers.

d) Archetype buildings are specific buildings where we have knowledge of building systems and operations to enable modeling and analysis. We compare them against median energy use for that building type determined from Ontario's publicly reported BPS and EWRB databases.

e) A sample working model for the small office archetype has been provided under M2-TH-007 b). This model is representative for other archetypes.

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M2-TH-009

Reference: Enerlife Report, p. [Page 16: "Section 2.2.4 Electrification Adoption in Commercial Buildings – 2025 to 2029 Period"]

Preamble: "Based on discussions with a number of clients, Enerlife expects a steady increase in market penetration over the 2024-2029 period, averaging 2% per year, for commercial buildings in Toronto, predominantly "hybrid" electrification with existing fossil-fuel-fired heating continuing in use during peak demand periods. By this estimate, 12% of commercial buildings in Toronto would have adopted electrification by the end of 2029 as described above."

a) What was the number of clients Enerlife had the discussions with to determine the adoption rate for electrification of 2%?

b) Were these clients with whom discussions were had a representative sample of BOMA members? Was this a representative sample of all building owners in Toronto? Are the buildings owned or managed by these clients representative of all the buildings in Toronto? For any answer in the affirmative, please explain how that was determined and file corresponding evidence.

c) What level of uncertainty surrounds the assumption of an average annual increase of 2% in market penetration for commercial buildings in Toronto?

d) Please provide all supporting evidence, including a schedule (working excel file) by commercial building type, that sets out the derivation of the 2% average steady increase in market penetration in commercial buildings in Toronto.

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e) Please confirm if Enerlife meant to state "12% of commercial buildings of BOMA Toronto members in Toronto would have adopted electrification by the end of 2029 as described above". If not, please elaborate how Enerlife determined the anticipated impact on all buildings within Toronto.

f) What assumptions were made to allocate the impacts of building electrification among the rate classes?

g) Please provide all supporting evidence for 2024-2029, including a schedule (working excel file), that sets out the derivation of average 2% per year of market penetration over 2024-2029 period leading to 12% of commercial buildings in Toronto adopting electrification by the end of 2029.

Responses:

a) About 20.
b) This was not intended to be a representative sample. Neither was it just BOMA members. Enerlife's evidence includes public sector as well as commercial buildings.
c) It is highly uncertain and intended only to model the impact. We look forward to seeing more in-depth market research which can refine the decarbonization forecasting.
d) See M2-TH-009 c).
e) See M2-TH-009 b).
f) Toronto Hydro provided no information on commercial customer rate classes.
g) See M2-TH-009 c).

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

M2-TH-010

Reference: Enerlife Report, p. [Pages 20-21: Section 3.2 Alternative Load Forecast Scenario One]

Preamble: "Generating this scenario requires three steps:

a) Remove the expected commercial CDM impact incorporated in the original Toronto Hydro load forecast from all the GS rate classes - The Business CDM variable used in Toronto Hydro's multivariate regression includes impacts of both commercial and industrial CDM programs. Only the impact from commercial CDM programs have been removed.

b) Align Enerlife's expected CDM impact as listed in Table 2-2 (2024 to 2029 CDM impact by building type) to two rate class categories: i) CSMUR and ii) Total GS rate classes (which include GS<50kW, GS 50 to 999 kW, GS 1,000 to 4,999 kW and the Large User Rate Classes).

c) Incorporate Enerlife's expected CDM impact by rate class to the CSMUR, GS<50kW, GS 50 to 999 kW, GS 1,000 to 4,999 kW and the Large User Rate Classes."

> "Table 3-5, Table 3-6, and Table 3-7 below presents the Alternative Load Forecast Scenario One. Enerlife's CDM analysis impacts the multi-residential condo/apartment, commercial and institutional buildings only. As such, only CSMUR, GS<50kW, GS50-999kW, GS1,000-4,999kW and Large User Rate Classes are affected."

Questions:

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

a) Toronto Hydro understands that Enerlife only removed 2024-2029 Commercial CDM savings from its Business CDM variable in its multivariate regression modelling. Please confirm Toronto Hydro's understanding for the removal of Commercial CDM savings from its Business CDM variable.

   i. If yes, please provide a schedule (working excel file) that derives the removal of Commercial CDM Savings from Toronto Hydro's Business CDM variable.

   ii. If no, please explain how the Commercial CDM savings were removed.

b) Please explain how the CDM impacts from multi-residential condo/apartment, commercial and institutional buildings was applied to the CSMUR, GS<50kW, GS50-999kW, GS1,000-4,999kW and Large User Rate Classes.

c) Please provide all supporting evidence, including a schedule (working excel file), that sets out the calculations used to derive the information shown in Tables 3-5, 3-6, and 3-7.

Responses:

A working excel file is provided as BOMA_M2-TH-010-1_20240523.xlsx

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M2-TH-011

Reference: Enerlife Report, p. [Pages 21-23: “Section 3.3 Alternative Load Forecast Scenario Two”]

Preamble: “Generating the alternative load forecast scenario 2 requires two steps:

1. Align Enerlife’s expected electrification impact as described in sections 2.2.3 and 2.2.4 (i.e. 2024 to 2029 electrification impact by building type) to two rate class categories: i) CSMUR and ii) Total GS rate classes (which include GS<50kW, GS 50 to 999 kW, GS 1,000 to 4,999 kW and the Large User Rate Classes).

2. Incorporate Enerlife’s expected electrification impact by rate class to the CSMUR, GS<50kW, GS 50 to 999 kW, GS 1,000 to 4,999 kW and the Large User Rate Classes.”

“Table 3-8, Table 3-9, and Table 3-10 below present the Alternative Load Forecast Scenario Two. Enerlife’s electrification analysis impacts the multi-residential condo/apartment, commercial and institutional buildings only. As such, only CSMUR, GS<50kW, GS50-999kW, GS1,000-4,999kW and Large User Rate Classes are affected.”

a) Please explain how electrification impacts from multi-residential condo/apartment, commercial and institutional buildings were applied to the CSMUR, GS<50kW, GS50-999kW, GS1,000-4,999kW and Large User rate classes.

b) Please provide all supporting evidence, including a schedule (working excel file), that sets out the calculations used to derive the information shown in Tables 3-8, 3-9, and 3-10.

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Responses:

A working excel file is provided as BOMA_M2-TH-011-1_20240523.xlsx.

While preparing this response, Enerlife noticed an incorrect formula in its spreadsheet, resulting in minor errors in Table 3-9. This error has been corrected and a revised Table 3-9 has been included in the attached excel spreadsheet. Overall, the figures in the revised Table 3-9 have increased by less than 0.01% when compared to the numbers in the original Table 3-9. This error has immaterial impact on other figures in this evidence and therefore no further update is required.

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M2-TH-012

Reference: Enerlife Report, p. [Page 19: Table 3-4 “Toronto Hydro 2025 to 2029 Winter and Summer Peaks”]

Preamble: “To estimate the impact of Load Forecast Scenarios One and Two on Toronto Hydro’s distribution system winter and summer peak demand, a 2025 to 2029 forecast of winter and summer peak demand by rate class (as shown in Table 3-4 below) is estimated based on information provided in Table 3-3 (winter and summer peak by class), Table 3-1 (non demand billed rate classes’ 2025 to 2029 kWh growth) and Table 3-2 (demand billed rate classes’ 2025 to 2029 kW growth).”

a) Provide the excel model to demonstrate how the co-incident peak is derived for the years 2026-2029.

Responses:

A working excel file is provided as BOMA_M2-TH-012-1_20240523.xlsx

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

M2-TH-013

References: Enerlife Report, p. [Page 21: Table 3-7 “Impact of Alternative Load Forecast Scenario 1 on 2025 to 2029 Toronto Hydro Distribution System Peak”]

Enerlife Report, p. [Page 23: Table 3-10 “Impact of Alternative Load Forecast Scenario 2 on 2025 to 2029 Toronto Hydro Distribution System Peak”]

a) Provide the excel model to demonstrate how the co-incident peak is derived for Scenarios 1 and 2.

Responses:

Please refer to M2-TH-010 and M2-TH-011.

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M2-TH-014

References: Enerlife Report, p. [Page 25: Section 4.1.2 "The Impact of Electrification - Alternative Scenario Two vs. Alternative Scenario One"]

Enerlife Report, p. [Page 5: Section 1.4.3 "Coordination Among Stakeholders"]

Preamble 1: "Enerlife estimated the adoption of electrification (primarily switching from natural gas heating to electric heat pump technology) and its impact on commercial buildings in Toronto during the 2025-2029 period based on its knowledge of installations already in operation or development and involvement in energy transition planning for a number of major owners. In commercial buildings, almost all current electrification installations and planning use "hybrid" solutions (with natural gas backup), and Enerlife expects this trend to continue during the 2025-2029 period (discussed in Section 2)."

Preamble 2: The low carbon transition which is just beginning will see a massive transformation in all aspects of the commercial buildings' sector which has to navigate great uncertainties including government policy, market demand, economic factors and technology. It requires active involvement from many stakeholders.

a) What level of confidence does Enerlife have in their estimation of the adoption of electrification (switching from natural gas heating to electric heat pump technology) in commercial buildings in Toronto from 2025 to 2029 given the uncertainties and predictability of the building electrification technology? How was that confidence level calculated or otherwise determined?

RESPONSES TO TORONTO HYDRO-ELECTRIC SYSTEM LIMITED INTERROGATORIES

Response:

a) See M2-TH-009 c).

RESPONSES TO VECC INTERROGATORIES

M2 – VECC -1

Reference: Enerlife Consulting Evidence (Enerlife), page 3
THES Exhibit 8, Tab 3, Schedule 2

Preamble: The Evidence states:

> "Considering Toronto Hydro's General Service rate classes (GS <50kW, GS 50–999kW, GS 1,000–4,999kW and Large Users) include both CRE and institutional buildings (such as hospitals, government buildings, schools and colleges/university), it is estimated that BOMA Toronto members represent about 60% of Toronto Hydro's General Service and CSMUR rate classes."

Exhibit 8, Tab 3, Schedule 2 defines the CSMUR rate class as:

> "This classification is applicable to an account where electricity is used exclusively for residential purposes in a multi- unit residential building, where unit metering is provided using technology that is substantially similar to that employed by competitive sector sub-metering providers. Use of electricity in non-residential units of multi-unit buildings does not qualify for this classification and will instead be subject to the applicable commercial classification."

Questions:

a) Please clarify what the 60% represents (i.e., is it 60% of the customers in the referenced classes, 60% of the kWh usage by the referenced classes, or some other basis?)?

b) Please explain how Enerlife determined that "BOMA Toronto members represent about 60% of Toronto Hydro's General Service and CSMUR rate classes".

c) For each of the General Service (i.e., GS<50, GS 50-999 and GS 1,000-4,999 classes) and the Large Use class, what percentage is represented by BOMA Toronto members?

RESPONSES TO VECC INTERROGATORIES

d) Given that the CSMUR class is consists of separately metered residential units in multi-residential buildings, please explain how BOMA members account for usage by the CSMUR class.

Response:

a) Combining Toronto Hydro's CSMUR, GS <50kW, GS 50–999kW, GS 1,000–4,999kW and Large User Rate Classes, BOMA Toronto members represent about 60% of these rate classes, in terms of number of customers (for CSMUR class, number of building owners/managers are counted, i.e. not individual units in the building).

b) BOMA Toronto members represent about 85% of the Commercial Real Estate (CRE) industry. Toronto Hydro's CSMUR, GS <50kW, GS 50–999kW, GS 1,000–4,999kW and Large User Rate Classes include CRE, multi-residential and institutional buildings (such as hospitals, government buildings, schools, colleges and universities, together they have about 30% share). It is therefore estimated that BOMA Toronto members represents about 60% (i.e. 85% x (1-30%)) of Toronto Hydro's General Service and CSMUR rate classes.

c) As discussed in Enerlife's evidence (page 3), Toronto Hydro did not provide the rate class breakdown requested and therefore this information is not available.

d) As discussed in our response in part a, for CSMUR class, number of building owners/managers are counted, i.e. not individual units in the building.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC -2

Reference: Enerlife Evidence, pages 3, 4-5 and 11

Preamble: The Evidence states:

"Electrification of existing and new buildings is already beginning, with planning and installation of heat recovery chillers in large commercial and institutional buildings and air source heat pumps in smaller buildings." (page 3)

And

"In commercial buildings, almost all current electrification installations and planning use "hybrid" solutions (with natural gas backup), and Enerlife expects this trend to continue during the 2025-2029 period (discussed in Section 2)." (pages 4-5)

And

"Electrification in commercial buildings has already started. A growing number of new buildings including CIBC Square and Humber River Hospital have heat recovery chillers and other heat pump technology." (page 11)

a) By "electrification" is Enerlife referring specifically to the use of heat recovery chillers and air source heat pumps?
    i. If not, what else does Enerlife consider to be "electrification" activities?
b) Please provide any additional information Enerlife has regarding the extent to which: i) heat recovery chillers are currently (i.e., as of 2023) used in large commercial and industrial buildings and ii) air source heat pumps are currently used in smaller buildings.

Responses:

a) Yes

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b) Enerlife has direct knowledge of heat recovery chiller installations in a number of recently opened major new office and hospital buildings. We have not researched current installations of air source heat pumps in commercial buildings.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC - 3

Reference: Enerlife Evidence, pages 4 & 5

Preamble: The Evidence states:

"Traditional load forecasting methodologies relying primarily on historical trends may not be well suited to project the individual or cumulative effect of these new emerging trends." (page 4)

And

"In its prefiled evidence, and further confirmed in the Technical Conference, Toronto Hydro indicated that the potential load impacts of electrification in commercial buildings, such as heat pumps, installation of heat recovery chillers and connection to district energy, are not incorporated in its 2025 – 2029 load forecast." (page 5)

a) Is it reasonable to assume that THES' multivariate forecast regression models will implicitly capture historic trends in the use of technologies such as heat recovery chillers and air source heat pumps and the resulting forecasts will implicitly project a continuation of the same trends into the future?
    i. If not, why not?

Response:

a) While it is reasonable to assume that THES' multivariate forecast regression models will implicitly capture historic trends in the use of technologies such as heat recovery chillers and air source heat pumps that have been in-service before 2024 and the resulting forecasts will implicitly project a continuation of the same trends into the future, Enerlife expects the pace of the use of these technologies will not remain the same as the historical trend (which was very low) and therefore its load forecast scenario 2 includes <u>additional</u> load impact from electrification (Enerlife believes that is more realistic) in commercial buildings such as heat pump and heat recovery chillers from 2024 to 2029.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC - 4

Reference: Enerlife Evidence, page 6

Preamble: The Evidence states:

> "New regulations can be expected similar to EU Directive 2023/1791, requiring data centres over 1MW to recover their waste heat, and New York City's local law 97 putting carbon caps on buildings. Enerlife believes district energy is likely to be an important part of the low carbon future, enabling large-scale solutions which are impractical at the individual building level."

a) At what government level does Enerlife expect these new regulations to be implemented (e.g., provincial, municipal, other)?

b) Please provide any specific evidence Enerlife has that such regulations impacting THES customers can be expected to be implemented during the 2025-2029 period.

Responses:

a) Enerlife is working on National Energy Code research with Natural Resources Canada's Codes Acceleration Fund and is a member of Toronto's Retrofit Industry Advisory Group addressing the City's Building Emissions Performance Standards. In response to the deepening climate crisis, we expect ongoing regulatory action at the provincial and municipal levels.

b) We have no specific evidence on timing of new regulations.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC - 5

Reference: Enerlife Evidence, pages 5 & 7-8

Preamble: The Evidence states:

> "Enerlife believes that significant electrification of commercial buildings will occur during this period and recommends that Toronto Hydro should review the analysis provided in this report and assess its potential impact on the proposed load forecast, capital investment plan and revenue requirement in Toronto Hydro's current and future rate applications." (page 5)

And

> "Figure 2-1 below presents electricity intensity data in kWh/sqft for over 700 K-12 (Kindergarten to 12th Grade) schools in Toronto. This dataset (2020-2021 school year) was constructed from publicly available Top Boards Report4 and has been weather normalized to Toronto City weather station. All these buildings provide similar functions, yet their electricity intensity varies by more than 3:1. There is little correlation with age – a few recently built schools are at the top of the chart, while other new schools are below the median, and many older schools are found in the top quartile. Adjustments for electrically heated portable classrooms, heating system types and air conditioning account for only a small part of the differences." (page 7)

And

> "The main differences between the high performers and the rest are operational – equipment condition, scheduling and controls – and cost-effective lighting and motor drive retrofits which are supported by current CDM programs. While absolute electricity

RESPONSES TO VECC INTERROGATORIES

intensities vary, this story can be found repeated across all commercial building types." (page 8)

a) Please provide the basis for the comment (page 7) that "Adjustments for electrically heated portable classrooms, heating system types and air conditioning account for only a small part of the differences".

b) The evidence on pages 7 and 8 appears to suggest that "electrification" has a minimal impact on electricity use. Please reconcile this with Enerlife's comment on page 5 that THES needs to account for the potential impact of electrification on its load forecast.

Responses:

a) Enerlife reports annually on energy performance of Ontario's 72 school boards, including TDSB and TCDSB. The boards report on portable classrooms and HVAC systems for all 5,000 school buildings, and Enerlife analyzes the associated energy use in our Top Boards Reports. Please see the White Paper detailing the methodology and analytics available on the Sustainable Schools website at *https://sustainableschools.ca/research*.

b) The energy transition is just beginning. Pages 7-8 provide empirical support for the magnitude of CDM savings potential, which will offset the impact of electrification. However, we are seeing the first installations of heat pump technology in commercial and institutional buildings, and planning for decarbonization is well advanced for a number of owners.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC - 6

Reference: Enerlife Evidence, page 8 and Appendix A

Preamble: The Evidence states:

> "Enerlife applies data-driven performance-based conservation to estimate achievable electricity savings potential for individual buildings, portfolios and sectors. Empirical targets are set, typically at the top-quartile level of the benchmark charts. Target adjustments are applied to account for material differences between individual buildings, including weather and heating/cooling system types. Achievable savings are then determined for each building as the difference between its actual and target electricity use." (page 8)
>
> And
>
> "Table 2-1 presents top quartile target electricity consumption savings potential for a range of commercial building types derived from a number of data sources." (page 8)

a) Please explain how the "potential savings" percentages set out in Table 2-1 were derived from the data presented in Appendix A. As part of the response please provide the calculations supporting the 38% savings cited for Lodging.

   i. If data sources other Appendix A were used, please provide and indicate how the associated data was used in calculating the Table 2-1 values.

Response:

a) The potential CDM savings for all building types in Table 2-1 has been calculated using the difference between median and top-quartile EUIs from the latest Ontario public BPS and EWRB databases. From prior experience, Enerlife has found that most commercial buildings can reach top-quartile performance through CDM measures only. For lodging, with reference to figure A10, the potential savings calculation is (9.4-5.8)/9.4*100.

   i. No other data sources were used.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC – 7

Reference: Enerlife Evidence, pages 9 & 10 and Appendix A

Preamble: The Evidence states:

> "Drawing from this direct experience with many commercial building owners/managers, Enerlife forecasts that, in the Toronto Hydro service area, 50% of this electricity consumption savings potential shown in Table 2-1 will be achieved by the end of this proceeding's period (i.e. by the end of 2029)." (page 9)
>
> And
>
> "The expected CDM electricity consumption cumulative savings during the 2024 to 2029 period are listed in Table 2-2 below, based on 50% of the potential savings shown in Table 2-1 being achieved by 2029." (page 10)

a) It is noted that for the majority of the commercial building types, the data set out in Appendix A is based on 2019 while for the remaining types it is 2020 or 2020/21. Enerlife does not appear to have factored into the derivation of the savings for 2024-2029 (per Table 2-2) the fact that some of the potential savings are likely to be achieved prior to 2024 and, therefore, embedded in actual usage data used by THES to develop its forecast models. Please comment on why no such adjustments have been made and whether, in Enerlife's view, an adjustment should be made to remove pre-2024 savings.

Response:

Energy use during the COVID-19 pandemic, particularly electricity, responded differently in different commercial and institutional building types, which is one reason why we use different baseline years. Most commercial office buildings showed substantial reductions and have not

RESPONSES TO VECC INTERROGATORIES

yet recovered. Schools recorded sharp reductions in 2020-21 but have since largely returned to pre-pandemic levels. Some municipal facilities shut down or changed use entirely and are now back in operation. We continue to analyze year on year changes in energy use to see the net effect of these factors. We agree that some CDM happened since 2019 but do not believe it materially affects the conclusions presented in evidence.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC – 8

Reference: Enerlife Evidence, page 9

Preamble: The Evidence states:

> "All public sector building owners are preparing their 5-year ECDM Plans which are required by regulation to be posted by July 1st, 2024."

a) Please provide a copy of the referenced regulation.

Response:

a) See O. Reg. 25/23: BROADER PUBLIC SECTOR: ENERGY REPORTING AND CONSERVATION AND DEMAND MANAGEMENT PLANS. https://www.ontario.ca/laws/regulation/r23025

RESPONSES TO VECC INTERROGATORIES

M2 – VECC – 9

Reference: Enerlife Evidence, page 11

a) The footnote to Table 2-2 indicates that the Average Commercial CDM Savings were calculated based on a weighted average using the kWh share by building type. Please explain source/basis for the kWh shares given the comment on page 3 regarding THES' inability to provide details by building type.

Response:

Please see response to M2-CCMBC-3.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC – 10

Reference: Enerlife Evidence, pages 4 and 11

Preamble: The Evidence states:

> "Both Enerlife and Toronto Hydro's projected CDM savings are generally consistent with the Independent Electricity System Operator's (IESO) 2019 Achievable Potential Study (2019 APS), its subsequent 2022 APS Refresh and the 2024 Annual Planning Outlook." (page 4)
>
> And
>
> "This adoption rate is largely consistent with the Independent Electricity System Operator's (IESO) 2019 Achievable Potential Study (2019 APS), its subsequent 2022 APS Refresh and the 2024 Annual Planning Outlook." (page 10)
>
> And
>
> "Enerlife's projected average commercial sector CDM savings of 1.7% (annual reduction) is generally consistent with what was included in the Toronto Hydro load forecast and the APS targets." (page 10)

a) Please provide the Enerlife's projected commercial CDM savings (kWh) savings for each of the years 2024 to 2029 along with the supporting calculations.

b) Please provide the basis (e.g. supporting calculations and comparisons) for Enerlife's conclusion that Enerlife's projected average commercial sector CDM savings are consistent with the 2022 APS targets. As part of the response, please provide Enerlife's calculation of the average commercial savings over the 2024-2029 period based on the 2022 APS target values, including references as to the sources of the data used.

c) Please provide the basis (e.g. supporting calculations and comparisons) for Enerlife's conclusion that Enerlife's projected average commercial sector CDM savings are consistent with the IESO's 2024 Annual Planning Outlook (APO). As part of the response,

RESPONSES TO VECC INTERROGATORIES

please provide Enerlife's calculation of the average commercial savings over the 2024-2029 period based on the 2024 APO, including references as to the sources of the data used.

Responses:

a) Please refer to the response to M2-TH-010.

b) Per "2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study"[2], prepared by Navigant, issued/updated December 10, 2019, page 31, Figure 3-10, the reference 2030 commercial electricity consumption is about 55,000 GWh. On page 118, Table 7-6, the Constrained Potential ("SC-A"), the Semi-Constrained Potential ("SC-C") and the Unconstrained Potential ("SC-B") scenarios show 7,273 GWh or 13% (i.e. 7273/55000), 7,592 GWh or 14% (i.e. 7592/55000) and 9,644 GWh or 18% (i.e. 9644/55000) electricity savings by the end of 2030, respectively.

In the 2022 APS refresh, the reference forecast and the maximum Achievable Scenario (i.e. Scenario B as described in 2019 APS) have been updated. SC-A and SC-C were not updated in the 2022 refresh. Per "APS Refresh Forecast Potential and Consumption Appendix 1[3], prepared by Guidehouse and released on September 8, 2022, the 2030 reference 2030 commercial electricity consumption has been revised to 54,379 GWh (shown in tab 03a – Ref Forecast by Segment). Tab 04a – Potential by Segment shows the 2030 commercial unconstrained potential has been revised to 7,011 GWh or 13%

[2] https://www.oeb.ca/sites/default/files/2019_Achievable_Potential_Study_20191218.pdf

[3] https://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation/APS/APPENDIX-1-Forecast-Potential-and-Consumption-2022.xlsx

RESPONSES TO VECC INTERROGATORIES

(i.e. 7011/54379), which represents a drop of 28% (i.e. from 18% to 13%) from the 2019 APS.

Assuming the drop from 2019 to 2022 APS is the same for SC-A and SC-C, the 2030 commercial savings for SC-A and SC-C could be estimated to be 9% and 10%, respectively.

The response to M2-CCMBC-3 (cell R14) shows the average cumulative commercial sector CDM savings (estimated by Enerlife) of 10.3% by 2029.

Comparing the above estimated 2022 APS figures (9% and 10% commercial CDM savings by 2030 in SC-A and SC-C) to Enerlife's figure (10.3% by 2029), Enerlife concluded that the two sets of figures are generally aligned.

c) In its prefiled evidence Exhibit 3, Tab 1, Schedule 1 page 16, lines 16 to 21, Toronto Hydro states that:

> *"Toronto Hydro's annual forecasted savings for 2025 to 2029 were developed based on the assumption that there will be a continuation of CDM program delivery by the IESO. In the absence of a new framework, the projected impact is based on the anticipated "status quo" CDM delivery objectives and expectations assigned for the post-2024 conservation planning period. …."*

The above statement can be further verified in THESL_3_T01_S01_AppC - CDM Variables_20240402.xlsx, Tab "Annual Savings" and THESL_3_T01_S01_AppE - Extrapolation Method 2019-2020 and 2021-2024 Prov Frameworks_20240402.XLSX, Tab "2021-2024 CDM Framework Est.".

RESPONSES TO VECC INTERROGATORIES

Per the IESO's Annual Planning Outlook – Ontario's electricity system needs: 2025-2050, issued in March 2024[4], page 26, section 2.4.7.1, the IESO states that:

> *"This Forecast assumes the delivery of CDM programs will continue after the current Framework. It is assumed that the annual savings of new programs will be consistent with levels forecasted for the enhanced 2021-2024 CDM Framework, on a proportion of gross demand basis."*

Based on the above statements in Toronto Hydro's evidence and in the IESO's Annual Planning Outlook, Enerlife concluded that Toronto Hydro's projected CDM savings (and Enerlife's estimated CDM savings) are generally consistent with the Independent Electricity System Operator's (IESO) 2024 Annual Planning Outlook.

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[4] https://sites-airdberlis.vuturevx.com/1/4905/uploads/2024-annual-planning-outlook.pdf?_gl=1*d83pkj*_ga*MzA5NTUwNzA0LjE3MTY0NDA1MTg.*_ga_H0VDVXK798*MTcxNjQ0MDUxNy4xLjEuMTcxNjQ0MDU0Ni4wLjAuMA..

RESPONSES TO VECC INTERROGATORIES

M2 – VECC – 11

Reference: Enerlife Evidence, pages 17, 20

THES Exhibit 3, Tab 1, Schedule 1, Appendix C

Preamble: The Evidence states:

"Alternative Load Forecast Scenario One - In this scenario, the estimated impact of commercial sector CDM impact included in the original Toronto Hydro load forecast is replaced by the expected commercial sector CDM impact based on Enerlife's analysis." (page 17)

And

"In this scenario, the estimated impact of commercial sector CDM activities included in the original Toronto Hydro load forecast is replaced by the expected commercial sector CDM impact based on Enerlife's analysis.

Generating this scenario requires three steps:

1. Remove the expected commercial CDM impact incorporated in the original Toronto Hydro load forecast from all the GS rate classes - The Business CDM variable used in Toronto Hydro's multivariate regression includes impacts of both commercial and industrial CDM programs. Only the impact from commercial CDM programs have been removed.
2. Align Enerlife's expected CDM impact as listed in Table 2-2 (2024 to 2029 CDM impact by building type) to two rate class categories: i) CSMUR and ii) Total GS rate classes (which include GS<50kW, GS 50 to 999 kW, GS 1,000 to 4,999 kW and the Large User Rate Classes).
3. Incorporate Enerlife's expected CDM impact by rate class to the CSMUR, GS<50kW, GS 50 to 999 kW, GS 1,000 to 4,999 kW and the Large User Rate Classes." (page 20)

RESPONSES TO VECC INTERROGATORIES

a) With respect to Step #1 (page 20), please provide the detailed calculations setting out how the expected commercial CDM impacts were removed from the original THES load forecast for each of the GS rate classes.
   i. As part of the response please clarify whether it was only the impact of CDM initiatives implemented in 2024-2029 (THES Exhibit 3, Tab 1, Schedule 1, Appendix C) that were removed.
   ii. As part of the response, please indicate how Enerlife determined the commercial vs. industrial CDM program impact of the THES forecast CDM for 2024-2029 per THES Exhibit 3, Tab 1, Schedule 1, Appendix C.
   iii. As part of the response, please provide the resulting load forecast for each GS class and the Large Use class, with these savings removed.

b) With respect to Step #2, please set out Enerlife's calculation of the annual CDM impact (kWh) over the 2024-209 period for: i) the CSMUR class and ii) the GS & Large Use classes in total using the percentage savings in Table 2-2.

c) With respect to Step #3, please set out how Enerlife assigned the total GS & Large Use classes' savings to the individual customer classes and the resulting values by class for each of the years 2024-2029.

Response:

Please refer to M2-TH-010.

RESPONSES TO VECC INTERROGATORIES

M2 – VECC – 12

Reference: Enerlife Evidence, pages 11 and 16

Preamble: The Evidence states:

> "Electrification in commercial buildings has already started. A growing number of new buildings including CIBC Square and Humber River Hospital have heat recovery chillers and other heat pump technology." (page 11)
>
> And
>
> "Based on discussions with a number of clients, Enerlife expects a steady increase in market penetration over the 2024-2029 period, averaging 2% per year, for commercial buildings in Toronto, predominantly "hybrid" electrification with existing fossil-fuel-fired heating continuing in use during peak demand periods. By this estimate, 12% of commercial buildings in Toronto would have adopted electrification by the end of 2029 as described above." (page 16)

a) The statement on page 16 that increased market penetration of 2% per year will result in an overall penetration of 12% by 2029 suggests that the penetration rate in 2023 was zero. However, the statement on page 11 indicates that some market penetration has already taken place. Please reconcile.

Response:

Electrification has already started and Enerlife agrees that market penetration was not zero in 2023. However, we believe the commercial building electrification 2023 market penetration would be small and therefore the minor inconsistence would not materially affect the conclusions presented in this evidence.

End of document