David I. Poch Barrister tel. (613) 264-0055 fax (613) 264-2878

March 25, 2020

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

Attn: Christine E. Long, Registrar and Board Secretary

By electronic filing and e-mail

Dear Ms Long:

Re: EB-2019-0159 Enbridge Gas Inc. 2021 Dawn Parkway Expansion
GEC initial interrogatories

Attached please find GEC's initial interrogatories in this matter. Pursuant to the Board's letter of March 26th, we will be filing additional interrogatories on or before April 3rd.

Sincerely,

David Poch

Cc: Z. Crnojacki, M. Millar, all parties

1649 Old Brooke Road, Maberly, Ontario K0H 2B0 e-mail: dpoch@eelaw.ca

EB-2019-0159

GEC Initial Interrogatories

1. Regarding Exh. A, Tab 3, p. 2, please provide a table showing both (i) total annual throughput, (ii) peak day throughput, (iii) peak hour throughput and (iv) design day throughput for the Dawn Parkway System for every year including the winter of 2017/2018 through the winter of 2040/2041 (actuals for past years/winters, forecast for current and future winters). Please provide the information separately for:
    a. In-franchise
        i. For end use customers other than electric generators (i.e. those who burn gas for end uses in their homes and businesses) for each Enbridge and Union rate zone
        ii. For electric generators (i.e. those who burn gas to supply electricity to the Ontario electric grid) for each Enbridge and Union rate zone
    b. Ex-franchise
        i. Provide a breakdown by recipient
2. Regarding Exh. A, Tab 3, p. 6 where Enbridge states that the estimated impact on total bills will be less than $1.50 per year,
    a. Is that the estimated impact on all customer bills, residential or business? If not, what is it?
    b. How many customers in each rate class would incur this impact?
    c. Is that the rate impact in the first year, or a levelized rate impact over the life of the project, or something else? Please specify.
    d. For how many years would this impact be experienced by ratepayers?
    e. Please provide the forecast rate impact separately for each rate class and for each year over which the project would recover costs from ratepayers.
    f. Please provide an Excel file containing all the assumptions and calculations (with formulae intact) underlying the rate impact estimate of $1.50, as well as the response to part "e" of this question.
3. Regarding Exh. A, Tab 3, p. 8, please provide a copy of Enbridge's most recent Asset Management Plan.
4. On Exh. A., Tab 7, Attachment 1, p. 6, Enbridge states that the design day weather condition for the Union South rate zone is 43.1 heating degree days, or an average daily temperature of -25.1 C, which is based on the coldest day experienced in London, Ontario between 1953 and 2019. The Company goes on to say that a similar approach is used for other regions, presumably based on historical weather for cities representative of those other regions.
    a. Please identify the coldest day in each year since 1953 for London, as well as the number of heating degree days and average temperature on each of those days.
    b. Please identify the following for each of the other cities whose historic weather data Enbridge relies upon to estimate design day demand:
        i. The name of the city,
        ii. the region or zone for which that city is used as a reference,
        iii. the span of years (analogous to 1953 through 2019 for London) of historic weather data used to establish the coldest day for each city/region,

iv. the date of the coldest day, the number of heating degree days and the average temperature during the coldest day in each year for which records are available (i.e. for each year in the spans referenced in part "iii");
v. the date and year of the coldest day on record during the span of years for which records are available (i.e. the coldest day in the spans referenced in part "iii"); and
vi. the heating degree days and average temperature during the coldest day on record.

c. Given that temperatures have been increasing across North America due to climate change, why is it appropriate to use the coldest day on record to estimate design day demand, rather than the coldest day in, for example, the last 20 years?
d. Approximately what portion of the design day demand on the Dawn Parkway System is associated with space heating?
e. Approximately what portion of the average peak day demand on the Dawn Parkway system over the past 20 years is associated with space heating?
f. What is Enbridge's best estimate of the ratio of design day demand to average annual peak day demand over the past 20 years for the Dawn Parkway System?

5. Regarding Exh. A, Tab 3, Sch. 1 and the Company's definition of "peak day", for each of the last 30 years, please provide:
    a. The date of the peak day on the Dawn Parkway System;
    b. The average outdoor temperature(s) on the peak day;
    c. The difference between the outdoor temperature(s) on the peak day and the outdoor temperature(s) under the Company's current definition demand day;
    d. The actual peak day gas demand (GJ/day) on the Dawn Parkway System; and
    e. What the design day demand would have been estimated to be using the Company's current definition of demand day.
6. In Exh. A, Tab 3, Sch. 1, the Company provides a definition for "peak hour".
    a. How are peak hours used, if at all, in the Company's planning for capacity needs on the Dawn Parkway System?
    b. How are peak hours used in planning for capacity needs on other aspects of the Company's system?
7. What is Enbridge's best estimate of the percent of annual gas that is moved through the Dawn Hub to its end use customers in Ontario that is lost – i.e. does not arrive at the customers' meters – due to leakage and/or other forms of loss?
8. In Exh. A, Tab 4, Enbridge describes its service districts as being comprised of three regions in the EGD Rate Zone (Central, Niagara, and Eastern) plus two Union Rate Zones (north and south). For each of these five regions, please provide the following:
    a. The number of each of the following types of customers Enbridge serves:
        i. Residential single family (please provide definition used)
        ii. Residential multi-family housing units that are individually metered
        iii. Residential multi-family buildings that are master-metered
        iv. Small commercial and industrial, excluding electric generators producing electricity for the Ontario grid (please provide definition used)
        v. Large commercial and industrial, excluding electric generators producing electricity for the Ontario grid (please provide definition used)
        vi. Electric generators producing electricity for the Ontario grid

vii. The sum of all customers (all the above)

b. The following averages for the current year (2020) for each of the customer types in part "a" of this question:
   i. Average annual m3 (e.g. average annual m3 per single family home, per multi-family apartment, etc.)
   ii. Average peak day m3
   iii. Average design day m3

Please provide this information in a table comparable to the following, in both PDF and live Excel (with formulae intact) format:

		Enbridge Central	Enbridge Niagara	Enbridge Eastern	Union South	Union North	Total
SF homes							
1	Total Customers						
2	Current Avg Annual m3						
3	Current Avg peak day m3						
4	Current Avg Design Day m3						
MF Units (individually-metered)							
1	Total Customers						
2	Current Avg Annual m3						
3	Current Avg peak day m3						
4	Current Avg Design Day m3						
MF Master-Metered Bldgs							
1	Total Customers						
2	Current Avg Annual m3						
3	Current Avg peak day m3						
4	Current Avg Design Day m3						
Small C&I							
1	Total Customers						
2	Current Avg Annual m3						
3	Current Avg peak day m3						
4	Current Avg Design Day m3						
Large C&I							
1	Total Customers						
2	Current Avg Annual m3						
3	Current Avg peak day m3						
4	Current Avg Design Day m3						
Generators							
1	Total Customers						
2	Current Avg Annual m3						
3	Current Avg peak day m3						
4	Current Avg Design Day m3						
Total							
1	Total Customers						

9. In Exh. A, Tab 4, Enbridge describes its service districts as being comprised of three regions in the EGD Rate Zone (Central, Niagara, and Eastern) plus two Union Rate Zones (north and

south). For each of these five regions/zones, please provide the following, both in a PDF table and a live Excel file:

a. The following historic consumption/demand information for all customers in each region/zone (whether or not served by the Dawn Parkway System) for each of the last five years, separately for each of the types of customers identified in GEC/ED question "8a":
    i. Total number of customers
    ii. Total actual annual consumption of gas for each customer type
    iii. Total actual (or estimated, if actual is not available) peak day demand for each customer type
    iv. Total estimated design day demand for each customer type
b. The following forecast consumption demand for the current year and each of the next ten years:
    i. Total annual consumption of gas for each customer type
    ii. Total peak day demand for each customer type
    iii. Total design day demand for each customer type

Please provide this information in five separate tables (one for each region/zone) comparable to the following (though the "years columns" should be expressed in the form used by Enbridge to forecast demand instead of calendar years – please specify what those are), in both PDF and live Excel format:

EGD or Union Region/Zone		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
SF homes																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																
MF Units (individually-metered)																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																
MF Master-Metered Bldgs																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																
Small C&I																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																
Large C&I																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																
Generators																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																
Total (sum of six customer types)																	
a	Total Customers																
b	Total Annual m3																
c	Total Peak Day m3																
d	total design day m3																

10. In Exh. A, Tab 4, Enbridge describes its service districts as being comprised of three regions in the EGD Rate Zone (Central, Niagara, and Eastern) plus two Union Rate Zones (north and south). For each of these five regions/zones, please provide the following:
    a. The percentage of customers, annual m3 consumption, peak day consumption and design day consumption served by the Dawn Parkway System for each of the following types of customer:
        i. Residential single family (please provide definition used)
        ii. Residential multi-family housing units that are individually metered
        iii. Residential multi-family buildings that are master-metered
        iv. Small commercial and industrial, excluding electric generators producing electricity for the Ontario grid (please provide definition used)
        v. Large commercial and industrial, excluding electric generators producing electricity for the Ontario grid (please provide definition used)
        vi. Electric generators producing electricity for the Ontario grid
        vii. All customers (all the above)

b. If different than the response to part "a" of this question, the percentage of customers, annual m3 consumption, peak day consumption and design day consumption downstream of the proposed pipeline project (i.e. whose demands affect the need for the pipeline). Note: if different than the response to part "a" of this question, please explain why.

Please provide both tables, in both in PDF and a live Excel format (with formulae intact) in the following format:

		Enbridge Central	Enbridge Niagara	Enbridge Eastern	Union South	Union North	Total
SF homes							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						
MF Units (individually-metered)							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						
MF Master-Metered Bldgs							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						
Small C&I							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						
Large C&I							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						
Generators							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						
Total							
1	% of Customers						
2	% of Annual m3						
3	% of peak day m3						
4	% of Design Day m3						

11. Please provide the impacts of Enbridge and/or Union's DSM programs between 2015 and 2019, separately for each region/zone and for each customer type (per question "8a"). If data is not available broken out by region/zone, please provide aggregated data. Please include:
    a. The number of unique customers that have participated at least once, by customer type and region/zone
    b. The incremental annual gas savings achieved for each customer type by region/zone
    c. The Company's best estimate of the peak day gas savings achieved for each customer type by region/zone
    d. The Company's best estimate of the design day gas savings achieved for each customer type by region/zone
12. For both Enbridge's and Union's Residential Retrofit DSM programs, please provide the following for each year from 2015 through 2019, as well as the Company's best forecast for 2020 and 2021:
    a. The number of customers who received an initial assessment of savings opportunities, an energy audit and/or EnerGuide rating
    b. The number of customers who received an initial assessment of savings opportunities, an energy audit and/or EnerGuide rating for whom one or more major measures were recommended, including both those that followed through on the recommendations and those who did not
    c. The number of customers who followed through on at least some recommendations for some recommended major measures and participated in the program
    d. The average pre-treatment EnerGuide rating for participants
    e. The average post-treatment EnerGuide rating for participants
    f. The average per home annual gas (m3) savings for participants
    g. The average per home annual electric energy (kWh) savings for participants
    h. The fraction of the participating customers for which each of the following measures were both (1) recommended and (2) installed:
        i. Furnace or boiler replacement
        ii. Water heater replacement
        iii. Attic insulation
        iv. Wall insulation
        v. Basement wall insulation
        vi. Air sealing
        vii. Duct sealing
        viii. Duct insulation
        ix. Other major measures (specify)
    i. The average rebate paid to participating customers
    j. The average rebate paid to participating customers as a portion of estimated incremental cost of measures installed
13. On Exh A., Tab 7, p. 23, Enbridge states that the Dawn Parkway System shortfall is 120,776 GJ/d for the winter of 2021/2022 and 164,798 GJ/d for the winter of 2022/2023.
    a. Are those forecast shortfalls net of (i.e. after subtracting the demand savings from) the Company's past, current ***and future*** energy efficiency programs?
    b. If the answer to part "a" is no, why not?
    c. If the answer to part "a" is yes, what level of energy efficiency programming did Enbridge assume when estimating the capacity shortfall? What did Enbridge assume

about the level of savings that its efficiency programs produce from customers whose demands contribute to the Dawn Parkway System demand. Specifically, please provide the following estimates of what Enbridge assumed that its efficiency programs in the years 2019/2020, 2020/2021, 2021/2022 and 2022/2023 would produce from both its programs as a whole and from the subset of its customers whose demands affect the need for the proposed pipeline project:

i. Incremental annual energy savings (m3)
ii. Cumulative persisting annual energy savings (m3)
iii. Incremental peak day savings (m3/d)
iv. Cumulative persisting annual peak day savings (m3/d)
v. Incremental design day savings (m3/d)
vi. Cumulative persisting design day savings (m3/d)

14. On Exh A., Tab 7, pp. 23-24, Enbridge states and reducing 92,174 GJ/d of the forecast Dawn Parkway System capacity shortfall would be equivalent to "eliminating the entire design day demand for the city of Guelph within two years."
    a. What is 92,174 GJ/d as a percent of the total forecast Dawn Parkway System design day demand in the winter of 2021/2022?
    b. What is Enbridge's best estimate of the design day savings – in GJ/d – that its current efficiency programs produce each year from customers served by the Dawn Parkway System? Please provide all calculations and assumptions underpinning the estimate provided.
    c. If the 92,174 GJ/d of design day savings were to be achieved in two equal annual increments of 46,087 GJ/d, what would that 46,087 GJ/d of increased design day savings be relative to the level of design day savings that Enbridge estimates its current energy efficiency programs produce each year? Would achieving that additional savings require a 25% increase, 50% increase, 100% increase, 200% increase – or some other percentage increase – in current annual efficiency savings levels? Please provide the basis, including all assumptions and calculations, underpinning the response.
    d. Has Enbridge actually performed an analysis to determine whether 92,174 GJ/d of design day savings is achievable within two years? If so, please provide that analysis?
    e. Is it Enbridge's opinion that it is not possible to achieve 92,174 GJ/d of design day demand savings in two years through a combination of geographically targeted efficiency and/or gas demand response? If so, what is the basis for that opinion?
    f. How many GJ/d of design day demand savings would Enbridge estimate to be achievable from geotargeted efficiency and/or demand response in two years?
    g. In answering the above questions, please indicate whether Enbridge has included consideration of incremental electric CDM that could be undertaken to reduce peak day gas-fired electricity impacts on the Dawn Parkway System.
15. On Exh A. Tab 7, p. 24, Enbridge offers several reasons why it states that geo-targeting of DSM "is not a reasonable solution". The first reason is that "design day demand growth forecasted in subsequent years would require commensurate incremental IRPAs sufficient to reduce demand growth or expansion of the Dawn Parkway System."
    a. What is Enbridge's forecast of the design day demand growth in each of the subsequent ten years? What is the basis for that forecast?
    b. What is Enbridge's estimate of the design day capacity shortfall, absent any IRPAs, in each of the subsequent ten years?

c. What does Enbridge mean by “commensurate incremental IRPAs”?
d. Has Enbridge conducted an analysis to determine the maximum amount of cost-effective energy efficiency and demand response savings that it could achieve each year over the next ten years? If so, please provide that analysis. If not, what is the basis for the suggestion that “commensurate incremental IRPAs sufficient to reduce demand growth or expansion” could not be achieved?

16. On Exh A. Tab 7, p. 24, Enbridge offers several reasons why it states that geo-targeting of DSM “is not a reasonable solution”. The second reason is that there is uncertainty regarding whether forecast savings from incremental IRPAs would be realized, and that if they are not realized the Company would be forced “to purchase alternative solutions at a cost premium”.
    a. Would the Company agree that the need for the capacity addition is predicated on the Company’s demand forecast?
    b. Would the Company agree that all demand forecasts inherently have some uncertainty associated with them?
    c. Is the Company suggesting that the uncertainty associated with forecast efficiency savings is inherently greater than the uncertainty associated with its load forecast? If so, what is the basis for that suggestion?
    d. Please provide the details of the Company’s analyses of cost premiums associated with IRPA shortfalls. Specifically, which alternative solutions would need to be pursued, what would their annual costs be and how long would they need to be in place?
17. On Exh A. Tab 7, p. 24, Enbridge offers several reasons why it states that geo-targeting of DSM “is not a reasonable solution”. A part of the third reason is that there is a “lack of information on the ability of natural gas DSM programs to impact peak demand…” Has Enbridge conducted any studies over the past decade to improve its ability to assess the impacts of any efficiency measures or programs on peak demand? If so, please describe all such studies and provide copies of any memos, reports and other documentation available regarding the results of such studies.
18. On Exh A. Tab 7, pp. 24-25, Enbridge offers several reasons why it states that geo-targeting of DSM “is not a reasonable solution”. A part of the third reason is that “…given the need to evaluate the impacts of the IRPA, the program would need to be completed or demonstrating measurable results, at least three years prior to the date at which the additional capacity provided by the infrastructure project was initially proposed to be required” which means that “a successful IRPA would need to be approved and put into motion no less than four years prior to the expected in-service date of the preferred facility alternative.”
    a. Enbridge is proposing an in-service date of November 1, 2021 for its proposed pipeline project and seeking approval for it in the Spring of 2020. Why would an IRPA need to demonstrate results at least three years prior to the date at which the infrastructure project would otherwise be needed if the Company only needs a year and a half or so of lead time to put this project in place?
    b. If an IRPA would need to be approved and put into motion at least four years prior to the in-service date of a facility alternative, and assuming that it would take at least a year to analyze and develop IRPAs and get them approved by the OEB, does that mean IRPAs could only be viable alternatives to supply-side investment needs identified more than five years ahead of time? If not, why not? If so, does Enbridge regularly produce forecasts of potential future supply-side infrastructure investments ten years into the future? If not, why not?

c. When did Enbridge first become aware of the potential for capacity shortfall on the Dawn Parkway System? Did it immediately begin an analysis of alternatives, including IRPAs at that time? Please provide documentation to support the answers.

19. Regarding Exhibit A, Tab 8, Schedule 5:
    a. Regarding the gas cost of $0.13/m3:
        i. What does this cost represent?
        ii. Is it just the commodity cost, or does it include other variable charges on customers' bills? If it is just the commodity cost, why does it not include other variable charges on customers' bills?
        iii. Is it an average for all residential, commercial, industrial and electric generator customers? If not, for what types of customers does it apply? Please provide the equivalent value separately for residential, small business, large business and electric generator customers.
    b. Regarding the $0.89/m3 for electricity:
        i. What does this represent?
        ii. Is it the average annual wholesale cost or the average retail cost of electricity or something else? Please explain.
        iii. Is it an average for all residential, commercial and industrial customers? If not, for what types of customers does it apply? Please provide the equivalent value separately for residential, small business, and large business customers.
        iv. How did Enbridge convert electricity costs to m3? Please provide assumptions and calculations used.
        v. When converting electricity costs to m3, what did Enbridge assume about the difference in efficiency of gas systems and electric systems? Specifically, did the Company assume the use of a high efficiency cold climate heat pump? If so, at what average annual coefficient of performance (COP)?
        vi. Please provide all assumptions and calculations used to develop the $0.89/m3 estimate.
    c. What is the basis for the assumed fuel mix?
    d. What was assumed about the carbon intensity per m3 of electricity when applying carbon prices for each of the next 20 years? What were those assumptions based upon? Please provide specific references.
    e. When comparing costs of different fuels, did the Company also consider differences in capital costs for gas heating, water heating and other equipment (e.g. the difference in cost between a centrally ducted heat pump in a home and the combination of a gas furnace and central air conditioner in the same home)? If not, why not?
    f. For each of the past three years, what was the average cost per single family home associated with connecting a new customer to Enbridge's gas distribution system:
        i. To Enbridge?
        ii. To the customer or builder?
    g. When comparing the costs of using different alternative fuels, did the Company consider the cost savings associated with not incurring the cost of a gas hook-up? If not, why not?
    h. What did Enbridge assume about real (inflation-adjusted) changes in future fuel prices for natural gas and the alternative fuels analyzed?

i. Please provide an Excel file showing all underlying assumptions and calculations (formulae intact) underpinning the analysis summarized in Tab 8, Schedule 5.

20. Regarding Exhibit A, Tab 7, Attachment 1, Enbridge states that it develops its estimates of design day demands from General Service and Contract Rate customers "from a regression analysis of actual measured demands and degree days", either from the previous winter season (General Service) or from a combination of the previous season and daily contracted demand (Contract Rate).
    a. Would Enbridge agree that this essentially means that space heating consumption on design days is assumed to be a largely linear function of heating degree days? If not, please explain why not?
    b. Would Enbridge agree that it would be reasonable to assume that design day savings from a space heating efficiency measure would be approximately equal to (1) annual m3 savings multiplied by (2) the ratio of design day heating degree days to total annual heating degree days (e.g. for a space heating measure that saved 100 m3 per year for a region with 50 design day heating degree days and 5000 annual average heating degree days, that the design day savings would be 100 x 50/5000 = 1 m3)? If not, why not?
21. Please provide a copy of all the avoided costs assumptions (gas, electricity, and water) most recently developed by Enbridge to assess the cost-effectiveness of its efficiency programs.
22. Please describe and document all current gas demand response initiatives operated by Enbridge. As part of the response, please provide the following:
    a. A list of all initiatives
    b. The design of the initiative, including the type of customer targeted (e.g. residential, small business, large C&I), financial incentives paid to participants and the Company's approach to marketing it to and recruiting customers/participants
    c. The number of customers currently participating in each initiative
    d. The portion of participating customers served by the Dawn Parkway System
    e. The estimated peak hour, peak day and design day savings each initiative is estimated to produce for the Dawn Parkway System – both per participating DR customer (on average) and in aggregate for all such customers
    f. How much Enbridge believes it could increase DR participation and savings from customers served by the Dawn Parkway System and over what period of time, as well as the basis for that assessment.
23. In Exh. A, Tab 13, p. 2, Enbridge notes that the OEB "expects the natural gas utilities to develop more rigorous, robust and comprehensive procedures to ensure conservation and energy efficiency opportunities can be reasonably considered as alternatives to future capital projects."
    a. Would Enbridge agree that performing field studies of the peak day and peak hour impacts of key efficiency measures would be one way to develop such "rigorous, robust and comprehensive procedures"? If not, why not?
    b. Please provide a description of all such studies made by Enbridge, including the date each study commenced and results to date.
24. On Exh. A, Tab 13, pp. 2-3, Enbridge states that one reason for its inclusion of its IRP proposal in its filing was to "establish the necessary policy guidance…including acknowledgement of Advanced Metering Infrastructure ('AMI') as an IRP enabling element." Is the Company suggesting that AMI deployment is necessary – a prerequisite – to considering and deploying

IRPAs, or just that it is one option (among others) for enabling IRPAs? Please explain the rationale for the response.

25. On Exh. A, Tab 13, p. 20, Table 13-3, Enbridge presents its Stage 1 analysis of IRPAs versus the proposed pipeline project.
    a. Please explain how the capital costs and capacity savings from the "traditional DSM" were derived. Footnote 16 suggests they are "based on" the 2016 DSM program year approved verified costs and savings. Please provide the actual assumptions, with reference to specific values in the 2016 DSM audit reports (and/or other documents) and mathematical calculations used to derive the values presented in the Table.
    b. Please explain how the capital costs and capacity savings from the APS were derived. What APS scenario was used and why? Please provide the actual assumptions – with reference to specific pages, tables and values in the APS – and mathematical calculations used to derive the values presented in the Table.
    c. Please explain how the estimated annual cost of the pipeline "project", "Traditional DSM" and "APS" were derived. Are these the up-front costs amortized over a certain number of years? If so, over how many years for each of the three scenarios? At what discount rate? Please provide the actual calculation of these values.
    d. Is the number of years over which the estimated annual costs would be incurred different for the pipeline project than for the DSM alternatives? If not, why not? Isn't Enbridge planning to recover the cost of the pipeline over a longer period of time than the average measure life of the DSM measures considered?
    e. Why is it appropriate to compare only the costs of the pipeline project to only the costs of DSM alternatives? Since the efficiency programs also save energy (whereas the pipeline project does not), wouldn't it be more appropriate to compare the cost of the pipeline to the ***net*** cost of DSM – i.e. the cost of the efficiency programs minus the net present value of the avoided energy costs, avoided carbon emissions taxes, avoided electricity and water savings and other avoided costs? If not, why not?
    f. Please provide all analyses supporting the values in Table 13-3 in Excel with formulae intact.
26. Please provide the total annual throughput of gas for Enbridge (all regions and zones, including Union zones) for each of the past 10 years and forecast for each of the next ten years as follows:
    a. Total (all customers)
    b. Total excluding sales to electric generators
    c. Totals broken down by rate class
27. As also requested in an Interrogatory in EB-2019-0271, please provide an Excel spreadsheet, with formulae and calculations intact, that shows the following for each efficiency measure and for each program – separately for Enbridge and Union Gas – that was supported in 2017, 2018 and 2019:
    a. The program name
    b. The measure name and description
    c. The per unit gas savings (m3), electric savings (kWh), water savings (litres), incremental cost, measure life and net-to-gross assumption used to estimate savings achieved in each year. For programs for which measure level data are not available (e.g. because savings are tracked at a measure bundle or program level only), as well as for C&I

custom programs, please provide average per participant savings, incremental cost, measure life for the measure bundle.

d. The actual number of participants per measure (or measure bundle or C&I Custom program).
e. The gross realization rate adjustment factor applied (for the years for which it is available)
f. The net-to-gross assumption used at the measure level (if applicable) or at the program level (if not applicable at the measure level).
g. A computation of the net first year savings per measure (per measure savings multiplied by number of measures/participants multiplied by the gross realization rate multiplied by the net-to-gross ratio).
h. A computation of the net lifetime savings per measure (per measure first year savings multiplied by measure life)
i. The sum of net savings, both first year and lifetime, across all measures in each program and for the portfolio as a whole.
j. The rebate level (or average rebate level for measures or measure bundles for which rebate levels vary by customer or project).
k. Total rebate payments by measure (or measure bundle), program and program portfolio.
l. Total non-rebate spending by program, including non-resource acquisition programs, and for the portfolio as a whole, broken down by any sub-categories that are separately tracked.

28. As also requested in an Interrogatory in EB-2019-0271, please provide participation levels – in each way that they may have been tracked – for each non-resource acquisition program for Union and Enbridge in 2017, 2018 and 2019.
29. Enbridge references the 5 year gas supply plans as basis for the amount of capacity need (EB-2019-0137). Page 31 of the supply plan describes the following steps in the demand forecast estimation (Page 69 of the supply plan describes similar steps for the Union rate zones):

> *1. Forecast the annual average number of billed customers for each rate class and sector for 2020-2024.* The annual average number of customers forecast is a combination of historical number of customers and forecasted customer additions. Residential, apartment, commercial and industrial customer additions are comprised of the new construction and replacement markets. The residential sector accounts for over 90% of the EGD rate zone forecast customer additions.
>
> *2. Forecast the normalized average consumption ("NAC") for each revenue/rate class and sector.*
> *3. Multiply the forecasted number of customers by their respective NAC forecasts to obtain the total general service throughput volume forecast*
>
> *4. Remove the forecasted volume savings resulting from natural conservation and DSM programs from the total general service throughput forecast.* DSM volumes are forecasted based on the 2015-2020 DSM plan approved by the Board in EB-2015-0049, historical actual achievement and best-available verification results.

a. Please provide a table covering all rates zones indicating:

i. the forecast the annual average number of billed customers for each rate class and sector for 2020-2024,
ii. the forecast the normalized average consumption ("NAC") for each revenue/rate class and sector,
iii. the total general service throughput volume forecast (the forecasted number of customers multiplied by their respective NAC forecasts to obtain),
iv. the forecasted volume savings related to DSM programs from the total general service throughput forecast, and
v. the general service throughput forecast minus the DSM forecast.

b. Please the table referenced in (a) separately for each rate zone.
c. Please provide a breakdown for each year from 2020-2024 between the (i) natural conservation (m3) and (ii) DSM programs (m3) accounted for in step 4 referenced above.
d. How is DSM accounted for the design day demand calculations underlying the supply plan?
e. Please complete the following table for (i) all rate zones and (ii) only the rate zones that will be served by the Hamilton Pipeline:

Design Day Demand Forecast per Supply Plan with DSM Broken Out			
	2020	…	2024
Forecast Design Day Demand (without DSM)			
Forecast DSM Savings for Design Day			
Total Forecast Design Day Demand			

f. To the extent not already included in the answers to the above, please file all spreadsheets and analysis underlying the demand forecast(s) in the 5-year supply plan and how energy efficiency is accounted-for therein.

30. Enbridge references the 5 year gas supply plans as basis for the amount of capacity need (EB-2019-0137). Pages 31 and 69 of the supply plan suggest different methodologies for considering DSM in the annual demand forecasts between Enbridge and Union:

> Enbridge: 4. *Remove the forecasted volume savings resulting from natural conservation and DSM programs from the total general service throughput forecast.* DSM volumes are forecasted based on the 2015-2020 DSM plan approved by the Board in EB-2015-0049, historical actual achievement and best-available verification results.
>
> Union: 4. *Remove the forecasted volume savings related to DSM programs from the total general service throughput forecast.* These DSM volume impacts correspond to the 2016-2020 DSM plan approved by the Board in EB-2015-0029

a. Please explain why Union and Enbridge took different approaches.
b. Please provide a revised Enbridge DSM forecast based on the Union methodology, and vice versa, and compare those to the figures included in the supply plan in a table.

c. For the Enbridge rate zones, the DSM forecast is based on "the 2015-2020 DSM plan approved by the Board in EB-2015-0049, historical actual achievement and best-available verification results." Please indicate for each year over 2020-2024 the difference (m3) between the forecast volume savings based on the DSM plan and the forecast volume savings based on the DSM plan adjusted for achievement and verification.