Elexicon Energy Inc.

Answer to Interrogatory from

Environmental Defence

Interrogatory ED-01:

Reference: Appendix B – Incremental Capital Module Whitby Smart Grid & Sustainable Brooklin

Preamble: Per page 11:

Table 1: WSG Net Benefits

Customer Annual Benefit Summary (All Dollars Listed in Thousands CAD)		
Cost of Power (WRZ)	$	108,526
Projected % Energy Savings from WSG		3.00%
Total Purchased Power Savings from WSG (A)	$	3,256
ICM Additional Revenue (B)	$	4,120
Additional OM&A Expenses (C)	$	324
Operating Efficiencies from WSG (D)	$	41
Sub-Total of Savings (E = A-B-C+D)	$	(1,147)
Projected VoLL Benefit from Reliability (F)	$	1,820
Annual Net Benefit to WSG Customers (G = E+F)	$	673

Questions:

(a) Please provide the net savings/costs from the WSG project expressed as a net present value and calculated over a 20 or 40 year period.

(b) Please provide an estimate of how much of the $26.6 million for the Sustainable Brooklin Project will be paid for by incremental distribution rates over the next 40 years. For instance, please provide a standard discounted cash flow and NPV analysis over 40 years that includes the forecast costs and distribution revenue from the forecast growth expected in this area. To help us understand the numbers, it would be helpful to file the excel spreadsheet that is used. If Elexicon believes a longer period is appropriate (e.g. because these are longer-lived assets), please use that period.

(c) Please provide the net savings/costs from the WSG and Sustainable Brooklin projects combined, expressed as a net present value and calculated over a 20 or 40 year period.

(d) Please confirm that the net benefits figures and table on pages 9 to 11 do not include:

i. For the Sustainable Brooklin Project:

A. For customers that would have purchased a DER or EV regardless of the investments, the incremental cost of having to retrofit their building to do so;

B. For customers who would not have purchased a DER or EV but for the investments, the incremental net benefits from the DER/EV (i.e. the net of the cost and the benefits, including reliability benefits from a battery or bi-directional EV charger; savings from the DER arising from peak shaving, generation revenue, substitution of electricity for gasoline, etc.);

ii. For the Whitby Smart Grid:

A. The specific value of transmission losses reductions being highest when demand and electricity costs are highest;

B. Customer benefits arising from DERs that are enabled by the project (e.g. by allowing greater DER penetration);

iii. For both:

A. Avoided costs of province-wide non-emitting generation capacity;

B. Contribution to potential future avoidance of transmission or distribution infrastructure;

C. Benefits to the economy (e.g. DER spending, and its contribution to the local economy); and

D. Greenhouse gas reductions, including the marginal cost of making equivalent reductions through other means.

(e) For each of the items listed in (d) above, please provide a rough estimate of the value of the benefit, or if that is not possible, please provide some commentary on the magnitude of the value.

(f) How did Elexicon value the reliability benefits in Table 1? Please explain and provide underlying calculations.

(g) Do the reliability benefits in Table 1 include the customer specific benefits from, for example, installing a bi-directional electric vehicle charger that can provide backup to a home?

(h) How did Elexicon value the energy benefits in Table 1? Please explain and provide underlying calculations. For instance, did Elexicon use the average wholesale price including HOEP and GA, or another method?

(i) Page 9 states: “The WSG and Sustainable Brooklin Projects are anticipated to provide an annual benefit to WRZ customers of $0.673MM”, which refers to the table on page 11 itemizing the benefit of the WSG only. Please confirm if the $0.673 million accounts for the costs and benefits of both the WSG and Sustainable Brooklin Projects, or just the WSG.

Response:

a) Please see table below for 20 Year NPV Benefit Calculation for the Whitby Smart Grid project:

Table 1 – 20 Year NPV Whitby Smart Grid Benefit Calculation

Customer 20yr NPV Benefit Summary (5% Discount)		
(All Dollars Listed in Thousands CAD)		
Total Purchased Power Savings from WSG	$	47,748
ICM Additional Revenue	$	42,346
Additional OM&A Expenses	$	4,747
Operating Efficiencies from WSG	$	601
Sub-Total of Savings	$	1,255
Projected VoLL Benefit from Reliability	$	26,689
NPV of Net Benefits (20 years) to WSG Customers	$	27,944

b) Please see Table 2 below for revenues per year and total revenues over 40 years from the Brooklin Developers constructing 700 homes for approximately 16 years to construct a total of 10,800 homes. Table 3 is a sensitivity analysis with various discount rates applied to the excel model. Please see Attachment 1 for the Excel workbook that supports the tables below.

Table 2 – Brooklin Developers Revenue Forecast

Forecasted Revenue ($000s)		
Baseline @ 5% Discount Rate	$	25,685

Table 3 – Brooklin Developers Revenue Forecast Discount Rate Sensitivity Analysis

Sensitivity Analysis ($000s)	
Discount Rate	**Forecasted Revenues**
2%	$ 34,949
3%	$ 31,461
4%	$ 28,392
5%	$ 25,685
6%	$ 23,292
7%	$ 21,172
8%	$ 19,290
9%	$ 17,616

c) Please see table below for 20 Year NPV Benefit Calculation inclusive of both the Sustainable Brooklin and Whitby Smart Grid projects:

Table 4 – 20 Year NPV Benefits From Sustainable Brooklin and Whitby Smart Grid

Customer 20yr NPV All Costs Benefit Summary (5% Discount)		
(All Dollars Listed in Thousands CAD)		
Total Purchased Power Savings from WSG	$	47,748
ICM Additional Revenue	$	65,393
Additional OM&A Expenses	$	4,747
Operating Efficiencies from WSG	$	601
Sub-Total of Savings	-$	21,792
Projected VoLL Benefit from Reliability	$	26,689
NPV of Net Benefits (20 years) to WSG Customers	$	4,897

d) Confirmation that the net benefits figures and table on pages 9 to 11 do not include:

i. For the Sustainable Brooklin Project:

A. Confirmed;

B. Confirmed;

ii. For the Whitby Smart Grid:

A. Confirmed;

B. Confirmed;

iii. For both:

A. Confirmed;

B. Confirmed;

C. Confirmed;

D. Confirmed;

(e) Elexicon expects to conduct additional research as part of its DER Enabling Program application that will provide stakeholders information on some of the savings categories outlined in part d above.

i. For the Sustainable Brooklin Project:

A. Elexicon does not have a specific cost estimate associated with retrofitting a non DER-and-EV-ready home to accept these technologies, and expects significant variance amongst different homeowners based on home size, configuration, types of finishes (e.g. finished vs. unfinished basement), and technology choice. In preparing a new construction home to be DER-and-EV-ready at an estimated cost of $2,260, labour is completed concurrent with all other in-home infrastructure in an unfinished setting. Given the expected need for a combination of drywall removal, retrofitting egress for conduit through floors and ceilings, the need to complete work in confined and restricted spaces (e.g. wall cut-outs), and the need for restoration (e.g. drywall repair and paint), it is not unreasonable to expect costs which are double the cost of creating a new construction home DER-and-EV-ready. In certain circumstances, Elexicon sees realistic scenarios where the cost could well exceed this amount.

B. Benefits to individual homeowners that install DERs or purchase EVs will vary by technology and home characteristics, and as noted Elexicon anticipates the preparation of additional research on these matters in the preparation of its DER Enabling Program. At a high-level, customers that elect to install solar photovoltaic systems can expect reductions to any variable component of their electricity bill with an estimated payback period of approximately 8 years[1], customers that elect to install battery storage can participate in rate arbitrage (i.e. reasonable amount of off-peak charging, on-peak power supply) with an estimated payback of

[1] Solar Rooftop installations range in costs from $13k-$20k, and optimistic savings estimates range from $1500-$2400 per year.

approximately 25 years at today's rates[2]. Rate structures are predicted to change by reducing the night time rate which will increase the rate differential and maybe as much as double the reduction in the payback period to approzimately 10 years. Customers whose homes have been roughed in for DER connections can expect to see about a 1 year improvement on the payback for both technologies. Customers will also have a reliable back-up power source, and customers that elect to purchase EV's will see protection from gasoline price volatility and have back-up power functionality depending on the technology combination chosen.

ii. For the Whitby Smart Grid:

A. Elexicon has not completed a quantitative analysis of the benefits cited. Elexicon expects reduced transmission losses during peak demand conditions would have the same impact as demand reductions at that time; avoidance of marginal power (likely gas-fired generation) with commensurate reductions to GHG emissions and the overall cost of power for Ontarians.

B. Please see i) B) above.

iii. For both:

A. Elexicon is not in a position to quantify the benefit of avoided costs relating to new, refurbished or extended non-emitting province-wide generation capacity due to the scale and number of variables at play. Elexicon does note however the Minister of Energy's recent announcement[3] regarding the need for additional provincial capacity beginning in 2025 and 2026. Additional DERs installed in the Whitby Rate Zone will contribute to efforts to balance province-wide demands with available and planned capacity.

B. With respect to future transmission capacity, Elexicon cannot quantify impacts of the Projects due to the scale and number of variables at play. Elexicon has however noted in evidence the potential benefits associated with material distribution infrastructure deferrals, should they prove feasible as a result of the Projects. Such benefits could prove to be as great as $9.94 million in the event a

[2] A single Tesla Powerwall is a 13.5kWhr battery. It can be charged at minimum rates and discharged at peak for a current price differential of about 10cents/kWhr or $1.35 x 365 ~$500/yr. A Tesla Powerwall has an estimated install cost of $12.5k.

[3] Minister of Energy, Ontario Building More Electricity Generation and Storage to Meet Growing Demand, October 7, 2022, <https://news.ontario.ca/en/release/1002373/ontario-building-more-electricity-generation-and-storage-to-meet-growing-demand>

TS or similar sized investment is deferred for a period of 5 years, assuming a 3% discount rate.

C. Qualitatively, the benefits to the economy are wide ranging. As shown in Table 1 of Appendix B, Elexicon forecasts a net benefit to customers as a result of the Whitby Smart Grid. This amount is representative of funds which will be available to customers to deploy elsewhere in the economy on goods and services. Should an infrastructure deferral prove feasible as a result of the Projects, the economic beneifts of deferral will similarly result in more available funds in consumer hands to be deployed on other goods and services besides energy. In addition, the incremental costs incurred by developers to construct DER-and-EV-ready homes will boost the revenues of contractors participating in development, while firms specializing in DER and EV installations will benefit from increased business, which may in turn yield price reductions over time, all else equal.

D. Elexicon has provided an estimate of the GHG reductions achieved from 2022 to 2041 via the Whitby Smart Grid at Appendix B-1, page 34. These reductions total 202,977 TCO_2e. For illustration, overlaying these forecast emission reductions against the Government of Canada's planned minimum national price on carbon yields net present value savings over 20 years of $24.0 million at a 3% discount rate, $19.3 million at a 5% discount rate, and $14.3 million at an 8% discount rate.[4]

(f) Please see Elexicon Energy's response to VECC-02.

(g) The reliability benefits in Table 1 do not include customer specific benefits from installing a bi-directional electric vehicle charger that can provide backup to a home.

(h) Please see Elexicon Energy's response to VECC-02.

(i) Not confirmed. The $0.673 million benefit in Table 1 accounts for the costs and benefits of the Whitby Smart Grid

[4] The values presented are based solely on the Government of Canada's minimum carbon price established to 2030, assuming 2% increases in 2031 and beyond. To the degree these values vary now or in the future from Output-based pricing systems or other approaches to carbon prices, such variances have not been incorporated into this analysis

Elexicon Energy Inc.

Answer to Interrogatory from

Environmental Defence

Interrogatory ED-02:

Reference: Appendix B – Incremental Capital Module Whitby Smart Grid & Sustainable Brooklin

Questions:

(a) Per page 47: "Homeowners that are not able to purchase DER-and-EV-Ready homes are forced to undergo expensive retrofits to accommodate the installation of Solar PV, battery storage, or electric vehicle charging infrastructure." Please provide a rough estimate of the number of customers that will avoid those retrofits, the approximate cost of those retrofits, and the total savings (over 20 years). We understand that this will involve significant uncertainty – please provide caveats and or a range of outcomes if that assists in addressing the uncertainty.

(b) Per page 47: "This will result in greater costs for customers, and lower uptake of DERs and EVs, resulting in lost opportunities". Please provide a rough estimate of the number of incremental customer uptake for DERs and EVs due to this project and the value to them of (i) backup, (ii) net electricity savings, and (iii) net energy savings by substituting electricity for gasoline. We understand that this will involve significant uncertainty – please provide caveats and or a range of outcomes if that assists in addressing the uncertainty.

(c) Rate riders are discussed on page 53. Please provide the average incremental monthly cost to residential ratepayers in 2023, 2024, and 2025 accounting for all the proposed ICM spending.

(d) When will the proposed ICM investments be fully paid-for via rates?

Response:

a) Elexicon's rough estimate of the minimum number of customers that would avoid costly retrofits is 700+ per year for 16 years. This estimate represents the Brooklin Landowner's Group's projected annual new home construction in North Brooklin.

   Elexicon does not have home retrofit costs or the total savings.

   Elexicon does not have a cost estimate for building retrofits to accommodate solar PV, battery storage or electric vehicle charging. Elexicon is not active in the building retrofit market. The only estimates which Elexicon has available are the costs to rough-in for the new builds provided by the Brooklin Developers included at Figure 2 of Appendix B of the Application.

b) Elexicon has not produced a forecast of customer installations of DERs and EVs. Elexicon expects to develop a forecast in its DER Enabling Program(s) as contemplated in Appendix B-3 based on OEB approval of the Whitby Smart Grid application. As noted in response to STAFF-9, one of the benefits of this project is to generate quantitative data to support such uptake assumptions in the future.

c) The average incremental monthly cost to residential ratepayers for 2023, 2024, and 2025 is outlined in Appendix B, Tables 12, 13 and 14.

Table 12 is specific to WRZ Sustainable Brooklin and the impact will be $2.74 effective 2023.

Table 13 is specific to WRZ Smart Grid and the impact will be $2.98 effective 2025.

Table 14 is specific to VRZ Smart Grid and the impact will be $.70 effective 2025

NOTE: The monthly cost impact of the Whitby Smart Grid on WRZ and VRZ customers does include Energy Savings benefits (i.e., VVO conservation savings) as shown in Table 1 WSG Net Benefits[1].

d) The proposed ICM investments will be fully paid-for via rates until such time as the assets are either fully depreciated or they are no longer used or useful. The cost of the proposed ICM investments will be recovered through rate riders which will be effective until the next rebasing (currently scheduled for 2029). At that time of rebasing, the assets will be included in Elexicon's rate base and will form part of the new distribution rates effective 2029. The calculation of distribution rates includes depreciation expense which is based on the useful life of the assets.

[1] Appendix B – Incremental Capital Module Whitby Smart Grid & Sustainable Brooklin, Page 11 of 56

Elexicon Energy Inc.

Answer to Interrogatory from

Environmental Defence

Interrogatory ED-03:

Reference: Appendix B-1 - Whitby Smart Grid Business Case

Questions:

(a) How many residential customers are in the area that will be served by the Whitby Smart Grid? Approximately how many and what percent of those are on a constrained feeder such that they cannot install a distributed energy resource? Of those, how many are restricted due to a distribution feeder versus a transmission feeder?

(b) Will the Whitby Smart Grid project help to mitigate short circuit capacity constraints and therefore allow more customers to connect DERs to the distribution system? Please explain.

(c) Will Elexicon be investing in dynamic control systems that would allow customers to connect to constrained feeders by ensuring, for instance, that neighbouring DERs do not operate at the same time to avoid short circuit constraint issues?

(d) Per page 24: "IEEE 1547 now recommends detailed engineering take place if the total DER on a feeder exceeds 33% of minimum load." What is the basis for this? Is it meant to ensure that the grid can balance load and generation without hitting thermal limits? Will the proposed project eliminate this 33% constraint, and if yes, how?

(e) On page 31, Elexicon describes having a DERMS to control distributed energy resources. What is Elexicon's current DERMS? How much does it (or will it) cost for a below 10 kW DER to be connected to and controlled by Elexicon's DERMS? Please address any Elexicon charges and estimated customer costs.

(f) How much does it (or will it) cost for an above 50 kW DER to be connected to and controlled by Elexicon's DERMS? Please address any Elexicon charges and estimated customer costs.

(g) Per page 43: "Elexicon will not bring forward detailed relief requests for its CDM proposal or Local Capacity Market proposal within its ICM application." Can Elexicon provide a rough approximate time period expected for this application?

(h) The DER connections working group is considering recommendations for residential connections that may include allowing 20 kW and below to be processed as a micro connection, and, alternatively, allowing 20 kW and below (nameplate) to be processed as a micro connection if export to the grid is controlled to 10 kW and below. These changes are motivated in part by the higher capacity needs for multi-DER residential installations (e.g. solar plus bi-directional EV charger). Would these potential changes assist Elexicon in enabling DERs?

Response:

a) As of Sept 2022, Elexicon has 44,269 customers in the Whitby Rate Zone. To determine the constraints limiting any of these customers from being eligible for DER, Elexicon will need to perform a short-circuit analysis.

b) The Whitby Smart Grid does not mitigate short circuit capacity constraints.

c) Dynamic control systems will be part of the advanced level ADMS (or DERMS) applications. While it is possible with these systems to allow DERs to share capacity, it is not common practice to do so.

d) The IEEE 1547 limit is about preventing islanding by ensuring that the DERs cannot support load if the feeder breaker has been opened. Previously the IEEE 1547 standard has been considered a "hard limit", and any connection that exceeded this level required a "transfer trip signal" from the feeder breaker. However, today it is acceptable to conduct engineering analysis to confirm the issues. Absent an engineering study, the 33% minimum or 7.5% maximum is considered prudent. This refers to comments made on Page 18 of Appendix B. Page 24 of Appendix B-1, Page 10 of Appendix B-2, and Page 25 of Appendix B-4

e) Elexicon will be implementing a DERMs as part of the Whitby Smart Grid project. It has not yet commenced this component of the project. Elexicon is not able to comment at this time on the costs for a DER to be connected to and controlled by Elexicon's DERMS.

f) See response to part e above.

g) Elexicon expects to file its DER Enabling Program application in the first quarter of 2023 subject to the OEB approval of the Whitby Smart Grid project.

h) Elexicon will need to assess the details of any DER working group's recommendation to determine if the guidance is supportive of Elexicon's stated objectives with the Whitby Smart Grid and Sustainable Brooklin projects.

Elexicon Energy Inc.

Answer to Interrogatory from

Environmental Defence

Interrogatory ED-04:

Reference: Appendix B-2 Sustainable Brooklin Business Case

Questions:

(a) Will the feeders and other distribution equipment be sufficiently sized for customers in the development to implement cold-climate heat pumps instead of fossil-fuel-based heating? If not, what would the limitation be and what would the cost be to eliminate the limitation? Also, what percent of homes would be able to electrify their heating without hitting that distribution system limitation?

(b) The charges in s. 3.2 of the DSC provide an incentive for developers to propose denser developments that will have lower per-house distribution capital contribution costs when the additional distribution revenue from the denser housing is accounted for. Is Elexicon willing to provide a revenue-neutral incentive for developers to build denser housing to increase the distribution revenue that could offset capital costs (e.g. a modest capital contribution levied only for less-dense housing types)?

(c) Per page 14: "Where the roof size and orientation are suitable, the Brooklin Developers will offer customers the option to purchase and install solar panels and related inverter and controls." What percent of homes will have a roof size and orientation suitable for solar? Is Elexicon willing to seek a specific commitment that developments will be designed such that, say, 95% of homes have a roof that is suitable for solar in order to maximize the benefits of this project?

(d) For the new developments, will Elexicon be installing bi-directional meters to avoid the cost of having to switch out a meter for customers who seek net metering? If not, what would the cost be per meter to install bi-directional meters from the outset (i.e. the incremental equipment cost) versus the cost to switch out the meter after-the-fact (i.e. the additional labour and the meter-related cost).

(e) What recourse does Elexicon have if a developer declines to fulfil one of the specific undertakings described on page 14-15? Are those undertakings contained in a formal agreement? If yes, please provide a copy.

Response:

a) Elexicon supports the move to net zero and understands that electrification of residential heating will be a significant component of decarbonization. Residential heat pumps are an evolving application. Elexicon's standards for feeders and its other distribution system includes a factor of safety that will generally support these loads. Elexicon expects that in the event of significant uptake of cold-climate heat pumps it will need to conduct a study to identify potential system limitations and update its standards and its system in due course.
b) No. The Town of Whitby and Region of Durham planning deparments control density of developments.
c) Elexicon would not support the proposed commitment as outlined in the question, understanding that developers and the municipality must balance numerous constraints in designing and approving a development (e.g. natural environmental characteristics, transportation conduits), and a generic commitment uninformed by the specifics of the development may inadvertently negatively impact other important outcomes for the municipality (e.g., environmental protection, density targets, project timelines).
d) Yes; Elexicon plans to install bi-directional meters for the new construction noted in North Brooklin.
e) Elexicon has requested a condition of approval in its Application (Appendix B at page 8), which, if approved by the OEB, would be enforced by Elexicon by way of a yet to be drafted commercial agreement with all developers in the North Brooklin territory. Elexicon will utilize all remedies included within the agreement and the OEB's decision and order should a developer decline to fulfill any of the conditions of approval.

Elexicon Energy Inc.

Answer to Interrogatory from

Environmental Defence

Interrogatory ED-05:

Reference: APPENDIX B-3 DER Enabling Program and Local Capacity Market

Questions:

(a) Per page 3, Elexicon is considering on-bill financing. Has it explored options for facilitating government funded 0% interest on-bill financing, such as a partnership with the Greener Homes Grant and its 0% interest green loans? Please discuss.

(b) With on-bill financing, would the cost of the financed investment (e.g. solar) be passed to the new owner in the event of a home sale? Please discuss.

Response:

a) Not at this time. Elexicon will explore the suggested partnership as it develops its DER Enabling Program subject to the OEB's Decision in this proceeding.
b) Elexicon has not developed an on-bill financing program at this time, and thus has not determined the program details.