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May 3, 2019

VIA E-MAIL

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge St.
Toronto, ON

Dear Ms. Walli:

**Re: EB-2018-0219 – PUC Distribution Inc. 2019 4GIRM Application - ICM
Interrogatories of Vulnerable Energy Consumers Coalition (VECC)**

Please find enclosed the interrogatories of VECC in the above-noted proceeding. We have also directed a copy of the same to the Applicant.

Yours truly,

(Original Signed By)

John Lawford
Counsel for VECC

Copy to: Andrew Belsito, PUC Distribution Inc.

EB-2018-0219

PUC Distribution Inc.

Application for electricity distribution rates and other

charges effective May 1, 2019

VECC Interrogatories

VECC #1

- a) Please provide the number of sustained outages per year for the years 2010 to 2018.
- b) Please provide the duration (interruption hours) of sustained outages per year for the years 2010 to 2018.
- c) Please provide the number of momentary outages per year for the years 2010 to 2018.
- d) Please provide the annual reduced interruption frequency and duration projections resulting from the SSG Project.

VECC #2

Please provide the number of severe/major weather events per year since 2010.

VECC #3

Ref: ICM Application Page 6

Preamble: The total capital cost of the SSG Project is estimated to be \$34,389,046, with 22% of the SSG Project (\$7,655,053) to be in service by December 31, 2019 ("Phase 1") with the remaining 78% (\$26,733,992) to be in service by December 31, 2020 ("Phase 2"). Incremental funding for Phase 2 of the SSG Project will be requested by way of a 2020 ICM application.

- a) Please provide a cost estimate and scope of work for Phase 1 and Phase 2 and explain how the project phases were determined.
- b) If the project was implemented over three years instead of two years, please explain how the project could be broken down into three work phases and provide an estimate of costs for each phase.

VECC #4

Ref: ICM Application Page 6

Please confirm the Minister's Directive issued on November 23, 2010 is the key driver for this project.

VECC #5

Ref: ICM Application Page 6

Preamble: The evidence states "From the third quarter of 2013 to the first quarter of 2014, PUC Distribution and its project partners collected data and conducted preliminary analyses with respect to the development of a smart grid project."

- a) Please explain the type of data that PUC and its project partners collected.
- b) Please describe the quality of the data collected including accuracy, completeness, consistency, and comprehensiveness.
- c) Please discuss how the smart grid project responds to any data quality issues.

VECC #6

Ref: ICM Application Page 7

- a) Please provide a copy of the City of Sault Ste. Marie City Council resolution passed in the first quarter of 2014 along with a copy of the report to City Council supporting the concept of developing a smart grid in PUC's service area.
- b) Please provide any subsequent reports to City Council and City Council resolutions related to the smart grid project.

VECC #7

Ref: ICM Application Page 7

- a) Please confirm the costs for Leidos Engineering LLC and Navigant Consulting Inc. are included in the Project Cost Estimate at Appendix K.
- b) Please provide the cost of the work undertaken by Leidos Engineering LLC
- c) Please provide the cost of the work undertaken by Navigant Consulting Inc.

VECC #8

Ref: ICM Application Page 7

- a) Please show how PUC de-scoped the SSG Project and lowered costs.

- b) Please itemize all scope changes.
- c) Please discuss if the changes in scope in the Sault Smart Grid Project required City Council approval. If yes, please provide the council resolution.

VECC #9

Ref: ICM Application Page 8

Preamble: PUC indicates the Sault Smart Grid (SSG) Project was not included in PUC Distribution's latest Distribution System Plan (EB-2017-0071) filed on March 29, 2018.

- a) Please provide a list of investments in the latest DSP that qualify as smart grid investments.
- b) Please provide a description and breakdown of PUC's smart grid investments undertaken since 2010.
- c) Please identify capital projects in the DSP that could be deferred as a result of approval and implementation of the SSG Project.

VECC #10

Ref: ICM Application Page 8

Preamble: PUC explains that it has been exploring an innovative and large scale system smart grid project for a few years that could provide significant benefit to our customers. The project would include elements for distribution automation, voltage control and improved customer care and outage management capabilities.

- a) Please explain why PUC chose to undertake a large scale smart grid strategy rapidly versus smaller scale investments over time. Please discuss the advantages to this approach.
- b) Please compare the status of PUC's existing elements related to distribution automation, voltage control, customer care and outage management capabilities compared to what will be available through the SSG project.

VECC #11

Ref: ICM Application Page 10

Preamble: The evidence states "Overall the project returns a positive benefit to cost ratio of 1.1:1 for customers from a billing perspective and with assuming only a 25% value for reliability, a 1.4:1 ratio results for the project. Customer reliability improvements are also calculated and projected as \$2.55M annually to provide additional non-bill benefit to customers.

- a) Please explain the basis to assume a 25% value for reliability.
- b) Please explain how the 1.4:1 ratio was determined and provide the calculation.

VECC #12

Ref: ICM Application Page 10

Preamble: PUC indicates the SSG Project is an innovative initiative. If successful, the SSG Project could become a model for Canadian cities that wish to deploy grid modernization and community-scale smart grids rapidly, accelerating the benefits to customers while minimizing both costs and risks.

Please summarize any research PUC undertook in Canada and Ontario specifically, regarding what other utilities are doing or not doing with respect to smart grid implementation and how the SSG Project compares and could be used as a model.

VECC #13

Ref: ICM Application Page 11 Table 1 & Page 12

- a) Please provide the calculation of \$93,378 in system loss reduction.
- b) Please provide the calculation of \$2.55M annually in reliability improvements.
- c) Please provide the calculation that underpins the estimated 25 year net-present value of the customer reliability benefit of over \$40 million.

VECC #14

Preamble: The evidence states “With this approach, the SSG Project will increase the efficiency of the entire distribution grid, reducing electrical energy delivery requirements from the transmission grid, greenhouse gas emissions, and reducing total costs to consumers.”

Please quantify the annual greenhouse gas emission savings.

VECC #15

Ref: ICM Application Page 12 Table 2

- a) Please provide complete bill impact calculations in 2019 and 2020 for residential customers at the low, average and high consumption levels resulting from implementation of the SSG Project in 2019 and 2020.

- c) Has PUC consulted directly with low income seniors and other vulnerable customers on the SSG Project? If yes, when? Please discuss the outcome of these consultations. If not, please provide PUC's plan to consult with residential/vulnerable customers on the SSG Project.
- d) Please explain how low volume residential customers have the ability to lower energy use as a result of the SSG Project.

VECC #16

Ref: ICM Application Page 13

Preamble: PUC states "The system and data available will also support PUC Distribution decision making to make better long term asset management decisions and forecasting capital requirements with the continuing operating and financial challenges of aging infrastructure renewal.

Please explain how the system and data available will support PUC's decision making to make better long term asset management decisions and forecasting capital requirements.

VECC #17

Ref: ICM Application Page 13

Please provide the actual ROE for 2018.

VECC #18

Ref: ICM Application Page 13

Preamble: PUC states "In the event that the OEB does not approve this ICM, PUC Distribution would not proceed with the SSG Project and any NRCan funding would be forfeited."

Are there any elements of the SSG Project that PUC would incorporate into its capital plans and future DSP planning if the ICM was not approved? Please explain.

VECC #19

Ref: ICM Application Page 14

Preamble: The evidence states "PUC Distribution includes, throughout this ICM and in the Appendices attached hereto, comprehensive evidence which supports the need for the SSG Project."

Please describe the most pressing/immediate need for the project.

VECC #20

Ref: ICM Application Page 14

Preamble: Black & Veatch (“BV”) has been selected to act as the EPC contractor on the SSG Project.

- a) Please discuss the process PUC followed to select Black & Veatch.
- b) Please discuss when the scope will be finalized by Black & Veatch as part of the formal engineering phase.
- c) Please provide the not-to-exceed agreement price.

VECC #21

Ref: ICM Application Page 15

The key components of the SSG project are as follows:

- Voltage / VAR Optimization (“VVO”)
- Distribution Automation (“DA”)
- AMI Integration

- a) Please rank the priority of the above three components.
- b) For each component, please summarize the problem that is being solved.

VECC #22

Ref: ICM Application Page 22

Please provide the timing of the detailed design phase of the project.

VECC #23

Ref: ICM Application Page 27 Table 4

Please provide the total proposed equipment quantities to be installed as a percentage of PUC’s total existing asset quantities.

VECC #24

Ref: Appendix K

- a) Please provide the date of the Project Cost Estimate.
- b) Was the project Cost Estimate reviewed by an independent third party?
- c) Please identify any expenditures that would otherwise be included in PUC's capital or operating budgets.
- d) Please provide a breakdown of the costs to date related to the SSG Project.
- e) Please provide a breakdown of costs by party.
- f) Please provide the contingency for the project.
- g) Please provide the contingency for Phase 1 and Phase 2.
- h) Please provide the key milestones for the project.

VECC #25

Ref: ICM Application Appendix C Leidos Engineering LLC. Report, Utility Distribution Microgrid AMI Integration, Page 16

Preamble: The Leidos' report states that for a UDM to be successful, clear internal metrics and reports will be required that track performance of the UDM, identify operational issues or inefficiencies and provide supporting detail for design, build and operational stages. Ultimately, any operating organization will need a data driven set of metrics to optimize and ensure maximum value from the UDM for both internal and external users, customers, and stakeholders.

- a) Please provide the internal performance metrics that will be used to track the project and optimize and ensure maximum value.

VECC #26

Ref: ICM Application Appendix C

Please discuss the current involvement and role of Leidos Engineering LLC in the SSG Project.

VECC #27

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 1

Preamble: The Report indicates Energizing Company (ECo) is proposing to assist PUC with the implementation of a Utility Distribution Micro_grid (UDM).

- a) Please explain the relationship between ECo and PUC and the other parties listed in the SSG Project Organizational Chart at Appendix I.
- b) Please provide a breakdown of the costs ECo is currently responsible for.

VECC #28

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 9

Preamble: The Navigant Report #1 states, “The overall system design, architecture and system components are comparable with DA and VVM systems that Navigant has reviewed or analyzed throughout the U.S. and Canada. We note the proposed feeder coverage for DA and VVM – 84% and 68% – is higher than many other systems Navigant has encountered. We understand that one of PUC’s goals was to ensure that the benefits of the system were shared across the community to the extent possible. This coverage should maximize the total amount of benefits that can be achieved by DA and VVM on PUC’s distribution system, though it may not represent the optimal economic level of VVM and DA.”

- a) Please provide the feeder coverage typically encountered by Navigant.
- b) Please discuss the likelihood that some feeder locations are expected to be upgraded or targeted for reliability improvements over the next few years and may produce lower than expected economic benefits.
- c) Has PUC selected worst performing feeders for DA?

VECC #29

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 20

Preamble: Navigant indicates “As part of the proposed project, PUC will make a fixed monthly payment to ECo for the operating period of the contract. This contractual arrangements include a *performance management strategy* intended to ensure that the performance of the UDM system meets all contract expectations and design specifications. Under this arrangement for example, if the DA system, intended to locate, isolate, and restore faults automatically, fails to restore power to an un-faulted zone within 5minutes, the monthly payment could reflect a financial penalty for failing to meet performance standards.

Please discuss if any contractual agreements for the SSG Project include financial penalties for failing to meet performance standards.

VECC #30

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 25

Preamble: Navigant states “Leidos reduced the level of potential reliability improvement, as measured by SAIFI and SAIDI, from a theoretical reference of approximately 70% to estimates of 50% for feeders equipped with DA. Navigant agrees with the theoretical improvement in reliability predicted by Leidos’ methodology. However, Navigant has found that actual improvement in reliability statistics are sometimes lower than predictions due to a variety of factors such as inaccurate historic reliability data, failure of the FLIR to detect or isolate all interruption, or future improvements on distribution feeders. The latter may include enhanced reliability improvement programs such as enhanced trimming, replacement of deteriorated equipment, and enhanced protection systems.

Please explain how PUC has considered Navigant’s finding that actual improvement in reliability statistics are sometimes lower than predictions and how this impacts the reliability benefit calculation.

VECC #31

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 27

Preamble: Navigant indicates it did not independently confirm the level of reliability improvements or energy reduction.

How has PUC independently confirmed the level of reliability improvements and energy reductions?

VECC #32

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 27

Preamble: Navigant notes “Leidos was not able to cite other LDC’s where it has designed and implemented a system of comparable scope (i.e. level of coverage). Similarly, both Leidos commentary and Navigant’s review of prior Survalent experience in DA and VVM systems suggest that the proposed UDM project is more comprehensive than other projects reviewed both in terms of the level of coverage and project size relative to the size of PUC’s distribution system. Navigant does not view the project scope as unreasonable and acknowledges that

Leidos has the background and capability to perform requisite engineering and design of the UDM. Rather, we offer these observations both to reinforce the comprehensive nature of the project and to acknowledge the potential for cost overages, scheduling issues and lower than expected benefits for some segments of the system.”

In the context of PUC’s proposed change management process, please discuss the potential impact on the project if there are significant cost overages, scheduling issues and delays and lower than expected benefits for some segments of the system.

VECC #33

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 28 Table 3

Please provide an updated Table showing the distribution of SSG Project costs by project features.

VECC #34

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 29

a) Please provide the latest cost and % of total SSG project costs for the following categories:

- Engineering
- System integration of AMI, VVM and DA Systems
- Total design
- Project Management and Control

b) Please provide industry averages for total design, project management and system integration costs.

VECC #35

Ref: ICM Application Appendix D Navigant Report #1: Review of Business Case for Smart Grid Project for PUC Distribution, Page 30

Preamble: At Page 30, Navigant indicates any unscheduled work, and corresponding costs, will be a responsibility of PUC.

Please discuss PUC’s proposed treatment of unscheduled costs.

VECC #36

Ref: ICM Application Page 38

Preamble: PUC provides 3 options regarding the SSG Project. NRCan Funding requires projects to be completed by March 31, 2022.

- a) Did PUC consider pursuing and developing the project over 3 years and have the project in-service by December 31, 2021. If not, why not?
- b) Please provide the impact of implementing the project over three years instead of two years.

VECC #37

Ref: ICM Application Page 42

Preamble: PUC states “...in keeping with good utility practice, the SSG would likely still need to occur at some point in the future in order to upgrade PUC Distribution’s grid to the industry standard.

Please define the industry standard referred to above.

VECC #38

Please provide PUC’s most reliable check on the assumptions and impacts estimated for the two (2) year project.

VECC #39

Ref: ICM Application Appendix D Navigant Report #2: Review of Project Costs for Smart Grid Project, Page 8

Preamble: The Navigant report states “From the standpoint of the business case review, PUC could choose an alternative approach rather than pursue the ECo proposal.

Please discuss if PUC considered any alternative approaches such as implementing only portions of the capabilities proposed by Eco.

VECC #40

Ref: Appendix J

Preamble: The Design and Construction Specifications document indicates integration with PUC’s existing Geographic Information System (GIS) was originally planned, but based upon discussions with PUC staff and Survalent, the approach was changed so that GIS integration is no longer required.

Please explain why GIS integration is no longer required.

VECC #41

Please discuss if PUC will make the substation investments regardless of the implementation of the SSG Project.

VECC #42

Ref: ICM Application Appendix H Page 1

Preamble: The CVR factor is a proportionality variable that relates reductions in electricity demand to voltage reductions. Preliminary work looked at a CVR and savings factors of 0.5 (1.5%) and 0.7 (2.1%). Industry reports and Navigant suggested these may be overly conservative. In the end, PUC selected a CVR = 0.9 (2.7% savings) as an assumption to apply as a system or project average that is applied to the project energy savings estimate.

- a) Please confirm that if the original CVRs are used, the Customer Benefit Summary on Page 11 (Table 1) does not result in a net benefit to customers.
- b) Please discuss PUC's confidence level in the selected CVR = 0.9 (2.7% savings).
- c) Please provide references to the industry reports that PUC relies on to conclude the original CVRs may be overly conservative and explain why.

VECC #43

Ref: ICM Application Appendix H Page 1

Preamble: Reliability savings estimates vary pretty widely in industry studies but in the Navigant Community Microgrid Business Case Review report (May 2016) the Leidos values were considered reasonable based on industry data.

- a) Please provide the Navigant Community Microgrid Business Case Review report (May 2016).

VECC #44

Ref: ICM Application Appendix H Page 1

Preamble:

Looking at a complete year of feeder outage data, Leidos estimates the reliability benefits as follows:

- SAIFI reduced by 37%
- SAIDI reduced by 46%
- CAIDI reduced by 16%

- a) Please provide the page reference in the Leidos reports in Appendix C for these estimates.
- b) Please provide the analysis that underpins these reliability benefits.
- c) Did Leidos estimate a reduction in MAIFI? If yes, please provide.
- d) Please explain how these estimates translate into an annual projected reliability benefit of \$2,550,000 and provide all assumptions and calculations.