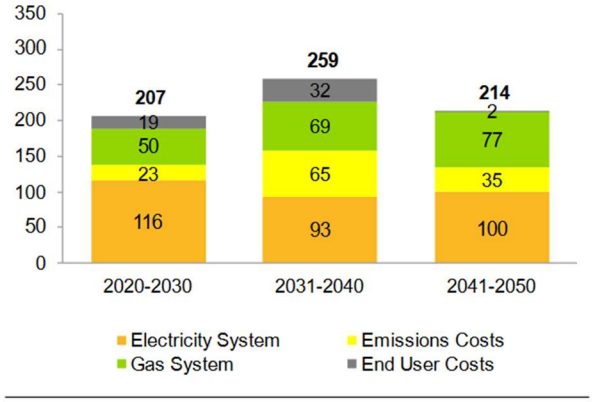
EB-2022-0200
EGI Panel 1
COMPENDIUM OF MATERIALS
BOMA

In the discussion of sensitivity analyses in section 5.6, emissions costs are allocated to the gas system. Figure 18 reports emissions costs separate from gas system costs to better demonstrate the costs associated with investment in the gas system.

Figure 18. Energy System Costs for Diversified and Electrification Scenarios[90]

Diversified

Energy System Costs (billion CAD, real 2020$)

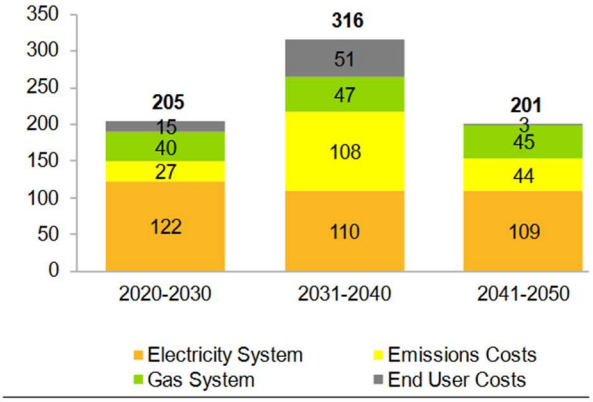


Billion CAD, real 2020$

	2020-30	2031-40	2041-50	Total
Gas System	50	69	77	**197**
Elec. System	116	93	100	**309**
Emissions	23	65	35	**122**
End Users	19	32	2	**53**
Total	**207**	**259**	**214**	**681**

Electrification

Energy System Costs (billion CAD, real 2020$)



Billion CAD, real 2020$

	2020-30	2031-40	2041-50	Total
Gas System	40	47	45	**132**
Elec. System	122	110	109	**341**
Emissions	27	108	44	**179**
End Users	15	51	3	**70**
Total	**205**	**316**	**201**	**722**

From: Pavel Rusyaev <prusyaev@enerlife.com>
Sent: Monday, June 5, 2023 4:51 PM
To: Ian Jarvis <ijarvis@enerlife.com>
Subject: RE: Gas System Load Factor

Hi Ian, below is what I have been able to find so far.

Pavel

EGI_EVD_Ex 1_Administration_Updated_20230322.pdf Page 1622
Filed: 2022-10-31
EB-2022-0200
Exhibit 1
Tab 10
Schedule 2
Page 2 of 26

On a peak basis, the natural gas system provides three to five times as much energy as the electricity system. For example, the most recent winter peak (highest hourly flow measured during the winter) occurred at 9 am on January 22, 2022 and was 8,507 10 3m 3/hr or approximately 92 GW.

EGI IRR Exhibit I1 2024 Rebasing 2023-03-08 Part 1 of 2.pdf Page 96

Pathways to net zero: Scenarios and actions for Ontario
Summary and recommendations for regulators and policymakers

Meeting Ontario's peak energy needs: gas system
Peak gas demand, 2019 (actual)
11 million m3/hr

EGI_EVD_Ex 8_Rate Design_Updated_20230308.pdf
Page 149
Rebasing and Harmonization: General Service Rates at Enbridge Gas Inc. by Christensen Associates Energy Consulting, LLC Madison, Wiscons in June 16, 2021
The document includes 2019 Load Factors (median) and consumption profiles by Account Category. It also presents methods to obtain consumption estimates for a peak day "since data for consumption on individual days are not available".

Building Towards a
Sustainable Future

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May 15, 2023

VIA RESS AND EMAIL

Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Attention: Nancy Marconi, Registrar

Dear Ms. Marconi:

Re: EB-2022-0200: Enbridge Gas Inc., 2024 Rebasing – BOMA Response to Interrogatories

BOMA's response to interrogatories can be found attached and has been submitted via the RESS portal and emailed to all interested parties.

Please let me know if you have any questions.

Yours sincerely (for BOMA),

Ian A Jarvis
President
Email: ijarvis@enerlife.com

Building Towards a Sustainable Future

EB-2022-0200 Enbridge Gas Rebasing

BOMA's Response to Interrogatories

Prepared by: Ian A Jarvis P.Eng, President, Enerlife Consulting Inc.

May 15, 2023

Responses to Interrogatories from OEB Staff

N. M3. Staff-1

a) *Clarify which of these recommendations Enerlife believes should be addressed within the current regulatory proceeding, having regard to the final issues list and the specific approvals that Enbridge Gas has requested.*
The recommendations as a whole are offered to provide context with respect to demand forecasting and requirements for delivering deep emissions reductions for commercial, institutional and multi-residential buildings as owners work through the transition to low carbon and net zero operations. We understand that this proceeding is to approve 2024 rates and only covers the period from 2024 to 2028. We found it challenging to connect the timelines of Canada's and Ontario's targets with the various forecasts and the Guidehouse P2NZ report in the Applicant's evidence, and chose 2030 as an appropriate planning period. We acknowledge that limited headway will be made in 2024 but forecast that demand reductions will increase markedly between 2025 and 2028 towards the proposed 30% 2030 savings target.

With respect to each of the recommendations and the current regulatory proceeding:

1. The likelihood of greater natural gas reductions due to energy transition and targeted IRP should be considered in relation to multi-year peak and volume demand forecasts, planned capital spends and rate escalation over the rebasing term (Issues 3, 6 and 8).
2. P2NZ modeling should incorporate the specific measures, costs and emissions reductions of commercial and multi-residential building types rather than relying on assumptions based on the single-family residential sector (Issue 3).
3. New DSM programming recommendations should be considered in the upcoming Achievable Potential Study and the next multi-year DSM framework, being mindful of a significant scaling up of targeted reductions and the importance of alignment with empirical data rather than assumptions and calculations.
4. Achievable Potential – the upcoming APS should fully incorporate the rapidly growing availability of empirical data to produce more reliable and actionable energy and emissions reduction forecasts.
5. Changes in gas demand peaks, load shape and balance temperature, as well as annual volumes, due to actions by commercial building owners related to energy transition and targeted IRP should be reflected in the Asset Management Plan (Issues 3, 6 and 10).
6. The need for accurate monthly consumption data and interval gas metering of commercial buildings to support owners' efficiency and decarbonization plans should be prioritized in the scorecard Performance Metrics (Issue 49).
7. Rapid deployment of AMI for commercial general service customers should be included in the Asset Management Plan as an essential support for achieving Ontario's and Canada's emissions reduction targets.

b) *Clarify how Enerlife's recommendations were informed by the OEB's determinations in its recent decision on Enbridge Gas's multi-year DSM plan (EB-2021-0002), and whether Enerlife believes any of its recommendations are more appropriately addressed as part of the OEB's review of Enbridge Gas's next multi-year DSM plan, covering 2026-2030.*
The recommendations are informed by and consistent with the EB-2021-0002 decision, in particular the exhortation to ramp up savings through the End of Term Natural Gas Reduction Incentive and the forward guidance of absolute annual gas throughput reduction targets to come. The recommendations should also be addressed in the current APS and the next multi-year DSM plan, but, with 2030 approaching quickly, the

overarching requirement is to align all parties, frameworks, scorecards and proceedings with the urgent need to scale up reductions in gas use and emissions now.

N. M3. Staff-2

a) *Should Enerlife's proposal to use a 30% reduction by 2030 in weather normalized gas use for the commercial buildings' sector be adopted as an alternative forecast for 2030, what level of reduction in design day or design hour demand would Enerlife recommend Enbridge Gas use for the commercial sector? Would this be less than, equal to, or greater than the proposed 30% reduction in overall gas use? Please provide supporting rationale for Enerlife's recommendation.*

The proposed 30% reduction by 2030 scenario is based just on widespread adoption of operational improvements and cost-effective energy efficiency retrofits, which have a greater impact on volume than peak gas demand. Common measures such as equipment scheduling, retro-commissioning, building automation programming, upgraded boiler controls and conversions from constant flow to variable volume systems avoid excessive heating demand under low load more than peak demand conditions and in some cases may cause spikes which actually increase peak gas demand. Other efficiency measures, such as improved control of outside air volumes and building envelope upgrades, can reduce peak demand as well as consumption. Our previous work in this area back in 2013 provided evidence for EB-2012-0451 (Enbridge Gas Pipeline Hearing), estimating peak demand savings in the range of 15% to 20% for commercial and apartment building segments in Toronto. While every building is different, we estimate that peak demand reductions due to energy efficiency in the order of 15% to 20% will accompany the 30% volume reduction.

Decarbonization measures have a far greater effect on peak demand. Commercial building owners are prioritizing peak heating demand reduction in order to reduce the size and cost of new low carbon plant and the expected ultra-high cost of energy on the peak coldest days. We have modeled the peak demand reductions due to exhaust air heat recovery and heat pump measures for the commercial office building (Heat Recovery Chiller HRC) and the K-12 school (Air Source Heat Pump ASHP) described in Sections 5.2 and 5.3 of our evidence.

Figure N1 shows the office building gas demand profile (blue) and the corresponding outdoor temperature (orange). Note the spike in demand each morning as the building returns to normal space temperatures following overnight setback. The impact of ventilation is also apparent as daytime demand jumps to around five times overnight levels when the fans are running. The yellow and green curves are the recoverable heat from exhaust air and heat recovery chiller respectively.

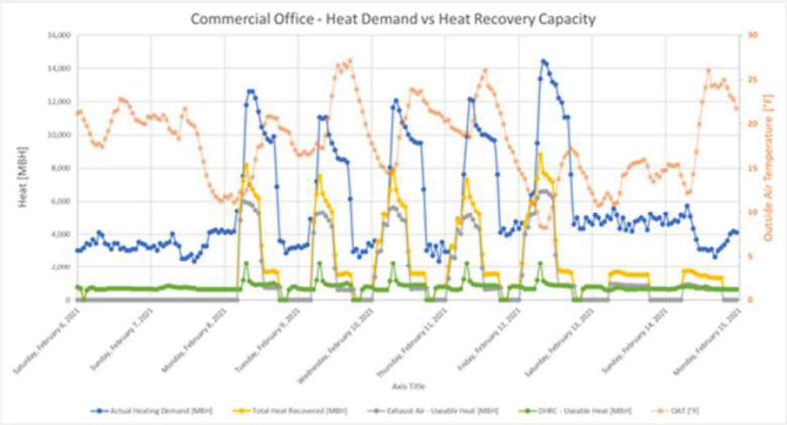

Figure N1 Office building gas demand and heat recovery profiles

Peak demand reductions due to these decarbonization measures are presented in Table N1, with the office building peak coming down by 50% and the school by as much as 80%. Heat recovery from washroom and general exhaust air systems to preheat incoming cold outside air is the dominant factor for reducing peak gas demand in commercial buildings. While every building is different, we anticipate these kinds of peak demand reductions in most buildings as net zero planning turns to implementation.

	Peak Demand MBH	Reductions (MBH) due to		Total Peak Reduction %
		Exhaust Air Heat Recovery	Heat Pump	
Commercial Office (Feb 2021)	14,433	6,596	1,147	53%
K-12 School (Jan 2019)	763	332	281	80%

Table N1 Peak gas demand reduction due to decarbonization measures

We again emphasize the importance of advanced gas metering (AMI), our recommendation 7, in enabling owners and Enbridge Gas to manage and significantly reduce peak gas demand. The modeling used for our evidence is based on hourly use data from two owners' independent metering systems. The data allow us to identify when peaks occur and take evidence-based action to reduce them. Very few owners now have this capability. The AMI will enable effective demand response by individual buildings and for the gas supply system as a whole (as we have had for well over a decade for electricity), providing additional insight for IRP, distribution system planning and customer connections.

b) *Enbridge Gas is proposing that the design criteria be determined using the coldest day on record, as measured by heating degree days (HDDs) for a specified timeframe, adjusted for wind speed, and is proposing to change the base temperature used to calculate HDD to 15°C. Does Enerlife recommend changes to this approach, based on its experience with commercial buildings? If so, please describe and provide rationale.*

Yes. As discussed in Sections 2.2 and 5.4 of our evidence, we see minimum outdoor temperatures rising steadily as a results of climate change, making "the coldest day on record" no longer appropriate. The 15°C base (balance) temperature is appropriate for commercial buildings today but will decline further over the coming years due to wider adoption of energy efficiency and decarbonization measures.

N. M3. Staff-3

a) *Enerlife notes the emissions reduction targets for the building sector in Canada's 2030 Emissions Reduction Plan as support for the proposed 30% reduction in gas use by 2030, as well as the technical potential arising from top quartile target gas savings potential results. Are there other factors that suggest to Enerlife that a 30% reduction in commercial sector gas volumes by 2030 has a reasonable likelihood of being achieved? If so, please describe.*

Yes. The Simcoe County District School Board and Cadillac Fairview are among the growing number of commercial owners taking systematic action for more than a decade to meet these top-quartile targets. There is ample evidence showing these targets to be achievable and demonstrating how. Climate Challenge Network's programs in healthcare, municipalities, K-12 schools and post-secondary institutions have documented case studies and savings achieved https://climatechallengenetwork.org/ . The data presented in Sections 4.1 and 4.2 of our evidence reinforce this conclusion, showing how previously unreported and unexplained gas use increases in hundreds of existing buildings have been masking actual progress being made while many new buildings are failing to meet, often by a wide margin, the energy efficiency levels they should be capable of. Fixing these issues with current and future DSM programming will

substantially impact demand growth trends for commercial buildings. The accumulating evidence is clear that this "technical potential" is also economic and achievable, as well as essential for meeting climate targets.

b) *Clarify if BOMA is requesting the OEB to consider a volume forecast for 2030. If yes, please explain why a volume forecast for 2030 is relevant for setting 2024 rates.*

Yes, BOMA is asking the OEB to consider this change in trajectory in gas demand for commercial and multi-residential buildings in all aspects of the rebasing proceeding, including demand forecasts, capital planning, bill impacts and the P2NZ directional planning.

c) *Confirm that the requested rate term in this application ends in 2028 and a volume forecast for 2030 will be considered in Enbridge Gas's next rebasing application.*

Confirmed that this rebasing period ends in 2028 and the next rebasing application will consider what, by then, will be further evidence of the rapid changes happening to demand for natural gas by commercial buildings.

d) *Does Enerlife believe that the risk of natural gas volumes for Enbridge Gas's commercial customers being lower than forecast, and the subsequent impacts to operating revenues, within the rebasing term are sufficiently addressed through Enbridge Gas's proposed rate design and its requested deferral and variance accounts (e.g., the Volume Variance Deferral Account and the Lost Revenue Adjustment Variance Account)? Why or why not?*

We understand (but have not examined) that these variance accounts should effectively mitigate Enbridge Gas risk by truing up general service revenues for variances in weather and customer usage, as well as compensating Enbridge Gas for loss of distribution margin due to lower volumes arising from its DSM programs. It is less clear to us whether risks to commercial customers of significantly lower volumes are identified or mitigated. Our proposal to apply an alternative 30% reduction scenario by 2030 seeks to surface and quantify bill impacts, as well as changes to capital expenditures, operating costs and any other factors affected.

N. M3. Staff-4

Enerlife discusses practical pathways to net zero for commercial buildings, including air source and ground source heat pumps. Enbridge Gas describes its forecasting assumptions for changes to the general service customer forecast, which are based primarily on single-family residential buildings.
Note that one of the biggest differences in energy systems and usage between commercial and residential buildings is found in the large potential for reclaiming internal heat which is currently rejected outside through exhaust ventilation, air cooled condensers and cooling towers. High efficiency exhaust air heat recovery and heat recovery chillers are primary measures for reducing annual and peak heating demands as well as lowering consumption.

a) *Based on its experience in the commercial sector, does Enerlife have a perspective on the energy transition assumptions Enbridge Gas has made for its customer forecast (assumptions for new construction, replacement, and exit of existing customers), and whether these assumptions are appropriate for the commercial sector? Please provide any additional context as to differences in the likelihood of buildings fuel switching entirely away from natural gas in the commercial sector versus the residential sector.*

For this rebasing period, we are not yet seeing significant trends of owners in Ontario opting for all-electric heating plants in new construction and major renovations, or disconnecting from natural gas as part of energy efficiency and decarbonization retrofit projects. The incremental capital and operational cost of "the last mile" of heating requirements on the coldest day at this time are too high. We have no information to question Enbridge Gas's customer forecast for the commercial sector.

b) *Should new commercial buildings elect to connect to the natural gas system, does BOMA expect that customer connection costs (e.g., based on size of gas line) will be reduced, relative to business-as-usual, due to the implementation of net zero measures and technologies?*

Yes. We forecast large reductions in peak hourly and daily demand (due primarily to heat recovery, advanced controls and building envelope improvements) as well as annual consumption, which will reduce customer connection sizes as well as distribution and ultimately transmission system sizes.

Response to Interrogatory from Enbridge Gas

N. M3-EGI-23

The summary of BOMA's evidence provides seven recommendations.
Question(s):

Please advise as to what order(s), determination(s) or direction(s) BOMA is seeking from the OEB for each of the seven recommendations and how these order(s), determination(s) or direction(s) relate to the specific issues set out in the approved issues list for this proceeding.

See also our response to N. M3. Staff-1. With respect to each of the recommendations, BOMA seeks the following determinations and direction from the OEB:

1. Direct Enbridge Gas to evaluate and report on implications with respect to planned capital spends, bill escalation and any other impacts to commercial customers over the rebasing term (Issues 3, 6 and 8) of reductions in weather normalized gas use for the commercial buildings' sector (general service and contract customers), relative to the forecast presented in evidence, of:
    a. 5% in 2025
    b. 10% in 2026
    c. 15% in 2027 and
    d. 20% in 2028
2. Direct Enbridge Gas to incorporate the specific measures, costs and emissions reductions of commercial building types, including gas and electricity distribution impacts, into the Guidehouse P2NZ scenario modeling (Issue 3) rather than simply relying on the residential sector.
3. Consider the DSM programming recommendations (Section 6.2 of our evidence) in the upcoming Achievable Potential Study, as well as the next multi-year DSM framework for the commercial buildings and multi-residential sectors, being mindful of significant scaling up of targeted reductions and the importance of alignment with empirical data rather than relying on assumptions and calculations.
4. Achievable Potential – direct staff to fully incorporate the rapidly growing availability of empirical data to produce more reliable and actionable energy and emissions reduction forecasts in the upcoming APS.
5. Direct Enbridge Gas to reflect changes in gas demand peaks, load shape and balance temperature, as well as annual volumes, due to actions by commercial building owners related to energy transition and targeted IRP, in the Asset Management Plan (Issues 3, 6 and 10).
6. Prioritize the need for accurate monthly consumption data and interval gas metering of commercial buildings to support owners' efficiency and decarbonization plans in the scorecard Performance Metrics (Issue 49).
7. Direct Enbridge Gas to rapidly deploy AMI for commercial general service customers as an essential support for achieving Ontario's and Canada's emissions reduction targets.