ONTARIO ENERGY BOARD

IN THE MATTER OF the Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Sch. B;

AND IN THE MATTER OF an Application by Essex Powerlines Corporation Application for electricity distribution rates and other charges beginning January 1, 2025.

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UNDERTAKING RESPONSES (ARISING FROM THE JUNE 24, 2024 PRESENTATION & TECHNICAL CONFERENCE)

Filed: July 2, 2024

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UNDERTAKING JT1.1:

Reference: Technical Conference Transcript dated June 24, 2024, P9L1-14, P17L28, P18L1-3

To explain how Essex derived the estimated quantity of local energy of 5000 megawatt-hours and capacity of 7500 megawatt-hours from the maximum capacity of 5000 megawatts that can be funded.

Response:

EPLC set the total project budget at 5,000 MWh and at $300/MWh for capacity (Appendix A, PDF page 87, unique line item IDs: 3.1.1, 3.1.1.a, 4.2.1, 4.2.1.a). The total project budget will not exceed this threshold. EPLC used estimates and guidance from a project partner who is experienced in operating a local energy market in determining that 7,500 MWh of capacity would need to be contracted to reliably meet the 5,000 MWh threshold of energy when required. A factor of 1.5 is representative of the fact that not all energy resources (or curtailment from demand response) will be activated when requested. Prior experience suggests that activation will be materially less than 100% and a factor of 1.5 represents an appropriate safety margin to ensure that adequate energy resources will be available when requested.

In the event EPLC activates more than 5,000 MWh of energy resources, the capacity price of $300/MWh will be reduced proportionally to ensure the total project budget threshold will not be exceeded.

Amounts paid for capacity and energy will vary, but in total will not exceed the project maximum and EPLC will be required to monitor those totals closely as they proceed through project implementation.

UNDERTAKING JT1.2:

Reference: Technical Conference Transcript dated June 24, 2024, P20L13-14

To provide the cost of billing impacts for customers.

Response:

EPLC used the cost allocation model from their 2025 Cost of Service Application in estimating bill impacts to customers. Further, EPLC followed the allocation criteria as set out in the OEB's DVA Continuity Schedule for Group 2 accounts. EPLC estimated bill impacts over 24 months to closely align the impact period with the duration of the Pilot project.

Rate Class	Units	Estimated Monthly Bill Impact	Estimated Monthly Distribution Charge Impact	Estimated Distribution Charge % Increase	Estimated Monthly Total Bill Impact	Estimated Monthly Total Bill % Increase
RESIDENTIAL	# of Customers	0.4405	0.44	1.42%	0.41	0.33%
GS<50	kWh	0.0006			1.12	0.32%
GS>50	kW	0.1616			18.26	0.30%
EMBEDDED DISTRIBUTOR	kW	0.2149			12.14	0.05%
STREETLIGHT	kW	0.1882			130.53	0.25%
SENTINEL LIGHT	kW	0.2089			14.16	0.29%
USL	kWh	0.0006			77.00	0.30%

UNDERTAKING JT1.3:

Reference: Technical Conference Transcript dated June 24, 2024, P22L12-28, P23L1-2

> *MR. RUBENSTEIN: All right. Thank you very much. Now, I understand the basis of the project, its evolution was the IESO's Grid Innovation Fund, OEB Sandbox joint call. Correct?*
>
> *MS. SWEENEY: Yes.*
>
> *MR. RUBENSTEIN: And as I understood, they were seeking high level pilot projects to better understand DER technologies. Correct?*
>
> *MS. SWEENEY: Yes.*
>
> *MR. RUBENSTEIN: Are you able to provide a copy of the proposal that you ultimately ended up filing with the IESO or the basis of what was approved?*
>
> *MS. SWEENEY: Unless it's to be kept confidential, I believe we can.*

To file a copy of the proposal filed with the IESO.

Response:

Attached as Appendix B is the Contribution Agreement. The Project Proposal is included as Schedule C (PDF Page 26).

UNDERTAKING JT1.4:

Reference: Technical Conference Transcript dated June 24, 2024, P24L20-21

To file a copy of the Contribution Agreement with the IESO.

Response:

Attached as Appendix B.

UNDERTAKING JT1.5:

Reference: Technical Conference Transcript dated June 24, 2024, P27L1-28, P28L1-23

To provide a Project Agreement including the budget between the participants, including who is bearing the costs.

Response:

Attached as Appendix B. The contributions are broken out in Schedule A of the Project Agreement (PDF page 13).

UNDERTAKING JT1.6:

Reference: Technical Conference Transcript dated June 24, 2024, P32L14-28

To file draft accounting orders for the account.

Response:

Please see the attached Draft Accounting Order attached as Appendix A.

UNDERTAKING JT1.7:

Reference: Technical Conference Transcript dated June 24, 2024, P33L8-28, P34L1

To file any milestone reports provided to the IESO to date.

Response:

Attached as Appendix c. While Milestone 1 has been filed with the IESO, it has not yet received formal approval, and excluded from this submission is one document that contains registered participant information and details of flexibility payments.

UNDERTAKING JT1.8:

Reference: Technical Conference Transcript dated June 24, 2024, P36L1-28, P37L1-28, P38L1-9

To provide the customer class for greenhouses.

Response:

Greenhouse customers of EPLC are in the GS>50 customer class.

UNDERTAKING JT1.9:

Reference: Technical Conference Transcript dated June 24, 2024, P50L13-28, P51L1-28, P52L1-28, P53L1-7

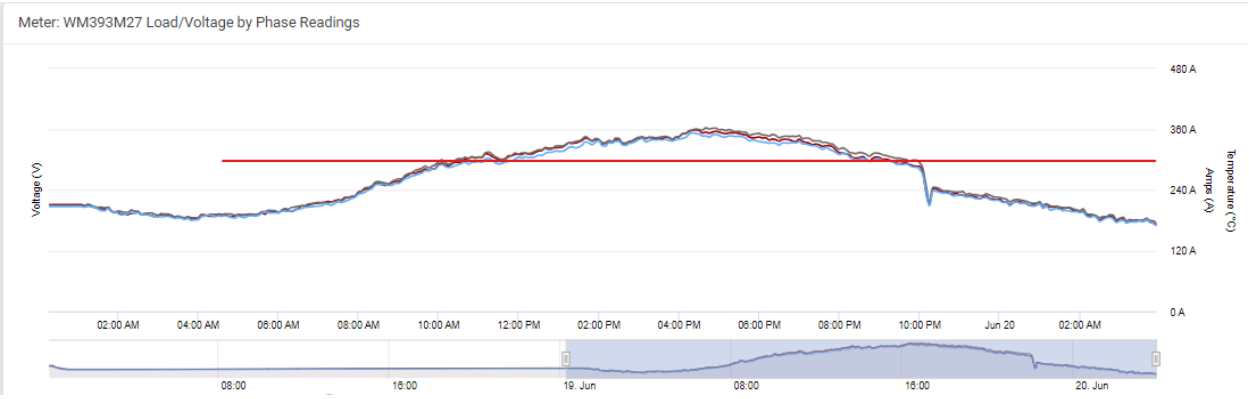
To provide any evidence showing distribution system needs that NWSES (*sic*) might address based on learnings from the Project in the future.

Response:

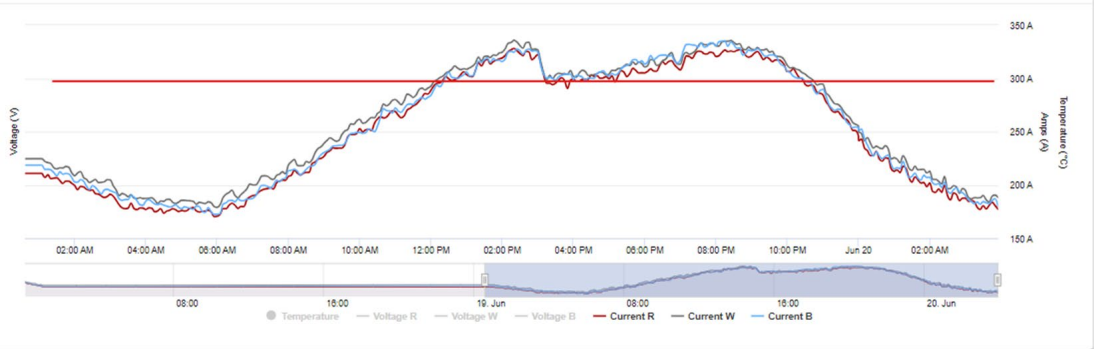
EPLCs PowerShare DSO Pilot project is anticipated to provide learnings in assessing the ability of non-wires solutions to meet distribution system needs. Planning for the project contemplated matching local constraints with local, distribution connected assets, that could alleviate those constraints.

One known distribution system need exists in EPLCs Leamington service territory on the 393M27 feeder which often exceeds the 50% threshold (~300A) and for long durations (8-10+ hours) during the normal peak periods from 10:00 am to 9:00 pm. EPLC is aiming to test the ability of securing local flexibility during these times to reduce the load on the feeder to the 50% threshold.

The graphic below evidences the overload condition at this location on June 19 and the red line represents the 50% threshold of 300A. The DSO Pilot project aims to test the ability of local non-wires solutions to be leveraged to alleviate this condition.



A second example is at the 23M24 feeder in LaSalle where, on the same date, June 19, that feeder experienced a similar overload condition at greater than the 50% threshold



Other similar needs exist in all of EPLC service territories, and it is anticipated that due to economic development and residential growth in the region, occurrences of these overload conditions will increase. Learnings from the project are expected to be widely applicable in addressing current and future needs and the potential use of DERs to address these needs.

Appendix A

Essex Powerlines Corporation

EB-2024-0022/EB-2024-0096

Draft Accounting Order

DRAFT ACCOUNTING ORDER – EPLC DSO Pilot Project Commodity Cost

1. This account shall be used to accrue costs paid to participants in the EPLC PowerShare DSO Local Energy Market Pilot Project. The net amount shall be determined as the difference between amounts paid in total for capacity and energy, net of project funding, and net of HOEP where energy is purchased.
2. On a monthly basis, EPLC will record the total amount paid for capacity purchased through the Project as a debit to USoA 4705 "Power Purchased" and a credit to USoA 2200 "Accounts Payable".
3. On a monthly basis, EPLC will record the total amount paid for energy or curtailment purchased through the Project as a debit to USoA 4705 "Power Purchased" and a credit to USoA 2200 "Accounts Payable".
4. On a monthly basis, EPLC will record 50% of the value of flexibility purchased through the Project as a credit to USoA Account 1100 "Accounts Receivable" and as a credit to USoA 4705 "Power Purchased" to recognize the amount recoverable through Project funding, based on the Project contribution agreement and not to exceed the project maximum for flexibility as approved therein.
5. In cases where flexibility purchased is in the form of energy, EPLC will calculate the Net Receivable to be debited to USoA 1100 "Accounts Receivable" and credited to USoA 4705 "Power Purchased" as total power purchased, less 50% project funding, less HOEP for the power injected, resulting in commodity cost of HOEP remaining in USoA 4705 "Power Purchased".
6. On a monthly basis, EPLC will debit a USoA Account 1508 "Other regulatory Assets/Liabilities – DSO Pilot Net Commodity Cost" subaccount and credit USoA 4705 "Power Purchased" to move any amounts paid for flexibility through the Project, net of Project funding and HOEP, to the new deferral account.

7. On a periodic basis, and as approved by the IESO based on Milestone reporting, EPLC will invoice the IESO to recover funds accrued in USoA 1100 "Accounts Receivable" during monthly settlement with participants.
8. EPLC will apply interest in the balance in USoA 1508 "Other Regulatory Assets/Liabilities – DSO Pilot Net Commodity Cost" at the OEB prescribed rate and accrue that interest in associated sub-account 1508-XX "Other Regulatory Assets/ Liabilities – DSO Pilot Net Commodity Cost, sub-account Carrying Charges". The offsetting entry will be recorded in USoA Account 4405.
9. On a monthly basis EPLC will include any energy purchased in the Embedded Generation Total that is submitted to the IESO as part of the monthly IESO portal submission, so that Class B Global Adjustment can be accurately charged to EPLC.
10. The new accounts will be used until the conclusion of the Pilot Project on March 31, 2026. EPLC has requested an effective date of February 19, 2024, and the balance will be collected from ratepayers.
11. The following are the proposed accounting entries:

Local Capacity Payments – monthly entries when Capacity is settled with Flexibility provider

DR 4705 – Power Purchased	$XX	
CR 2200 – Accounts Payable		$XX
~to record payment to DER owner		
DR 1100 – Accounts Receivable	$XX	
CR 4705 – Power Purchased		$XX
~to record recovery of 50% through Project funding		
DR 1508 – Other reg Assets/Liabilities		
– DSO Pilot Net Commodity Cost	$XX	
CR 4705 – Power Purchased		$XX
~to transfer net commodity cost to DVA		

Local Energy Payments – monthly entries when Energy is settled with Flexibility provider

DR 4705 – Power Purchased	$XX	
CR 2200 – Accounts Payable		$XX
~to record payment to DER owner		
DR 1100 – Accounts Receivable	$XX	
CR 4705 – Power Purchased		$XX

~to record recovery of 50% through Project funding

DR 1508 – Other reg Assets/Liabilities
– DSO Pilot Net Commodity Cost $XX
CR 4705 – Power Purchased $XX

~to transfer net commodity cost to DVA

Note: the amount moved to 1508- Other Regulatory Assets/Liabilities – DSO Pilot Net Commodity Cost, will be net of HOEP when the Flexibility activated is generation.

Local Curtailment Payments – monthly entries when Flexibility provider is activated to curtail load to meet contracted capacity.

DR 4705 – Power Purchased $XX
CR 2200 – Accounts Payable $XX

~to record payment to DER owner

DR 1100 – Accounts Receivable $XX
CR 4705 – Power Purchased $XX

~to record recovery of 50% through Project funding

DR 1508 – Other reg Assets/Liabilities
– DSO Pilot Net Commodity Cost $XX
CR 4705 – Power Purchased $XX

~to transfer net commodity cost to DVA

Carrying Charges Monthly Entry

DR 1508 – Other reg Assets/Liabilities
– DSO Pilot Net Comm Cost sub-account Carrying Charges $XX
CR 4405 - Interest Income $XX

~to record interest on 1508 – DSO Pilot Net Commodity Cost account balance

Appendix B

Essex Powerlines Corporation

EB-2024-0022/EB-2024-0096

GIF Contribution Agreement

RECITALS:

I. The Independent Electricity System Operator (the "**IESO**") established a fund (the "**Grid Innovation Fund**") in 2005 to provide funding for action-oriented, sector-specific Conservation pilot projects.

II. Essex Powerlines Corporation (the "**Recipient**") has proposed a project with a scalable market design for activation of distributed energy resource ("**DER**") flexibility in near real-time where they perform as a Distribution System Operator ("**DSO**") (the "**Project**").

III. The Recipient has applied for, and the IESO has agreed to award, financial assistance (the "**Contribution**") under the Grid Innovation Fund to the Recipient for carrying out the Project, subject to the terms and conditions set out in this agreement and the Schedules hereto.

IN CONSIDERATION of the covenants of the parties to this agreement, the parties covenant and agree with each other as follows:

1. Definitions: Capitalized terms are defined in the section opposite the term.

DEFINED TERM	SECTION
AODA	3(c)
Confidential Information	10(a)
Conflict of Interest	23(a)
Contribution	Recital III
Contribution Payment Amount	4(a)
Grid Innovation Fund	Recital I
Dispute	16(a)
HST	4(c)
Milestone	4(a)
Milestone Report	9(a)
IESO	Recital I

Project	Recital II
Proposal	Schedule "C"
Recipient	Recital II
Recipient's Marks	12(d)

2. Schedules: The following schedules are attached to and form a part of this agreement:

Schedule "A"	Specific Project Requirements, etc.
Schedule "B"	Invoices and Eligible Expenses
Schedule "C"	Proposal

and such additional schedules in respect of which the IESO from time to time may notify the Recipient.

3. Contribution Terms:

(a) The Recipient shall:

(i) carry out the Project substantially as described in the Proposal, and meeting the specific requirements set forth in Schedule "A";

(ii) not obtain financial commitments from parties other than the IESO other than the commitments listed in Schedule "A";

(iii) use the Contribution solely for the purposes of the Project; and

(iv) not make any material change to the Project without the prior written consent of the IESO.

(b) The IESO shall provide a Contribution of up to a maximum of $3,882,389.10 (including all reimbursements, expenses and any other payments) plus applicable sales taxes to the Project.

(c) The Recipient will comply with all IESO policies and all applicable laws relating to the *Accessibility for Ontarians with Disabilities Act, 2005*, as may be amended (the "**AODA**") that are applicable to the performance of the Recipient's obligations hereunder.

(d) The Recipient agrees to comply with the information and communications standards applicable to a "large organization" under O. Reg. 191/11: Integrated Accessibility Standards Regulation under the AODA, including conforming with the World Wide Web Consortium Web Content Accessibility Guidelines (WCAG), accessible websites and web content requirements. When performing the obligations hereunder, the Recipient will ensure the Project deliverables, including all communications, documentation, information, web content, web pages, and websites that are distributed or made publicly available by the Recipient or are

intended to be distributed or made publicly available by the IESO, are in compliance with these requirements or are provided in a format otherwise specified by the IESO in writing.

4. **Contribution Payment Terms:** The IESO shall pay the Contribution as follows:

   (a) Following completion of each project milestone specified in Schedule "A" (each a "**Milestone**") and provided that (i) the Recipient is not in breach of any of its obligations under this agreement, (ii) the Recipient has completed and delivered the Milestone Report, and (ii) the Milestone Report has been accepted by the IESO, the Recipient shall be entitled to submit an invoice for reimbursement of the "Eligible Expenses" specified in Schedule B up to the contribution payment amount (a "**Contribution Payment Amount**") corresponding to that Milestone, as specified in Schedule "A".

   (b) All invoices must reference the applicable Milestone and Milestone Report and may include only "Eligible Expenses". The IESO may accept or refuse an invoice, acting reasonably. Invoices that are accepted by the IESO will be funded within 30 days after the day on which such invoice is received.

   (c) Harmonized Sales Tax ("**HST**") and all other applicable taxes will be shown separately on all invoices. The Recipient shall deduct all recoverable HST from expenses and other costs of the Recipient before calculating HST on amounts to be invoiced to the IESO. The Recipient shall provide the IESO at the time of issuing the invoice with all supporting documentation required for the IESO to claim an input tax credit in respect of the HST incurred by it in connection with this agreement. The IESO has the right to request further details (including copies of previously submitted invoices or any documentation required in support thereof) in order to establish its claim for any input tax credit or rebate in respect of any HST incurred by the IESO in connection with this agreement. The Recipient shall co-operate to the reasonable extent necessary in providing such documentation to the IESO on a timely basis.

5. **No Duplicate Funding:** Except as expressly permitted in Schedule A, the Recipient shall not invoice, apply for or accept:

   (a) duplicate funding for the Project or any part of the Project; or

   (b) additional funding from (i) the IESO, or (ii) any IESO administered or funded program.

6. **No Subcontracting:**

   (a) If the Recipient uses all or any part of the Contribution to fund the purchase of work, services or goods from third parties (other than hiring employees) in an amount greater than $50,000.00, the Recipient shall:

      (i) use a competitive bidding process to purchase such work, services or goods, and

      (ii) obtain the written approval of the IESO before awarding the subcontract.

(b) Third parties that are identified as members of the Project team in the Project Proposal, and whose costs are accurately reflected in the Proposal budget, as well as any subcontractors identified and approved as part of the Project Proposal, will not be subject to section 6(a)(ii).

(c) The Recipient will not hire or purchase work, services or goods from any third party that has a Conflict of Interest with the Recipient or the Project.

7. Term and Termination: This agreement will continue until March 31, 2026, unless earlier terminated under any one of the following circumstances:

(a) IESO may terminate this agreement immediately at any time during the Term if funding to the IESO is terminated or the Grid Innovation Fund is suspended, revoked or terminated. In such instance IESO shall make payment to the Recipient only of amounts then due but as yet unpaid. The Recipient agrees that such amount shall be its sole and exclusive payment, and it shall not be entitled to any other amounts whether as damages, costs, expenses or otherwise.

(b) This agreement may be terminated at any time by either party upon 90 days prior written notice. In such instance IESO shall make payment to the Recipient of amounts due but unpaid on the termination date. The Recipient agrees that such amount shall be its sole and exclusive payment, and it shall not be entitled to any other amounts whether as damages, costs, expenses or otherwise.

(c) This agreement may be terminated by the IESO if the Recipient fails to deliver a Milestone Report acceptable to the IESO within 30 days of receipt by the Recipient of the IESO comments thereon, without obligation or recourse by either party. In such instance, the Recipient shall not be entitled to any further Contribution payments, or other payments whether as damages, expenses, costs or otherwise.

(d) This agreement may be terminated by either party if:

(i) the other party materially fails to perform a covenant or obligation and fails to remedy such default within 15 days after receiving notice thereof, or

(ii) a statement, representation or warranty contained in this agreement, the Recipient's application for funding or any other information provided to the IESO is materially untrue, and

(iii) if the defaulting party is the Recipient, the Recipient shall immediately repay all or any part of the Contribution advanced to the Recipient after:

1. such breach in the case of paragraph (i), or

2. the date on which the statement, representation or warranty was made in the case of paragraph (ii).

8. **Representations and Warranties:** The Recipient represents and warrants to the IESO that (a) the Recipient is duly organized and validly existing under the laws of the jurisdiction of its organization or incorporation and has all necessary power and authority to enter into this agreement and to perform its obligations hereunder; (b) this agreement is duly authorized, validly executed, will constitute a binding obligation of the Recipient in accordance with its terms, and will not result in a breach or violation of, constitute a default under, or cause a termination, cancellation or acceleration of any other material obligation of the Recipient; (c) the Recipient has the necessary experience, skill and personnel to perform its obligations hereunder; (d) there are no bankruptcy, insolvency, reorganization, receivership, seizure, realization, arrangement or other similar proceedings pending against or being contemplated against the Recipient; and (e) all information provided by the Recipient to the IESO in the course of applying to the Grid Innovation Fund, including the Project Proposal, is not misleading in any material respect, and the Recipient has not failed to disclose any information that would make the information disclosed misleading.

9. **Reporting and Meetings:**

   (a) The Recipient shall deliver a report (a "**Milestone Report**") in the form prescribed, from time to time, to the IESO following completion of each Milestone.

   (b) If the Recipient fails to complete a Milestone by its expected completion date, the Recipient shall, if requested by the IESO, prepare and deliver, within 30 days of the request, a report (i) explaining the reason for any failure to complete a Milestone by the expected completion date, (ii) detailing any activities being taken to address the issues creating the delay to completion, and (ii) providing an revised expected completion date.

   (c) The Recipient shall deliver periodic reports with respect to the Project upon the reasonable request of the IESO, including reports as to the status or progress of the Project, barriers and impediments to the advancement of the Project, outcomes of the Project and lessons learned from the implementation of the Project.

   (d) The Recipient shall deliver any reports as and when specified in Schedule A.

   (e) All Milestone Reports and any other report delivered under this agreement shall be free of restrictions on use or confidentiality and subject to subsection 12(c).

10. **Confidentiality:**

   (a) "**Confidential Information**" means any information in any format (including discussions) identified as confidential by the disclosing party, including, without limitation, information concerning past, present or future customers, suppliers, technology, operations, processes, know-how or business; provided that, information which:

      (i) is authorized in writing for release by the disclosing party;

(ii) is required to be disclosed by law or order of a court, government tribunal, government agency, or Government of Ontario (or any of its Ministries or representatives);

(iii) is or becomes part of public domain without material breach of this agreement by the party seeking to rely on this exclusion; or

(iv) was independently developed by the receiving party without relying on any Confidential Information provided by the disclosing party,

will not be considered Confidential Information.

(b) A party may disclose Confidential Information to the other party to facilitate work under this agreement. The receiving party shall safeguard and keep such information strictly confidential in accordance with its own standards for keeping confidential information, and at a minimum shall take such steps as a reasonably prudent commercial enterprise would take to protect such information from disclosure. Each party agrees that such information will be safeguarded and only disclosed to persons with a need to know who have been made aware of the confidentiality obligations under this agreement and who are bound to keep such information confidential.

(c) The receiving party will not use the disclosing party's Confidential Information for any purpose except for directly facilitating work under this agreement.

11. Privacy: The Recipient acknowledges that the Freedom of Information and Protection of Privacy Act binds the IESO and that information provided to the IESO may be subject to disclosure under that Act.

12. Intellectual Property:

(a) "Intellectual Property" means any intellectual, industrial or other proprietary right of any type in any form protected or protectable under the laws of Canada, any foreign country, or any political subdivision of any country, including all trademarks, official marks, copyrights, applications and registrations therefore, confidential information, all programs, plans, procedures, art, drawings, designs, patterns, specifications, process, data, research, documents, reports, studies, papers, preliminary sketches, layouts, copy, commercial material, computer software, source codes, photography, films, video tapes, transcriptions, compilation of information, and all plans for advertising.

(b) Each party will retain all rights, title and interest in and to its Intellectual Property. Neither party will acquire any right, title or interest in or to any Intellectual Property of the other party pursuant to this agreement except as provided expressly for herein.

(c) The Recipient grants the IESO a non-exclusive, perpetual, royalty-free, irrevocable, worldwide and paid up right to use, modify, disclose, reproduce, publish, copy and

distribute a Milestone Report or any other report delivered pursuant to this agreement in whole or in part.

(d) The Recipient grants to the IESO a non-exclusive, non-transferable, royalty-free license to display the Recipient's marks, trademarks, official marks, logos and the like (the "**Recipient's Marks**") solely in connection with the exercise of the IESO's rights in section 13. All such displays of the Recipient's Marks will comply with reasonable guidelines related thereto that may be provided by the Recipient to the IESO from time to time.

(e) The Recipient shall indemnify and hold harmless the IESO from all actions, claims, costs, losses, damages, expenses arising out of or relating to any actual or alleged infringements of third party Intellectual Property rights by the Recipient.

(f) The Recipient represents and warrants that it has obtained all required third party consents, permissions and authorizations to carry out the Project and to do all things contemplated in this agreement, including granting the IESO the use rights in section 13(b).

13. Publicity:

(a) The Recipient shall recognize the IESO's Contribution in all publicity or publications related to the Project verbally and in written documents by including the following text:

"This project was made possible through the financial support of the Independent Electricity System Operator."

(b) The Recipient shall obtain the IESO's approval of all public display and communications materials used by the Recipient in respect of the Project, and will offer the IESO the opportunity to co-brand all such material with marks owned or licensed to the IESO and to include quotes or other material at the IESO's discretion. The Recipient shall provide the IESO with all public display and communications materials for approval and co-branding a minimum of 10 days before the planned use of such materials.

(c) The IESO may make reference to the Project and to the IESO's financial sponsorship in any publicity or publication. The Recipient agrees that the IESO may use and make public the following information for publicity purposes:

(i) A description of the Project and the Recipient's Marks;

(ii) the Recipient's Marks;

(iii) project progress, lessons, and results;

(iv) Recipient contact information; and

(v) any Milestone Report or other report delivered under this agreement, in part or a summary thereof.

(d) The Recipient shall not request that the IESO endorses any product or thing developed or produced as a result of, or in connection with, the Project.

14. Limitation of Liability and Indemnification:

(a) The Recipient agrees that the IESO shall not be liable for any claims, losses, damages, injuries or expenses, loss of profits, consequential, special, incidental, indirect, collateral, exemplary or punitive damages arising as a result of entering into this agreement, and the Recipient agrees to indemnify and save the IESO harmless therefrom.

(b) Without limiting any other terms or conditions of this agreement, the Recipient agrees to defend, indemnify and hold harmless the IESO and its officers, directors, employees, agents and representatives from and against any claim, suit, action or proceeding, threatened or actual, arising out of or relating to:

(i) the Recipient's breach of any provision of this agreement; or

(ii) any injury to persons (including injuries resulting in death) or loss of or damage to property of others which may be or be alleged to be caused or suffered as a result of or in connection with the performance by the Recipient or any of its employees or subcontractors of all or any part of the Recipient's obligations under this agreement or as a result of, or in connection with, the Project.

15. Insurance:

(a) The Recipient will obtain and maintain throughout the Term, at its own cost and expense, all the necessary and appropriate insurance covering such risks and in such amount that a prudent person would maintain when carrying out the Project. Under no circumstances will the IESO be liable to the Recipient or any employee thereof for any failure by the Recipient to obtain any insurance necessary or desirable in relation to the subject matter of this agreement.

(b) The Recipient shall, upon request of the IESO, provide proof of the insurance required by this agreement in the form of valid certificates of insurance and confirm the required coverage exists, as at the time of the commencement of this agreement, and, if applicable, renewal replacements on or before the expiry of any such insurance. Upon the request of the IESO, a copy of each insurance policy shall be made available to it.

16. Dispute Resolution:

(a) Any controversy, dispute, difference, question or claim (collectively a "**Dispute**") arising between the Parties in connection with the interpretation, performance, construction or implementation of this agreement that cannot be resolved within 10 days after the Dispute has arisen will be settled in accordance with this section.

(b) The aggrieved party will send the other party written notice identifying the Dispute, the amount involved, if any, and the remedy sought, and invoking the procedures of this section. If the Dispute cannot be resolved within 30 days of the date the Dispute arose or such later date as agreed to by the parties, the Dispute will be resolved by arbitration in accordance with subsections 16(c), 16(d) and 16(e).

(c) The parties will submit any arbitration under this agreement to a single arbitrator agreed upon by both parties. If the Parties cannot agree upon a single arbitrator within 10 days after the Dispute is referred to arbitration, either party may make an application to a court of competent jurisdiction for appointment of an arbitrator. Any arbitrator selected to act under this agreement will be qualified by education, training and experience to pass on the particular question in Dispute and will have no current or past business, financial relationship or connection to either of the parties other than acting in previous arbitrations.

(d) The arbitrator will provide each of the parties an opportunity to be heard and will conduct the arbitration hearing in accordance with the Arbitration Act. Unless otherwise agreed by the parties, the arbitrator will render a decision within 90 days after the end of the arbitration hearing and will notify the Parties in writing of such decision with reasons. The decision of the arbitrator will be conclusive, final and binding on the parties. The decision of the arbitrator may be appealed solely on the grounds that the conduct of the arbitrator, or the decision itself, violated the Arbitration Act. The Arbitration Act will govern the procedures to apply in the enforcement of any award made. If it is necessary to enforce such award, all costs of enforcement will be payable and paid by the party against whom such award is enforced. Unless otherwise provided in the arbitral award, each party will bear (and be solely responsible for) its own costs incurred during the arbitration process, and each party will bear (and be solely responsible for) its equal share of the costs of the arbitrator. Each party will otherwise be responsible for its own costs incurred during the arbitration process.

(e) All proceedings and the making of the award in respect of subsection 16(d) will be in private and the parties will ensure that the conduct of the arbitration and the terms of the award will, subject to registration of any award in court, be kept confidential unless the parties otherwise agree; provided, however, that such obligation to maintain confidentiality will not prohibit any party from complying with any applicable laws and regulations.

17. Record Keeping: The Recipient will maintain proper and distinct books, records, contracts, accounts, invoices and all other information relating to the Project and the Contribution during the term of this agreement and for a period of seven years thereafter. During that period, the Recipient shall provide the IESO, its agents, the Government of Ontario and the Ontario Energy Board with reasonable access to such information for any reasonable purpose, including for audit examination, process audit or evaluation, measurement and verification of Project results and impacts. For certainty, if the IESO requests any information documentation, the Recipient shall deliver it within

30 days. The Recipient shall comply with all laws and regulations applicable to it, including any privacy obligations.

18. **Amendments and No Waiver of Rights:** This agreement may be amended or altered or modified only by a written document signed by both the Recipient and the IESO. A failure or delay in exercising any right, power or privilege in respect of the agreement will not be presumed to operate as a waiver, and a single or partial exercise of any right, power or privilege will not be presumed to preclude any subsequent or further exercise, of that right, power or privilege or the exercise of any other right, power or privilege.

19. **Assignment:** The Recipient may not assign this agreement in whole or in part without the prior written consent of the IESO.

20. **Inconsistency:** In the event of any inconsistency between the provisions of this agreement and any schedule to the agreement, the agreement will prevail.

21. **No Partnership:** The IESO and the Recipient are independent operators and (a) nothing in this agreement will be construed as creating a partnership, joint venture, or agency relationship between the parties; (b) neither party has any authority whatsoever to enter into legally binding obligations on behalf of the other, and (c) neither party shall make any representation to the contrary.

22. **Survival:** Terms, provisions, covenants and conditions contained in this agreement which, by their nature or terms, require their performance by the parties after the expiration or termination of this agreement shall continue in full force and effect following such expiry or termination, including sections 9, 10, 12(d), 13, and 17.

23. **Conflict of Interest:**

    (a) The Recipient must carry out its obligations and use the contribution amount without any actual, or potential Conflict of Interest, where a "**Conflict of Interest**" includes any situation or circumstance where, in relation to the performance of its obligations under this agreement, the Recipient's other commitments, relationships or financial interests: (i) could, or could be seen to, exercise an improper influence over the objective, unbiased and impartial exercise of its independent judgment; or (ii) could, or could be seen to, compromise, impair or be incompatible with the effective performance of its obligations hereunder.

    (b) The Recipient will: (i) avoid any Conflict of Interest in the performance of its obligations under this agreement; (ii) disclose to IESO without delay any actual or potential Conflict of Interest that arises during the performance of this agreement; and (iii) comply with any requirements prescribed by the IESO to resolve any Conflict of Interest. In addition to all other contractual rights or rights available at law or equity, the IESO may immediately terminate this Agreement upon giving notice to the Recipient if: (i) Recipient fails or has

failed to disclose an actual or potential Conflict of Interest; (ii) Recipient fails to comply with any requirements prescribed by the IESO to resolve a Conflict of Interest; or (iii) a Conflict of Interest cannot be resolved.

24. Governing Law: The agreement shall be governed by, and interpreted in accordance with, the laws of the Province of Ontario including the laws of Canada as applicable therein and each party irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts of such province and all courts competent to hear appeals therefrom. The jurisdiction of any proceeding commenced by the Recipient will vest solely and exclusively in Ontario, and the Recipient will not file a proceeding in any other jurisdiction.

25. Notices:

For all purposes of this agreement, notice to a party shall be delivered in writing or electronically to the addresses set out below. Notices shall be deemed to be received on the earlier of the time of actual receipt or two clear days (excluding Saturdays, Sundays and civic holidays in the Province of Ontario) after the sending thereof. Addresses for notices to a party are as follows:

For the IESO:

Organization:	Independent Electricity System Operator
Address:	120 Adelaide Street West, Suite 1600 Toronto, Ontario M5H 1T1
Attention:	Grid Innovation Fund Team
Telephone:	(416) 969-6029
Email:	gridinnovationfund@ieso.ca

For the Recipient:

Organization:	Essex Powerlines Corporation
Address:	2199 Blackacre Drive, Suite 200 Oldcastle, Ontario N0R 1L0
Attention:	Joe Barile
Telephone:	(519) 737-9811 ext. 217
Email:	jbarile@essexpowerlines.ca

Copy to:

Attention: Amanda Panetta
Telephone: (226) 348-1864
Email: apanetta@essexpower.ca

26. Effectiveness Date: This agreement will become effective when all the parties have signed it. The date this agreement is signed by the last party to sign it (as indicated by the date associated with that party's signature) will be deemed the effective date of this agreement.

Each party is signing this agreement on the date stated beneath that party's signature.

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

By: DocuSigned by: Carla Y. Nell 35DF517C64B649C...

Name: Carla Y. Nell

Title: Vice President, Corporate Relations, Stakeholder Engagement & Innovation

Date: 2022-03-21 | 15:47 EDT

ESSEX POWERLINES CORPORATION

By: Joe Barile

Name: Joe Barile

Title: General Manager

Date: March 11, 2022

SCHEDULE "A"

Specific Project Requirements, etc.

SPECIFIC PROJECT REQUIREMENTS

For the purposes of section 3(a)(i) of this agreement, the following are the specific requirements:

The IESO and the Ontario Energy Board ("**OEB**") will have the option to attend all strategic project steering committee meetings.

FINANCIAL COMMITMENTS (NON-IESO)

For the purposes of section 3(a)(ii) of this agreement, the following commitments shall be obtained:

Company Name	Approximate total contribution (over full project duration)			
	Cash ($)	Cash (% of total Project)	In-kind ($)	In-kind (% of total project)
Essex Powerlines Corporation	$1,134,209.70	14.02%	$14,388.40	0.18%
NODES AS	$0	0%	$656,484	8.12%
Essex Energy Corporation	$2,238,407	27.67%	$137,900	1.7%
Utilismart Corporation	$0	0%	$25,000	0.31%
Subtotal (non-IESO contribution)	*$3,372,616.70*	*41.7%*	*$833,772.40*	*10.31%*
IESO Contribution	$3,882,389.10	48%	$0	0%
Total	**$7,255,005.80**	**89.69%**	**$833,772.40**	**10.31%**

PROJECT MILESTONES

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount
0	***OEB Innovation Sandbox Support*** Activity/Deliverable: - Seek and receive regulatory guidance from the OEB's Innovation Sandbox as required *Note: Milestone 0 and Milestone 1 will run concurrently*	31/05/2022	$0
1	***Project Design*** Activities: - Establish DSO market design: o Develop DSO market design plan o Review DSO market design plan with IESO o Include Transmission-Distribution coordination protocol in market design o Seek approval and confirmation of coordination protocol from IESO - Establish market rules and alignment with IESO/OEB: o Review market rules with IESO/OEB - Seek confirmation of market participants: o Reach out to new and existing DER owners in Municipality of Leamington for confirmation *Note 1: For clarity, Essex Powerlines will be responsible for recruiting asset/DER owners, aggregators, flexibility service providers (FSPs) who will be participating in the pilot project. Once procured, Nodes will assist with the flexibility sellers through the process of registering on Nodes, signing membership agreements and understanding of the rulebook. Nodes will handle the onboarding of FSPs onto the platform, as well as the membership agreement and understanding of the Nodes Rulebook.*	31/12/2022	$89,640

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount

	- Establish Risk Mitigation Strategy and Marketing Outreach Plan to recruit potential participants and confirm market participants
	- Establish Baseline:
	  o Data collection and analysis
	- Reporting:
	  o Adjust final design as may be required as a result of the above tasks and produce a final design/scope document to guide market operations
	
	Deliverables:
	- Market Design for approval (including transmission-distribution coordination protocol)
	
	Note 2: In the development of a transmission-distribution coordination protocol, please review IESO Market Manual 4.2, Appendix B called "Short Notice Change Criteria" which includes the timing and notification requirements for dispatch data. Take note of Table B3. Please also to review IESO Market Manual 7.3 for submission of outages.
	
	- Report for market design and rules including the following sections:
	  o Executive Summary
	  o Introduction
	  o Methodology
	  o Market design and market rules
	  o Baseline parameters for future data analysis
	- Marketing outreach / Customer Acquisition Plan (Phase 1- minimum 5MW, Phase 2- minimum 10MW)
	- Letters of support from recruited participants		

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount
	- The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone *Note 3: A minimum of 5MW of capacity must be available for offer during Phase 1, confirmed via Letters of Support from resource owners in Milestone 1. Of this, at least 50% must be non-GHG emitting resource capacity. IESO funding for Milestone 1 is contingent upon these requirements.* *Note 4: If battery energy storage systems are planned to be installed at facilities that have existing generation assets with active FIT contracts, IESO approval of the proposed installations is required prior to accruing costs related to this activity. The IESO may request discussions with the FIT Supplier (renewable generation owner) and supporting documentation for the proposed battery installations.* *Note: Milestone 0 and Milestone 1 will run concurrently*		

2	***Software Development and in-field Upgrades***
	
	Activities:
	- Nodes Platform software upgrades:
	  o Integration into IESO wholesale market
	  o Integration into SmartMAP
	- SmartMAP software upgrades:
	  o Develop algorithm to recognize when flexibility is needed based on set of parameters
	  o Database (back-end) build out
	  o Develop algorithm to send buy signal and integrate into Nodes Platform
	  o Develop user interface
		31/03/2023	$2,761,307

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount

	- In-field upgrades:
	  o Connection Impact Assessments
	  o DER upgrades
	  o Installation of 1MW battery energy storage system (BESS) at the Leamington Pollution Control Plant
	  o Installation of BESSs ranging from 150kW – 800 kW (IESO approval of the proposed installations is required prior to accruing costs related to this activity)
	- Validate performance capabilities prior to market launch
	- Stress testing
	- DSO expertise consulting
	- Test functionality
	
	Deliverables:
	- A summary report on Milestone 2 including:
	  o Report on success of software upgrades, including results of stress testing and functionality testing
	  o Report on DER upgrades and field upgrades, including CIA and commissioning reports for the 1MW solar and battery storage solution, and commissioning reports for the 150kW-800kW BESSs
	- The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone		

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount
3	***Project Implementation – Phase 1*** Activities: - Market demonstration with confirmed market participants (minimum 5MW of offerable capacity, of which at least 50% is non-GHG emitting): o Run pilot DSO market - Data collection and analysis - Phase 1 Report document *Note 1: IESO guidance to be sought when developing test case scenarios for wholesale market demonstrations.* *Note 2: While the market is live, incorporate a minimum of two demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve the wholesale market.* *For clarity, while the market is live, Nodes will provide a functional market platform and metering system. This includes validating that flexibility has been delivered and providing the settlement services.* *Nodes will also provide technical and operational support to EPLC and to participating DER owners. In addition, during the trading phase, EPLC will need to place buy orders on the market to indicate the need for flexibility and allow for activation of flexibility. Meter readings can be submitted to the metering portal either by EPLC or DER/asset owners directly. The aggregators/DER owners will need to place sell orders in the market and deliver the flexibility that has been sold/traded. It is important to note that the Sequential market design will be trialed and tested in Milestone 3- Project Implementation Phase 1 of the DSO Pilot Project. The Sequential market design is outlined in Section 1.7.B of the project Proposal Part A.*	29/02/2024	$386,246* *255,000 of this payment is based on 1700 MW of cumulative capacity traded across the duration of Milestone 3, running Phase 1 of the market pilot (see Application Part B, Budget tab). This funding may be reduced accordingly and proportionally if cumulative traded capacity is reduced.

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount
	Deliverables: - Finalized report on Milestone 3: Implementation Phase 1 Report, including but not limited to: flexibility created, quantifiable outcomes, learnings from sequential market design approach, learnings from Tx-Dx coordination approach, barriers encountered, savings created for customers ($), non-wires alternatives value to Essex Powerlines ($) - Commentary on the following: With respect to the demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve in the wholesale market, comment on the order of events and the roles and responsibilities of the asset owners, the LDC (Essex) and the platform provided (NODES) that demonstrates that both the distribution and transmission systems do not face reliability issues resulting from this scenario - The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone		
4	***Project Implementation – Phase 2*** Activities: - Seek additional market participants: o Tender process to increase # of market participants *Note 1: Of the capacity acquired through the tender process, at least 50% must be non-GHG emitting resource capacity.*	31/01/2025	$629,396* *495,000 of this payment is based on 3300 MW of cumulative capacity traded across the duration of

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount

	- Confirm market participants:
	  o Signed agreements with new/additional market participants
	- Market demonstration phase 2
	  o Run phase 2 of pilot market (with added resources). For clarity, Phase 2 will trial and test the integrated market design approach to DSO/IESO coordination, as outline in section 1.7B of the Project Proposal Part A
	
	Note 2: IESO guidance to be sought when developing test case scenarios for wholesale market demonstrations.
	
	Note 3: While the market is live, incorporate a minimum of two demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve the wholesale market.
	
	- Reporting:
	  o Data collection and analysis
	  o Phase 2 report document
	
	Deliverables:
	- A finalized Report on Implementation Phase 2, including but not limited to: flexibility created, quantifiable outcomes, learnings from integrated market design approach, learnings from tendering process and customer engagement, learnings from Tx-Dx coordination approach, barriers encountered, savings created for customers ($), non-wires alternatives value to Essex ($)
	- Commentary on the following: With respect to the demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve in the wholesale market, comment on the order of
			Milestone 4, running Phase 2 of the market pilot (see Application Part B, Budget tab). This funding may be reduced accordingly and proportionally if cumulative traded capacity is reduced.

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount
	events and the roles and responsibilities of the asset owners, the LDC (Essex) and the platform provided (NODES) that demonstrates that both the distribution and transmission systems do not face reliability issues resulting from this scenario - The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone		
5	***Project Completion and Knowledge Transfer*** Activities: - Write report: o Include relevant market information, including benefits and constraints that occurred. Note: for clarity, EPLC will be responsible for driving the post project evaluation work. Nodes will work in collaboration with Essex Powerlines to obtain feedback from the participating aggregators/DER owners during or shortly after each pilot phase, share information on the types of analysis that other network operators have carried out as part of the post project assessments, and assist EPLC with accessing relevant market and trading data, where EPLC wishes to conduct quantitative analysis - Collect and share results and lessons learned: o Share lessons learned with the IESO and OEB o Work collaboratively with IESO and OEB to offer best practice solutions based on DSO pilot project results	31/03/2025	$15,800

Milestone Number	Reporting Milestone	Target Completion Date (dd/mm/yyyy)	Contribution Amount
	Deliverables: - A Final Report on outcomes of the DSO pilot project, including but not limited to: lessons learned around technical, regulatory, market-related or administrative components as well as recommendations for other LDCs pursuing similar approaches. The report will also summarize outcome learning from the Phase 1 and Phase 2 final reports - A DSO Pilot Assessment Report detailing various aspects of the project: o Qualitative and quantitative assessment of costs and benefits of procuring services from DERs o Assessment of operational efficiencies achieved by the pilot, including costs/savings to ratepayers o Qualitative and quantitative analysis of mitigation of large build-out costs of assets by achieving flexibility o Assessment of costs to EPLC associated with its contract to NODES and its own operation of DSO market o Quantification of increased reliability and resiliency gained from pilot o Coordination efforts/issues/resolutions between DSO and IESO o Assessment on integrity and reliability of the grid at transmission and distribution levels - The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone - Hold meeting(s) with the IESO and OEB to share lessons learned and market knowledge to help frame next iteration of regulatory policy		
		Total	$3,882,389

PERMITTED FUNDING

For the purposes of section 5 of this agreement, the following funding is permitted:

No duplicate funding or additional funding from the IESO or an IESO Administered or Funded Program is permitted.

ADDITIONAL REPORTS

For the purposes of section 9(d) of this agreement, the following reports are required:

(a) Upon request, which shall be no later than five (5) years following the completion of the Project, the Recipient shall provide to the IESO a report specifying the long-term impacts of the Project. The IESO may request that such report include information regarding the market effects of the Project, including but not limited to, the broader rollout of the Project and related electricity system impacts, changes in regulated and formalized structures, influences on decision and policy makers, acceleration in availability/adoption of solutions, and additional investments in the solution.

(b) Any other reports required as described in Schedule C.

SCHEDULE "B"

INVOICES AND ELIGIBLE EXPENSES

1. **Invoices:** The Recipient will submit invoices to the IESO as follows:

   (a) The Recipient may submit standard company invoice forms.

   (b) The following information must be reflected on each invoice:

      (i) Full Project name;

      (ii) Milestone number and description (e.g. 1 of 6, Pre-selection of …) and the date of the corresponding Milestone Report (including both the date submitted to IESO and date approved by IESO);

      (iii) Total Contribution Amount invoiced to date (e.g. $67,500/$240,000);

      (iv) IESO Purchase Order Number (which will be provided by the IESO following the signing of the agreement); and

   (c) Invoices must be delivered via email:

      To : accounts.payable@ieso.ca

      Copy to : gridinnovationfund@ieso.ca

2. **Changes to Invoicing Process:** In the event that the IESO needs to change its invoicing process, the parties agree to work together to update section 1 of this schedule.

3. Eligible Expenses:

The IESO may reimburse the Recipient for Eligible Expenses, but will not reimburse Ineligible Expenses, which shall comprise of the following:

Eligible Expenses	Ineligible Expenses
✓ Project-specific materials, equipment, products and services	× Budget deficits
✓ Salaries and benefits of employees directly involved in the design, selection, purchase and installation of the project	× Activities completed or costs incurred before the funding is approved or after the project is completed
✓ Professional, engineering, scientific, technical, management and contracting services, including training;	× Costs over $50,000 for any single consultant or contractor that has not been selected through a competitive process
✓ Permits and license fees	× Costs associated with the purchase of real estate
✓ Funding for marketing, communications and workshops directly related to the project activities	× Any overhead costs generated by the lead applicant or third parties, such as operating costs related to general maintenance and repair
✓ Costs associated with the monitoring, verification and evaluation of the project's impact, including data collection, processing, analysis and management	× Hospitality, incidental or food expenses for the project team
✓ Equipment and products, including diagnostic and testing tools and instruments, and associated software	× Hospitality or travel costs not in compliance with the government of Ontario's Travel, Meals and Hospitality Expenses Directive
✓ Costs associated with providing approved incentives to project participants	× Any costs not directly related to the achievement of the project's objectives as defined in the Contribution Agreement between the IESO and the applicant.

SCHEDULE "C"
PROJECT PROPOSAL

[*Project Proposal follows*]

Grid Innovation Fund and Innovation Sandbox

2021 Joint Targeted Call Project Proposal Template Part A

Applicant: Essex Powerlines Corporation

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Powering Tomorrow.

ONTARIO ENERGY BOARD

Contents

Part 1: Detailed Project Description

1.1. Applicant Information

Key Information

Project Title:	Essex Powerlines DSO Pilot Project
Applicant:	Essex Powerlines Corporation
Submission Date:	November 30, 2021

Applicant's Designated Contact

(e.g. project lead, project manager, etc.)

Name:	Amanda Panetta
Title:	Business Optimization Manager
Mailing Address:	2199 Blackacre Dr. Suite 200, Oldcastle ON, N0R1L0
Phone:	226-348-1864
Email:	apanetta@essexpower.ca

-Applicant's Executive with Signing Authority

(e.g. CEO, CFO, ED, etc.)

Name:	Joe Barile
Title:	General Manager
Mailing Address:	2730 Highway #3, Oldcastle ON N0R1L0
Phone:	519-737-9811 ext. 217
Email:	jbarile@essexpowerlines.ca

Accessibility Disclaimer: This is a fillable form and not all of the content in this document may be captured by a screen-reading device. If you require additional assistance to complete and submit this form, please contact gridinnovationfund@ieso.ca.

1.2 Brief Project Description

Provide a brief description of your project. Please keep your description to a maximum of 120 words.

The proposed project will enable Essex Powerlines Corporation ("EPLC") to perform as a Distribution System Operator ("DSO") with a scalable market design for activation of DER flexibility in near real-time. Using NODES platform, DER owners in the Municipality of Leamington will be able to participate in a pilot market whereby they can sell their excess or stored generation to support grid resiliency and transparency. DER owners will be enabled to monetize their investments while simultaneously adding flexibility to the grid as a non-wires alternative, allowing the DSO to adapt to the grid needs by maintaining reliable and steady power to its customers. In addition, the project will test coordination of the DSO market with the IESO Market via an interoperable solution.

Expected Project Duration: 36 Months

1.3 Project Overview

Please check off all categories and markets that are applicable to your project

Category	Target Market(s)	Project Type
☒ Demand Reduction ☒ Demand Response ☒ Load Shifting ☒ Efficient electrification ☒ Load Reduction ☒ System Integration	☒ Commercial ☒ Institutional ☒ Industrial ☒ Agricultural ☒ Commercial ☐ Existing Homes ☐ New Homes ☐ Single/Multifamily	☒ Strategic Opportunity ☒ Emerging Technology Demonstration ☒ Program ☒ Tool ☐ Strategic research

1.4 Budget Overview

Complete the table below following the example provided. Please list the names of any and all third party contributors and indicate whether or not their funding is confirmed. In addition to the budget outline below, Applicants must complete the Process Flow, Budget, Work Plan, Measuring Results, Project Risk Profile and Quantifiable Outcomes Excel template provided in Project Proposal Part B. "IESO Contribution" represents your cash request to the IESO. This request should not violate the leverage rules of the specific project category as stated in the Application Guideline.

EXAMPLE

	Approximate total contribution (over full project duration)			
	Cash ($)	Cash (% of total project)	In-kind ($)	In-kind (% of total project)
Applicant contribution	$25,000	22%	$5,000	4%
Partner 1 - Grantco (confirmed)	$5,000	4%	$15,000	13%
Partner 2 - Cogcon (not yet confirmed)	$0	0%	$10,000	9%
Other(s) - Widgetinc (confirmed)	$10,000	9%	$0	0%
Subtotal (non-IESO contribution)	$40,000	35%	$30,000	26%
IESO contribution	$45,000	39%		

APPLICANT TO COMPLETE*

	Approximate total contribution (over full project duration)			
	Cash ($)	Cash (% of total project)***	In-kind ($)	In-kind (% of total project)
Essex Powerlines Corporation	$1,134,209.70	14.02%	$14388.40	0.18%
NODES AS	$0	0%	$656,484	8.12%
Essex Energy Corporation	$2,238,407	27.67%	$137,900	1.7%
Utilismart Corporation	$0	0%	$25,000	0.31%
Subtotal (non-IESO contribution)	$ 3,372,616.70	41.7%	$833,772.40	10.31%
IESO Contribution	$3,882,389.10	48%	$0	0%
Total	$7,255,005.80	89.69%	$833,772.40	10.31%

** Provide actual name

*** In the highlighted cells right click and press "update field" to update the cell with correct value

1.5 About the applying organization

Describe the mandate and composition of the applying organization. Provide:

- a brief history of the organization (1 paragraph max);
- a description of the organization's primary business activities;
- a description of how the organization is funded and staffed;
- a description of the role of the organization in the energy sector.

Essex Powerlines Corporation ("EPLC") is a medium-sized, regulated utility in Southwestern Ontario under the Essex Power group of companies. The company's mission is to provide safe, reliable, and economical energy supply and services to its customers. EPLC delivers electricity to approximately 30,000 customers within its four shareholder communities, including the Town of Amherstburg, the Town of LaSalle, the Town of Tecumseh and the Municipality of Leamington, and is regulated by the Ontario Energy Board. EPLC has some of the most competitive distribution rates in the province and is also ranked as a Group II utility, indicating that it is among the most efficient utilities in Ontario.

EPLC is a forward-looking company that plans to improve and modify the distribution system to accommodate the ever-evolving electricity grid. With primary goals of providing reliable service to customers and enhancing the conservation and demand management landscape, EPLC continues to transform into a fully digital utility by investing in upgrades to the distribution system to help with customer trends in efficient electrification and conservation methods.

EPLC is looking to advance as a local distribution company and test its performance as a Distribution System Operator ("DSO") to help benefit its distribution system. The proposed model is similar to the "Total DSO Model" described in the IESO's June 2020 White Paper entitled "NWAs Using Energy and Capacity Markets". As a DSO, Essex Powerlines will be able to increase flexibility within its grid, ultimately providing increased reliability and resiliency to its customers.

1.6 About the project partners

Describe each of the partners' organizations. Provide:

- a brief history of the organization (1 paragraph max);
- a description of the organization's primary business activities;
- a description of how the organization is funded and staffed;
- a description of the role of the organization in the energy sector.

Over the past 4 years, NODES has been part of numerous projects in Europe and lately Ontario which are looking to unlock the value of operating flexibility in a way which creates transparency around flexibility availability and scarcity in the grid. We have successfully developed and implemented a market design which gives grid operators the tools to buy flexibility in the right place, at the right time and at the right price. Whilst at the same time providing a venue for flexibility asset owners to offer their flexibility during times of need and value stack their assets. NODES has developed an integrated market model for trading and settling flexibility between counterparts, across multiple time horizons, which are bringing the commercial and regulated domains to an independent marketplace. Our heritage in the Utility and Energy Markets means we have a strong understanding of the challenges faced with transitioning to a new energy system, and our collaborative approach means that we work with our clients to help shape the future market design around their needs. NODES AS was founded by Agder Energi AS (vertically integrated utility in Norway) and Nord Pool (European Power Exchange) in 2018 as a result of an award-winning smart grid project between Microsoft and Agder Energi. In Europe, NODES has been addressing the need to maintain a balanced network whilst maintaining low costs for consumers by looking at developing marketplaces where flexibility can be bought and sold across the horizontal and vertical levels of the grid. NODES has pioneered a market design which integrates the wholesale energy market, transmission system ancillary services market and the flexibility market within the distribution network.

Essex Energy Corporation is a dynamic energy company that was incorporated in June 2000 and is a wholly owned subsidiary of Essex Power Corporation. Essex Energy focuses on implementing a wide range of energy solutions that meet the needs of its consumers. As a leading energy technology company, Essex Energy has been called on to assist both nascent and established solar PV projects, and to date, manages over 100MW of distribution generation equipment. Essex Energy has grown its success and has exceeded boundaries in Ontario by developing its in-house expertise and Distributed Energy Resources portfolio of assets and services, as well as its engineering and consulting services.

Utilismart Corporation is a leader in utility digitization, transformation and advanced grid analytics, providing its innovative solutions to utility customers in North America since 2002. Data-driven solutions unlock the Corporation's transformative capability to meet today's challenges including the evolution of the distribution grid to enable the utility's transformation from a traditional poles-and-wires company to an Energy Management Services Company. Utilismart assists small and medium-sized utilities in improving system reliability, driving operational efficiencies and reducing distribution system management costs. Utilismart strives to deliver comprehensive solutions that accelerate digital transformation, including meter data management, outage management, engineering analysis, billing, asset management, grid visualization, rate analysis and energy management.

1.7 Project Concept and Rationale

In this section, fully describe the proposed project by addressing each of the points below. Please be specific, detailed, concise and structured. Claims need to be supported by citation, evidence and/or calculations with stated assumptions. Do not use embellishment or adjectives to upsell the solution. Bullet points, equations, calculations and quantitative descriptions are strongly encouraged where appropriate. Equations need to be numbered. References/citations can either be provided as an attached document or at the end of this document.

1.7.A. Describe the project concept and scope (max. 1 paragraph).

The concept of the project is to allow Essex Powerlines to perform as a DSO to better utilize new and existing DER assets in the field to create flexibility within its distribution system and mitigate local constraints on the grid. Using the NODES Platform, a pilot DSO marketplace would be created, allowing DER owners participating in the pilot to sell flexibility. In addition, a DSO/IESO coordination would be explored to ensure interoperability protocols, coordination instructions and prioritization of services between the IESO, DER asset and distribution system operator are met. Lastly, a 1MW solar PV solution and 1MW battery storage unit will be integrated into the project at a local pollution control plant within EPLC's service territory to help offset GHG emissions and ensure the project remains net negative in respect to GHG emissions. In addition, key areas within the Municipality of Leamington will be reached to participate in the DSO pilot project through the incorporation of a BESS. This will be offered through the pilot project to selected and interested parties. The scope of the project will allow for new and existing DER owners to monetize their assets within the marketplace, ultimately reducing costs for the participant while simultaneously supporting grid resiliency and increased reliability. A more reliable grid will lead to operational efficiencies, thus reducing costs for EPLC, which will be passed down to ratepayers. In addition, if the pilot is proven successful, it will enable future customer choice in relation to electrification and conservation methods by allowing customers to participate in the local DSO market.

1.7.B. Describe the project rationale. Include an explanation of the electricity issues or barriers and how the proposed solution will address them.

The pilot project proposes to solve two major issues or barriers: First, it will resolve local constraints on Essex Powerlines' grid specific to its services in Leamington, and second, it will remove existing barriers related to DERs and their potential impacts on distribution system assets and market participation Moreover, the project will test the coordination of DSO/IESO markets, helping solve grid constraints at a local, regional and provincial level.

EPLC is the local distribution company for the Towns of Amherstburg, LaSalle, and Tecumseh, and the Municipality of Leamington. The Municipality of Leamington has a diverse economy, with a focus on agriculture and manufacturing. Approximately 60% of Ontario's greenhouses can be found in the Leamington area. The high concentration of greenhouses in Leamington account for a significant amount of required load. EPLC currently has access to two feeders (M24 and M27) that service the Leamington community. During high producing months (approximately 6 months of the year), the load on the M27 feeder exceeds a comfortable level (greater than 50%). This limits EPLC's ability to transfer this load to the other feeder in the event of a failure. Existing measures to mitigate issues include requesting access to an additional feeder from Hydro One, however, there is obvious constraints and barriers to this process. The implementation of a DSO market would help alleviate the need to access an additional feeder by providing EPLC with the ability to foresee load constraints and therefore utilize generation from participating DERs to shift loads accordingly and mitigate potential loss of supply or other failures.

In addition, the pilot DSO project could provide insights and solutions to other grid constraints by utilizing DERs to their full capacity. The increasing penetration of DERs (including, but not limited to, grid-connected solar, EVs, battery storage systems, and wind) poses a barrier for utilities to effectively manage distribution needs and assure asset solutions are "right-sized". By increasing the capability of DERs within the distribution system, utilities would be able to avoid large build-out costs of assets by achieving flexibility through connected DERs. At the same time, the DSO project will incentivize DER owners to participate in the project by allowing them to monetize their assets. The potential to sell flexibility through the DSO market could entice further DER uptake and help achieve decarbonization and electrification goals set by both the provincial and federal governments.

Mitigating Barriers through Market Setup

The project will be set up in such a way to allow for optimization of DERs within EPLC's service territory, benefitting both the local and regional markets. Prior to market go-live, EPLC and NODES (in alignment with the IESO and the OEB), will collaborate on market parameters, procurement strategies and other aspects that EPLC may wish to consider. This will occur in Milestone 1- Project Design Phase. NODES will advise on best practices based on their experience from previous and ongoing projects and associated requirements and setups of flexibility markets in Europe. EPLC will ultimately decide what parameters, procurement strategy and other arrangements to use in the pilot DSO market project.

In addition, NODES has developed a Rulebook, which contains operational rules and commercial terms for trading flexibility in local markets operated by NODES. EPLC will collaborate with NODES to develop a market-specific schedule (Schedule 5 to the Rulebook), reflecting the local requirements in EPLC's service territory and utilizing market parameters or other arrangements that have been decided upon by EPLC.

While the market is live, NODES will provide a functional market platform and metering system. This includes validating that flexibility has been delivered and providing settlement services. The market platform will allow for EPLC and DER asset owners to buy and sell flexibility and submit meter readings via the portal. The market set up will work to effectively mitigate grid constraints and allow for increased flexibility locally and at the provincial level. EPLC will utilize its SmartMAP software to create an algorithm for the purpose of sending a buy signal to the Nodes platform when flexibility is needed to be purchased.

In order to remove barriers for IESO/DSO coordination, the project will seek to onboard some of the learnings from the European market on how flexibility markets could be used to address the growing demand on the network infrastructure. Overall, the DSO market will be set up in three phases allocation across the various project milestones: 1) Preparation Phase (preparing the market and determining rules that align with EPLC/IESO), 2) Pilot Phase (running the market), and 3) Performance and market analysis (knowledge transfer and dissemination).

The preparation phase consists of the following steps to ensure the correct understanding of the platform and integrated market rules, as well as market design validation ensures value to Ontario's electricity system and removes barriers outlined above:

1) Introduction and agreement into NODES Rulebook, definition of market rules in alignment with existing rules in Ontario, as well as market functionalities, parameters and platform.

2) Introduction to NODES products (ShortFlex, LongFlex)

3) IESO/Wholesale integration

Followed by the technical integration of systems and customer onboarding:

4) Ensuing the customer's capacity to submit metering values for validation and settlement

5) Registration and prequalification of relevant information on Nodes platform

6) Recruiting and onboarding of flexibility service providers/DER owners (EPLC and NODES)

The content of points 4-6 will be influenced by the work in the "Preparation Phase" and governed by the local market rules.

Solving Grid Constraints through DSO/IESO Coordination

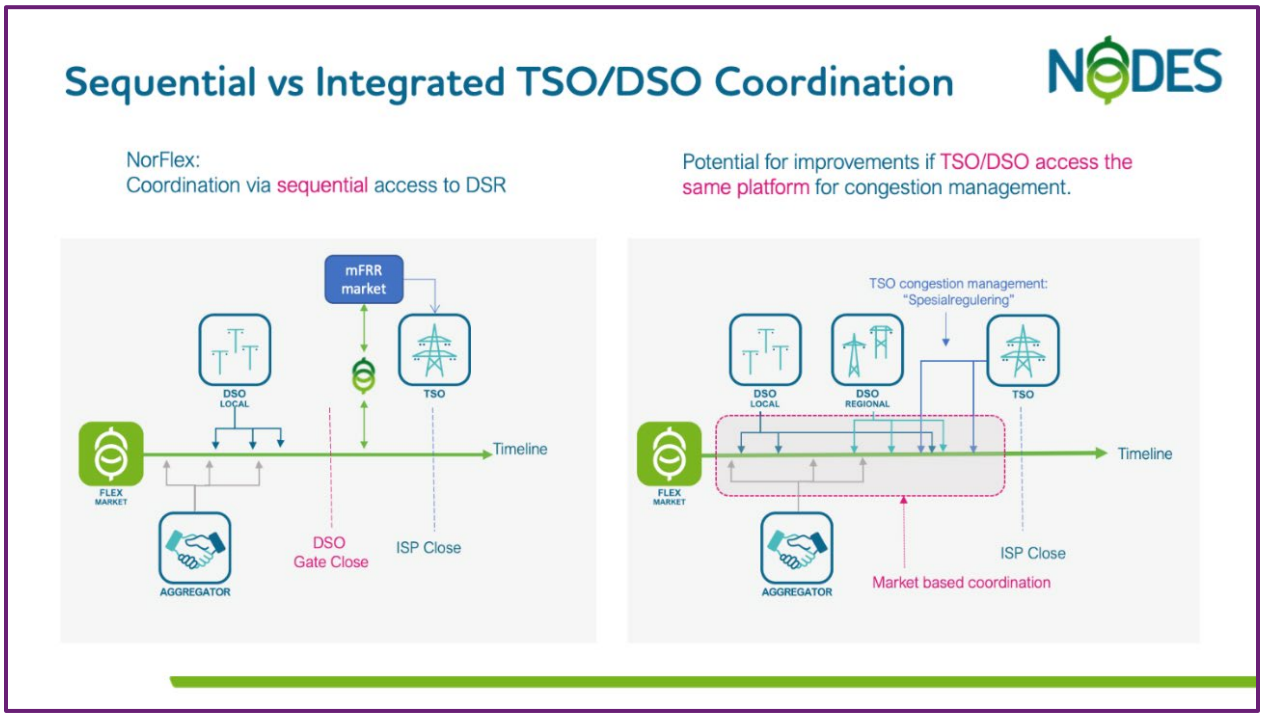
The project will aim to remove existing and forecasted barriers associated with grid constraints on a local, regional and provincial level by providing grid-level flexibility. As distribution companies commit further to procure flexibility services ahead of grid reinforcement, the need for flexibility will increase. As such, this project aims to understand how links could be created between EPLC and IESO-administered markets to minimize any risk as well as understand how the procurement of flexibility would impact the different markets on both market participation and imbalances and prices.

Balancing Coordination- Informing IESO about flexibility trades in the Essex Powerlines DSO Market

The NODES market design has been developed bottom up and allows flexibility to be traded in various constraint zones at any voltage level in the grid. EPLC will look to deploy the NODES platform to create the first, close to real-time flexibility market for a LDC in Ontario. This will allow for flexibility providers (aggregators) to offer flexibility in the day-ahead and intra-day timeframes with a number of features to ensure that any actions do not create imbalance in the wider IESO-administered market. In order to avoid imbalances, the IESO will automatically be notified when buy and sell orders are matched. NODES has the functionality to share trade information (volume, time and location) to the balance responsible party, and is configurable to meet the needs of the Ontario market.

IESO/DSO Coordination- link to the IESO-administered 10/30 min operating reserve market

NODES market design allows for technical aggregation of flexibility up to the transmission grid making this flexibility available to the IESO-administered Operating Reserve (OR) market. The DSO Pilot Project intends to test two IESO/DSO coordination models, illustrated below:



In the first implementation phase of the project (milestone 3), the focus will be centered on a sequential coordination process. First, a localized procurement of congestion management services by EPLC and thereafter, an offer of residual flexibility to the IESO's OR market. The market gate closure for local flexibility trading will be defined in the NODES Rule book (milestone 1), typically a specific number of minutes/hours ahead of IESO's market gate closure and delivery period. In more detail, this entails that EPLC trades will not collide or step into the IESO markets timeframe where IESO performs system rebalancing and/or ancillary services. The link between IESO and local DER owners will be handled by NODES, acting as an intermediary ("super aggregator") and enabling Distribution Energy Resource Aggregations (DERA) at scale.

In the second implementation phase of the project (milestone 4), EPLC (in coordination with the IESO), intends to migrate to the integrated market-based coordination process. In this model, the IESO will trade alongside EPLC, which allows both parties to trade closer to real-time in alignment with IESO's OR market rules. The core benefits of the integrated model rely on the ability of EPLC to handle congestion management services closure to real-time and the introduction of a market with competition on the buy side (a "two-too-many" rather than a market based on "one buyer, many sellers"). Put differently, this model will explore a true market-based coordination between DER/asset owners and buyers of flexibility, which is expected to increase the market liquidity and stakeholders' ability to better explore the accurate pricing of DER flexibility. NODES would no longer act as the "super aggregator", but rather solely focus on its role as an independent market operator, enabling IESO and EPLC to procure flexibility based on the same principles.

The IESO/DSO coordination has the potential to benefit the wholesale market by demonstrating a pathway for an LDC to procure operating flexibility in the local markets and congestion zones, with DERs responding to dispatch notifications in close to real-time. Moreover, the project will demonstrate the interoperability between different markets which can result in lower barriers to entry, increased liquidity, and the ability to meet both distribution system and wholesale needs independently and/or simultaneously. The DSO pilot project is anticipated to pave the way for a future-minded coordination approach between IESO-administered markets and the LDC/DSO, while also benefitting from value stacking, increased market liquidity for procurement of distributed flexibility, and improved stakeholders' understanding of correct pricing.

Overall, the pilot project will act as a first-of-its-kind DSO activation market within Ontario's jurisdiction. If proven successful, the pilot can be used as a proof-of-concept to help integrate DERs for the use of cleaner energy sources and to help alleviate constraints on the grid (both at a local and provincial level). The success of the pilot can also be used to help formulate regulatory guidance and best practice solutions for an innovative DSO framework to assist in the mitigation of existing barriers that the Ontario Energy Market currently faces.

1.7.C. Describe similar projects/programs/tools/solutions/research/technologies that exist in the market today.

There are no current programs or solutions that exist in the Ontario market today. A similar project that has been explored is the IESO York Region Non-Wires Alternatives Demonstration Project. While this project is exploring market-based approaches to secure energy and capacity services from DERs for local needs, it differs from Essex Powerlines' proposed project in that it is set up as an availability market, while Essex Powerlines is planning to use a close to real-time activation approach that increases the opportunity for DER participation. Essex Powerlines will be using the NODES Platform to create a marketplace based on buying and selling "flexibility" to mitigate local constraints, improve information about flexibility availability and to unlock the value of DER flexibility.

1.7.D. Describe how this project is unique and innovative from similar projects referenced above in 1.7.C.

Essex Powerlines' DSO pilot project is unique and innovative in comparison to similar projects in that it is utilizing NODES platform to create the DSO market. The market will be in near real-time and will allow for demand-side participation. Overall, the DSO pilot project differs from other projects in that it will act as a real-time flexibility market, testing real transactions and actual markets as an exercise for potential future-proof models. In addition, DER sizes that can participate range from 1kW+, allowing for even smaller, DER units to participate. The ability to have small-scale DERs participate supports the DSO pilot project in its ability for scalability if proven successful (the project is scalable to allow for both commercial and residential consumers to participate in the market, however, only larger DER assets will be considered for the pilot at this time).

The project is also unique in that it will test the ability of having an integrated market with DSO/IESO coordination. This will inform the IESO and OEB about the viability to operate new services alongside the existing wholesale markets, including providing valuable operational data from DER participants to the IESO. Through the NODES market design and utilizing some of the learning from the European market trials, the NODES marketplace will enable asset owners to value stack their availability across different markets. This means enabling additional revenue streams for flexibility asset owners, ensuring greater optimization of their assets.

The market design will allow for flexibility to be shown through the different layers of the grid, and depending on the model developed, flexibility can be bought top down, by allowing both the DSO and the IESO to compete against each other in procuring flexibility. In all, this means that the DSO and IESO can see orders posted on the NODES platform in a specific geographical area and the price and volume offered. The grid operator will be able to respond to these price signals and any matched transaction is automatically withdrawn from the market, preventing that order from being picked up by another grid operator, and thus preventing a single asset being used to deliver multiple service in the same operating hour. Dispatch notifications are then sent to the asset owners informing them when the asset needs to be dispatched and the volume. Overall, this setup is unique and innovative in the Ontario market.

The DSO pilot project is also unique and innovative in that it will be piloting market models and knowledge that have been tested in the European market, such as in Norway and Sweden. For instance, Nodes has experience with offering mFRR (manual frequency restoration reserve) services in Norway and Sweden, which can be translated into and tested in the Ontario market. Nodes, in the role of a technical aggregator (intermediary between the DSOs and the TSO), would pass unmatched orders from the local flexibility markets on behalf of all local aggregators to the TSO's mFRR market. In the rulebook for the European project, Norflex, the gate closure for local flexibility trading is defined to two hours ahead of the delivery period. In more detail, this entails that DSO trades will not collide or step into the TSO markets timeframe where the TSO performs system rebalancing and/or ancillary services. As such, the TSO/DSO coordination in the European market relies on:

- The DSO to obtain sufficient information in advance of gate closure to decide on the need for flexibility
- The aggregators/flexibility service providers to rebalance their portfolio ahead of the delivery period if a sell order is procured by the DSO, and
- Nodes to extract data from the order books which are not procured by the DSO and offer the excess flexibility to the mFRR market

As part of the European project, the Nodes platform is digitally integrated to the technology/platform that serves the TSO mFRR market. The current solution works by DSO/TSOs enabling mFRR for a given market, whereas FSPs can apply with their portfolios to participate. The TSO can then review the applications to ensure they meet the local demands and business rules. After an application has been approved, as explained, excess flexibility offered by FSPs in that market will be aggregated and offered to the TSO after the trading window has closed. In this circumstance, Nodes automatically handles the following scenarios:

- Negotiating start/stop times to comply with both parties' business rules
- Settling on a deal accepted by both parties
- Handling updates to start/stop times by the TSO
- Handling cancellation by the TSO
- Handling withdrawal of flexibility offered by FSPs

In all, the experience and knowledge gained from the European market as described above, will help make EPLC's DSO Pilot Project unique and innovative, as this set up has not been tested in the Ontario market to date.

1.7.E. Describe how this project enables savings and/or cost reduction for ratepayers in Ontario.

If the project is proven successful, it will enable cost savings and reductions for ratepayers in Ontario through various methods. First, by implementing a DSO structure, LDCs will have the ability to utilize flexibility to reduce constraints on the grid through demand reduction and load shifting. In turn, this will create a more reliable and resilient grid resulting in reduced loss-of-supply incidences (for example) and subsequently, reduced truck rollouts and man-hours spent to restore power. The cost savings from more efficient operations would therefore be passed down to ratepayers.

In addition, through the creation of a DSO market, rate payers can potentially see a reduction in electricity costs through the creation of a competitive market. The more DER owners that participate in the market, the more competitive costs will become, ultimately driving down costs of electricity. Moreover, DER owners will benefit from being able to monetize their assets which overall, could help reduce costs.

Lastly, the DSO pilot project will enable savings for ratepayers through further enhancement of the existing network by allowing new and existing DERs to be utilized in the field, at both the distribution and transmission levels. This in turn, will mitigate the need to add additional power via large build-out costs that would typically be passed down to ratepayers. For instance, a need for additional power supply was indicated by Hydro One for the Windsor-Essex Region and surrounding Chatham area. New transmission lines were proposed to improve bulk transmission system in the area, which would cost anywhere from $210 million to $290 million. As a potential alternative, if the DSO pilot project is found successful, the Region can utilize new and existing DERs to increase flexibility within the grid and mitigate the costs of new bulk transmission systems that will be passed down to ratepayers.

1.7.F. List the technology solution(s) (e.g. dispatching solution, telemetry solution, etc. and resource type(s) (e.g. solar PV, storage etc.) that will be included this project.

In order for the DSO market to be created, there are many technology solutions that will be included in the project:

NODES Platform – the NODES Platform is a marketplace that facilitates trading of flexibility (and energy) between grid operators and aggregators. As part of the technology package, NODES delivers the following:

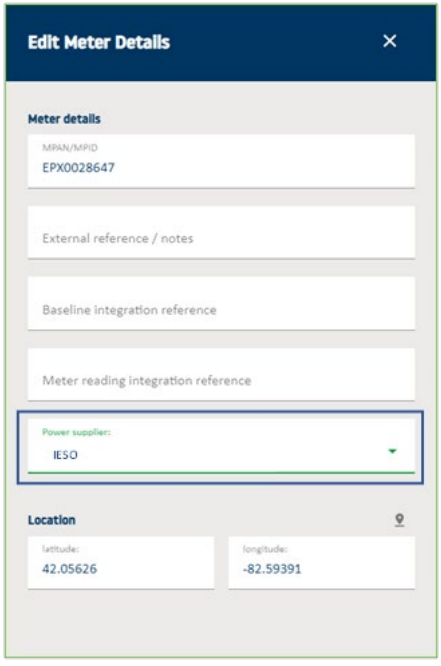
- A long-term market for buying flexibility (LongFlex), where services can be tendered for the reservation and activation of flexibility assets
- A close to real-term market place for the activation of flexibility assets.
- Validation of delivery and settlement services
- Training on platform functionality

- Platform and operation support (including incident response)
- Proactive marketing of bids and offers on the platform
- Dispatch notification
- Market messaging

The NODES platform includes an Integrated market design model where different congestion zones or voltage levels of the grid are linked to respective order books in order to facilitate the identification and activation of the most suitable solution for the grid constraints and hence, the grid coordination. The NODES market will be able to be accessed via the user interface or NODES API. This allows the customers to start with manual processes to understand the platform and market dynamics and to proceed to a more automatic implementation when ready.

To set up the technology, EPLC will define congestion zones (grid locations) where each congestion zone represents an order book in the ShortFlex market and link this to the SmartMAP software. Order books can be of any size and at any grid level. Furthermore, order books can be linked in a hierarchical order, so that an order placed at the lowest level of the grid can be purchased also higher up in the grid. Flexibility service providers("FSP")/aggregators can register their assets indicating location, meter point ID, and available flexibility. The registered assets must be assigned to a grid node by EPLC, to ensure the best assignment based on grid location and hence impact on a location-specific problem. During the testing phase of the Pilot Project, asset/DER owners will be required to demonstrate the ability to meet the EPLC market rules (aligned with the IESO energy and OR dispatches). Similar to projects tested in the European market, NODES and EPLC will run site acceptance tests to ensure that the technology works as intended end-to-end.

The NODES platform also includes software dispatch notification to DER/asset owners when buy and sell orders are matched. The seller configures what type of notification it prefers to receive (email, SMS, url callback, etc.) via the platform as well as the timing and frequency of the notification. In addition, the IESO will be registered as the balance responsible party (equivalent to "power suppliers" in European projects) when an asset/DER is registered to the NODES platform. When buy/sell orders are matched, IESO will be notified about the associated trade information, such as volume, time and location. This will include technical adjustments to ensure interoperability with IESO.



The above illustration is from the NODES portal showing how assets/DERs are registered to inform the IESO about trade/dispatch for rebalancing purposes.

The NODES platform includes validation components, allowing NODES to validate that the flexibility delivery by the seller using baselines and meter values. Baseline values represent expected consumption/production, without flexibility activation.

In addition, various parameters can be configured via the platform, including market close and opening, product duration, minimum bid size and other parameters. These parameters will be discussed in milestone 1 with EPLC, IESO, and the OEB. All NODES platform features will be accessible both manually and via the API and buyers and sellers of flexibility will have access to the marketplace via the NODES portal.

SmartMAP- SmartMAP is a geospatial load analysis tool that combines data from smart meter points and other sensors spread across the distribution system. It is a multi-faceted software that consists of engineering analysis, AMI technology, meter data management technology and is considered an advanced distribution management system. SmartMAP will be used by EPLC to determine when flexibility is needed for the LDC based on specific parameters (ie. loss of supply, high demand response times, etc.) and then will be developed to include functionality to send a purchase signal to NODES market platform.

In addition, Essex Energy Corporation has over 10 years of participation experience in the IESO real-time market with dispatchable generation. EEC has evolved with changing technologies by upgrading and refining its dispatch controller SCADA over the years. EEC's central controller is equipped with battery backup to add resiliency during utility outages. EEC possesses the expertise in-house for integrating new distributed generation resources, performing SCADA controller updates, automating dispatch instructions, establishing secure VPN communications, and developing dispatch and emergency operating procedures with the generator owners, thus playing a critical role in the development of the DSO pilot project.

Resource types include solar PV solutions, battery storage and natural gas/diesel generators. As part of the DSO pilot project, EPLC, through its affiliate company, Essex Energy, is proposing to design, procure and install a 1MW battery storage unit at the Leamington Pollution Control Plant. The installed battery storage would be used as an active participating asset in the pilot market. The battery storage solution will also play a pivotal role in achieving GHG emissions targets by ensuring an overall net negative GHG impact. In addition, Essex Powerlines has received funding through NRCan's Zero-Emission Vehicle Infrastructure Program to run a program for the installation of EV chargers throughout the Region. If interest is garnered, ZEVIP program participants could utilize their EV Charger stations to participate in the pilot project through a tender process decided by Essex Powerlines Corporation.

1.7.G. Quantitatively describe in detail how this project will achieve expected results for metrics referenced in *Project Proposal Document Part II* Worksheet "**6. Quantifiable Outcomes**" including any sustainable energy savings and/or cost reductions and/or increased reliability. Claims need to be supported by citation, evidence and/or step-by-step calculations with stated assumptions on how the outcomes were derived. All equations need to be numbered.

The project proposes to install a solar PV/BESS Hybrid Microgrid system, akin to the IESO's proposed Hybrid Integration Project foundational models, as well as enabling potential DERs as part of the pilot. Generation resources and control capabilities of microgrids can enhance fast recovery of distribution systems. The combination of monitoring and dispatching enhances capability of microgrids/DERs to pick up more interrupted loads and reduces the number of switching operations during restoration, hence improving reliability indexes as shown below:

Index	Without Microgrid/DER	With Microgrid/DER	Improvement

SAIDI (Hour/year)	0.7 *	Between 0.6 - 0.4	Between 10 – 40%
SAIFI (Frequency/Year)	0.5**	Between 0.48 – 0.45	Between 5 – 10%

Table 1. * Last 5-year average SAIDI = 0.7 hours **Last 5-year average SAIFI =0.5

The project proposes to install a 1MW solar system as a pilot, which will contribute to bill savings as below:

Annual Generation = (# hours) x (# days) x (capacity factor) x (solar capacity in kW)

Annual generation= 24 x 365 x 0.135 x 1,000= 1,182,600

Eq 1: 2020 price= 1,182,600 x 2.05*** = $24, 243.30

Eq 2: 2021 price= 1,182,600 x2.9775***= $25,211.92

***Hourly Ontario Energy Price (HOEP): 2020 average= 2.05, 2021 average= 2.9775

1.7.H. How will the successes, metrics and savings listed above in 1.7.G persist beyond project completion?

Energy savings will persist beyond the project completion due to the installation of a 1MW battery storage solution and additional behind-the-meter battery storage units throughout Leamington. If proven successful, the project will be used as a proof-of-concept for potential hybrid facilities and DSO models, with insights shared with the IESO and OEB. Assuming a successful pilot project and changes to the regulatory framework occur, the project will be able to persist, and savings and metrics will therefore be realized beyond project completion. In addition, the DSO model would be scalable to other local distribution companies, achieving savings beyond EPLC's service territory.

1.7.I. Describe how the scope of this pilot project relates to conservation and/or demand management.

i.e. reduction of electricity consumption and/or reducing the draw of electricity directly or indirectly from the IESO-controlled grid, and/or promoting consumers to change their demand profile by either consuming less electricity or shifting their consumption

The DSO pilot project directly relates to conservation and/or demand management through the reduction of the draw of electricity from the IESO-controlled grid. The DSO pilot project concept is to help integrate DERs for the use of cleaner energy sources and to help alleviate constraints on the grid (both at a local and provincial level). In addition, the DSO pilot will test load shifting and demand reduction for its participating customers, ultimately achieving conservation and demand management metrics. Savings due to load shifting will be calculated and shared with the IESO and OEB once participants are confirmed. Moreover, the installation of 1MW solar proposed as a pilot participant could help save 158 tonnes CO2e on an annual basis, consistent with evolving federal, provincial, and municipal GHG emissions reductions government policy.

1.7.J. Should this project not receive funding from the IESO, please describe the impact(s) this would have on the project.

The project would not be feasible without funding from the IESO, and therefore would not reach development. Given the nature of the business, there are currently no additional resources available for this project to reach its full potential.

1.7.K. A competitive bidding process is required for any subcontracts over $50,000.00 in value. If you require external consultants, please outline the key attributes and selection criteria you will use to make a decision. If you plan to continue using any third parties that have already been competitively procured, please provide information on them, including the role that they will play in this project, their existing contracted roles with your organization, and the manner and date that they were selected as your service providers.

A competitive bidding process is not required, as no external subcontract will be over $50,000 in value.

1.7.L. Projects funded through the Grid Innovation Fund cannot have a net-positive greenhouse gas (GHG) emissions impact. Please articulate how you will ensure that the solution being proposed will not contribute to a net-positive GHG emissions impact.

As part of the project solution, Essex Powerlines, through its affiliate company, Essex Energy, plans to design, procure and install a 1MW solar and 1MW battery storage unit at the Pollution Control Plant located in Leamington Ontario. The battery storage unit will be an active participant in the pilot market and will be a critical component of ensuring a net-negative GHG emissions impact. In addition, Essex Powerlines has located existing key areas within the Municipality of Leamington to participate in the DSO pilot project. Essex Powerlines is proposing to offer battery storage units behind-the-meter that vary in size in accordance with existing solutions at the proposed sites. The interested and selected participants will add approximately 1.3MW of clean energy to the DSO pilot project and have provided letters of support.

The following solution sizes will be added to the proposed project, subject to due diligence:

- 800 kW BESS (Grasshopper Energy)
- 150 kW BESS (Skyline Energy)
- 375 kW BESS (Sculler Energy)

It is important to note that there is an LSE arrangement at these existing key sites between the facility owners and renewable generation owners. Essex has reached out to existing renewable generation owners to garner interest in participating in the DSO pilot project and has received positive input from the potential participants. In addition, there is no conflict of interest with existing FIT contracts, as the renewable energy sources will not be affected by the addition of a BESS solution, nor will the existing FIT sites need to be materially altered to include the BESS. The BESS solution will be installed behind the meter, while the existing FIT contract assets are installed in-front of the meter, meaning that the batteries and existing renewable generation sources (FIT contracted assets) would be metered and settled separately.

For the purpose of the DSO pilot project, the BESS would be used to service the behind-the-meter load and provide local/wholesale demand response. Essex Powerlines will provide supporting documentation during milestone 1 and 2 of the market setup to ensure due diligence and no conflicts arise between existing FIT contract assets, the IESO and DSO pilot project prior to BESS installations.

Moreover, a letter of support from Lakeside Produce (Cervini Farms) has been obtained, adding a 10MW co-generator to the supply mix. The 10MW co-generator acts as a net neutral solution, as the heat from the electricity generation is put to productive use at the greenhouse.

In addition, the pilot project will not contribute to an overall positive GHG emissions when looking at Essex Powerlines territory as a whole. EPLC's current network consists of 19.7MW of solar, equating to an offset of 3.168 T CO2/hour. Please see below table for further explanation.

GHG Emissions Saved From Solar Generation			Note
Solar Capacity (AC)	19,700	kW (AC)	1
DC / AC ratio	1.2		2
Solar Capacity (DC)	23,640	kW (DC)	
C.F. (Essex County Region)	13.00%		3
Annual Energy Generated	26,921,232	kWh / year	4
# of Sunny Hours	1,138.8	Hours of full sun	
Marginal Emissions Factor (MEF)	134	g of CO2 / kWh	
	3,607,445,088	g of CO2 / year	
GHG Emissions Avoided	3,167,760	g of CO2 / hour	
	3.168	Tonnes of CO2 / hour	

Notes:
1. 19.7 MW AC is the existing installed solar capacity in EPLC territory
2. Early FIT didn't have any restrictions on DC size. By 2015, DC size was restricted to 1.2x the AC size.
3. CF= Capacity Factor: varies based on latitude, weather, panel angle to the sun, etc.
4. kWh/year= kWDC x 365x 24x CF

As shown above, it is clear that EPLC is in a net negative position with respect to GHG emissions. This does not include the proposed 1MW solar PV and BESS solution for the Pollution Control Plant located in Leamington, which will further better EPLC's position.

Within EPLC's territory, and more specifically within the Leamington area, there are several DER owners, including but not limited to:

- Leamington Pollution Control Plant (~1MW NG)
- Erie Shores Healthcare (~0.320 MW Diesel)
- Cerveni Farms (~10MW NG co-gen)
- Highbury Canco (~5MW NG)

Keeping in mind the existing offset with connected solar PV's, Essex Powerlines' plans to ensure the sum of GHG emissions of potential participants does not exceed the 3.168 T CO2/hr. A sample of potential participant breakdown and GHG emissions can be found below:

GHG Emissions Produced From Fueled Generators			Note
Participating Diesel Capacity	1,320	kW	1
Participating Natural Gas Capacity	1,000	kW	2
Emission Rate for Diesel Gen	0.872	Tonnes of CO2/MWh	
Emission Rate for Natural Gas Gen	0.670	Tonnes of CO2/MWh	
GHG Emissions Produced - Diesel	1.151	Tonnes of CO2 / hour	
GHG Emissions Produced - N. Gas	0.670	Tonnes of CO2 / hour	
Total GHG Emissions Produced	1.821	Tonnes of CO2 / hour	
GHG Emissions Saved	1.347	Tonnes of CO2 / hour	

Notes:
1. Targeted Diesel Capacity made up of two DERs:
   a. Leamington Pollution Control Plant @ ~1MW
   b. Erie Shores Healthcare @ ~0.32MW

2. Targeted Natural Gas Capacity made up of one DER
    a. Sun Parlour Homes @ ~1MW

Using this model, the market set up would assume a net negative GHG emission impact.

Moreover, the DSO pilot project can assume GHG emissions and cost savings by mitigating the need for large buildouts, such as additional transmission lines. For instance, by utilizing existing DERs in EPLC's service territory, EPLC will be able to create and manage flexibility without having to add additional equipment into the field, helping solve existing and future grid restraints. Currently, Hydro One is seeking approval for building a new 230 kV double-circuit line from Lambton TS to Chatham SS to supply forecasted load growth in the Windsor-Essex region and surrounding Chatham area. Cost estimates of the project would be approximately $210 to $290 million, and the installation would increase GHG emissions by approximately 21,000 tonne CO2 (see below for sample calculations). By implementing a DSO model, there is potential to mitigate the need for the proposed new circuit lines by utilizing existing DERs in the field, which would ultimately save taxpayer dollars and reduce GHG emissions.

	Total CO2 Emissions	Source/Notes:
Each tonne of Steel produced equates to	1.85 tonne CO2	https://www.carbonclean.com
Each Steel Transmission Tower consists of	50.00 tonne CO2	https://www.steel.org
Distance between Chatham and Leamington	75 km	(approximately via google maps. Could be longer)
Distance between towers	360m	(average distance is 275m to 450m)
# of Towers between Chatham and Leamington	208.33 towers	
Amount of steel needed for towers	10,416.67 tonne	
Amount of CO2 produced- only towers	19,270.83 tonne CO2	
Transmission Cable	520km	
Amount of steel in ACSR (eagle)	345.60 lb/1000ft SI equiv. 0.51 kg/m	https://nassaunationalcable.com *assuming Eagle 556 ACSR
Amount of steel needed (cables only)	270.01 tonne	
Amount of CO2 produced- only cable	499.52 tonne CO2	
Length of time to build Transmission Line	4.5 Years	(estimated, could be longer)
Working days for duration	1125 days	
Amount of diesel fuel burned	288 L/day	Estimated six trucks @ 80L/day running 60% of the time
GHG emission from burning diesel	2.70 kg CO2/L	https://www.nrcan.gc.ca
Amount of GHG emission (trucks only)	874.8 tonne CO2	
Total GHG Emission from building Trans, Line	20,645.16 tonne CO2 (1.84 tonne CO2/hr)	*estimating 10 hrs/day

Overall, the DSO pilot project would not result in a net positive GHG emission for the abovementioned reasons. By ensuring that the participants in the pilot do not equate to, or exceed EPLC's current net negative GHG position, as well as by mitigating large buildouts that would result in increased GHG emissions, the project will succeed in not adding new GHG emissions consistent with evolving GHG emission reduction government policy and will ultimately allow for EPLC to remain in its current net negative GHG position.

Furthermore, Essex Powerlines is aware of additional electrification resources being added within its service territory within the next 5 years. These resources will benefit the service territory by mitigating GHG emissions, however, have the potential to add constraints to the grid as electrification continues to become a predominant source. For instance, EPLC has multiple entities, including its shareholder municipalities, condominium owners, and developers that have reached out with plans to add electrification. Please note entities are customers of Essex Powerlines and will not be named at this time. Overall, the additional electrification will contribute to a cleaner, more environmentally friendly region by reducing GHG emissions

from various other sources. The addition of future electrification in EPLC's service territory is indicative of the growing interest in electrification methods and further contributes to the need to test and trial increased flexibility at a local and regional level. The DSO pilot project will act as a first-of-its kind project to help optimize and enable DERs, while also mitigating grid constraints from growing electrification needs.

Electrification Plans
- Plans include 10 EV chargers for 2022 - Expansion to 30 EV chargers 2023/24
- Transition of NG boiler to Electric - Addition of 800-1000kW load
- Municipalities investigating addition of electric buses within existing transit system (2023 plan) - Installation of 30+ EV chargers at various municipal properties
- Multiple condominium owners expected to add residential EV chargers
- Various developers planning to include EV charging stations for residents on their development lots
- Launch of ZEVIP will add 100-200 additional commercial EV chargers throughout the Region

1.8 Technical & Scalability Assessment

In this section, fully describe the proposed project by addressing each of the points below. Please be specific, detailed, concise and structured. Claims need to be supported by citation, evidence and/or equations with step-by-step calculations with stated assumptions. Do not use embellishment or adjectives to upsell the solution. Bullet points, equations, calculations and quantitative descriptions are strongly encouraged where appropriate. Equations need to be numbered. References/citations can either be provided as an attached document or at the end of this document.

1.8.1. Technology

1.8.1.A. Describe the proposed project's technology in detail. Clearly establish the basis for the project's novelty and technical and functional superiority. Provide diagrams, designs, equations, etc. as necessary (within this document).

A NODES market facilitates trading of flexibility between grid operators (LDCs/DSOs) and flexibility providers (aggregators and prosumers). The NODES technology offers integration both on the horizontal level from the DER to the LDC and on a vertical level from low voltage to the transmission grid. As part of the evolution of the technology, various European stakeholders within the energy industry were providing input to establish the integrated NODES market design (figure below). It is designed with a clear definition of roles and does not lock the DER owners in to one platform, one aggregator, one buyer or one technical solution. Rather it enables a variety of DER technologies to participate in the local DSO market and wholesale and reserve markets of the TSO/IESO.

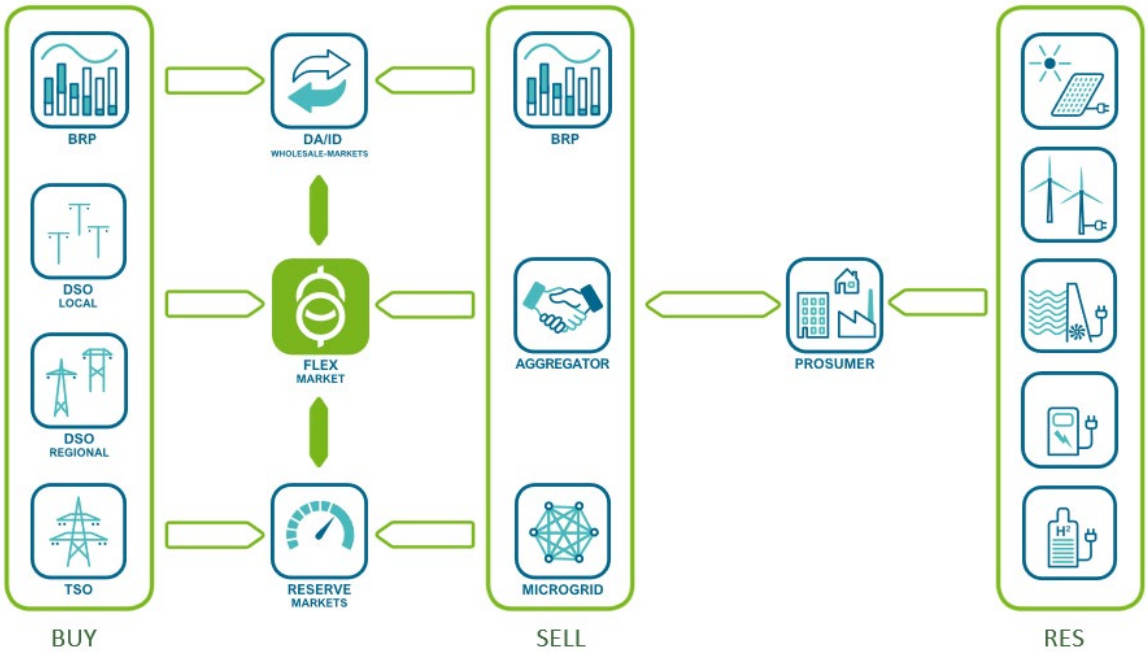


Figure 1 - NODES integrated market design © - to be adapted to comply with local and wholesale markets in Ontario.

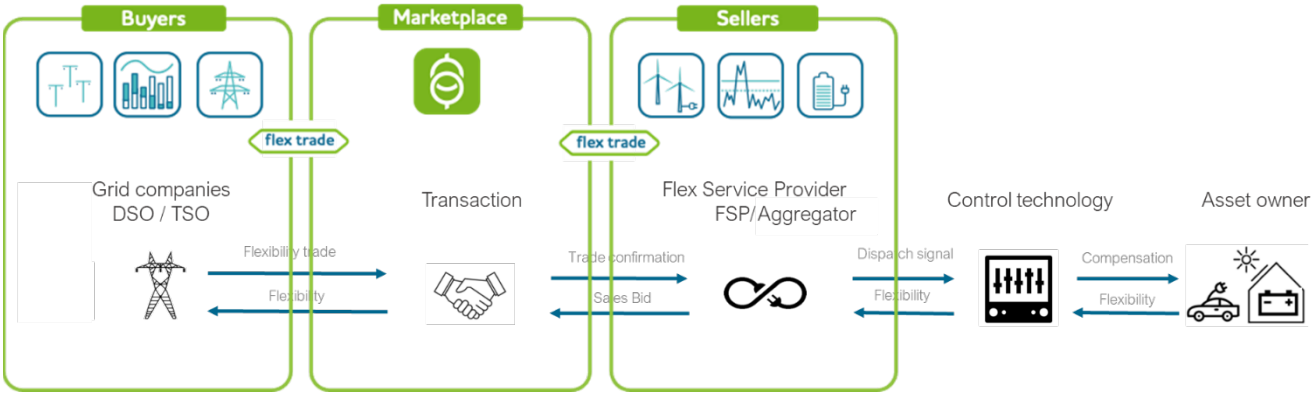


Figure 2 - Digital flexibility value chain ©

To align with local requirements and bespoke market needs, NODES works in a collaborative manor to establish the appropriate framework based on the NODES market design and the flexibility value chain. A core milestone of the project would therefore be to collaborate with relevant stakeholders to adopt experiences from how the NODES market design is applied in European projects in combination with how it may be utilized to support EPLC, other LDCs progressing towards the DSO role, and the IESO.

The NODES Platform offers end-to-end services such as grid model import, DER registration, trading desk/management, soft dispatch, validation (including metering collection and baseline) and settlement. In more detail, the following elements would be part of the service delivery to support the DSO pilot project:

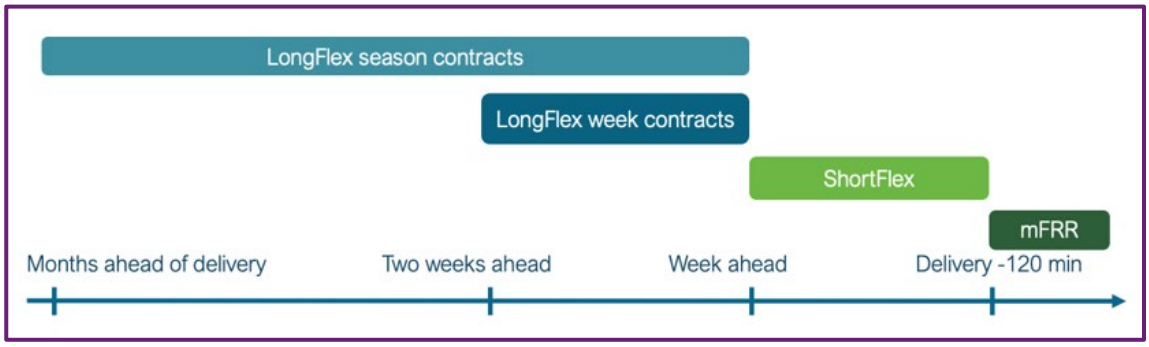
- **NODES** would act as an independent market operator for the DSO marketplace.
- **NODESmarket** would be the platform/technology where EPLC could define congestion zones and link zones so that operating flexibility offered at the lowest level of the grid would also be traded higher up in the grid, allowing for coordination between various DSO voltage levels and IESO-administered markets.
- **GridNodes** (grid polygons) would be mapped and used as congestion zones to establish an order book for buying and selling operating flexibility activation.
- **ShortFlex** is an activation product/service where aggregators/ flexibility service providers (FSPs) can offer portfolios of operating flexibility/reserve sourced from pre-qualified DERs/assets close to the delivery period.
    - Close to real-time market
    - Activation price only
    - Configurable market open/close & product duration
    - Continuous market, pay as bid
    - Congestions zones = order books

The ShortFlex market is used to procure short-term flexibility products (e.g. quarterly/15-minute products). The market framework includes schedules, alignment with other markets, as well as product duration and will be configured by EPLC according to the Ontario-specific regulatory rules and schedules or internal operational processes via the platform.

The Shortflex market is a continuous market. This means that for buy orders, orders are matched as soon as there is a sell order that is priced at or below the price of the buy order- and vice versa for sell orders. Both the buyer and seller can be the first to place an order in the market. (This is opposed to auctions, where sell orders are ranked and matched only at certain times). However, a deadline for bid submission can be defined in the rulebooks if necessary to coordinate the flexibility procurement with internal operational processes or the wholesale market (e.g. in accordance with IESO market rules, 10/30-min operating reserve and regulation).

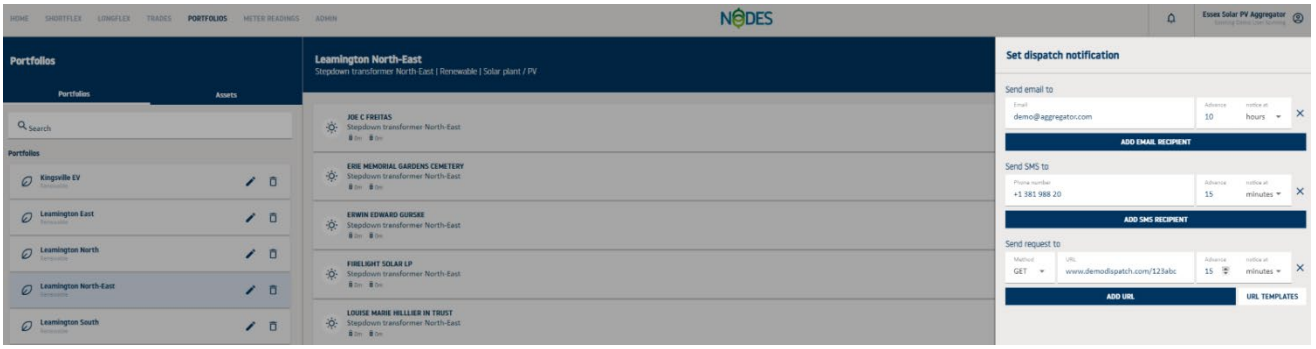
- **LongFlex** is a reservation product/service where operating flexibility can be sourced from pre-qualified assets and where the activation of these contracts can be facilitated in the ShortFlex market.

Longflex contracts typically consist both of an availability payment and an activation payment. The DSO can define different product durations and hours that are to be covered by the LongFlex contract on the Nodes platform. Examples that have been used by DSOs acting on NODES in the past include weekly and seasonal contracts. The registration of a LongFlex in a tendering process that allows FSPs to submit LongFlex offers to the DSO request. Once the DSO has selected an offer, the DSO and the FSP enter into a legally binding agreement. According ot this agreement, the FSP is obliged to offer the flexibility to the DSO according to the contract. LongFlex contracts are activated via the ShortFlex market. The activation price and relevant volume that are set out by the LongFlex contract feeds into the ShortFlex market for relevant delivery periods, where the LongFlex activation price competes with other sell orders. This allows the DSO to take the most cost-efficient actions.



- **InstantFlex** (reservation with automatic dispatch) may be developed to react on an automatic signal being, frequency, voltage or reactive power values

- **Soft dispatch notification** enabling the DERs to respond to signals from EPLC or the IESO



The type of dispatch notification and frequency are configured by the DER/asset owner in the NODES platform.

- **Metering and baseline** allowing NODES to verify delivery of the service against meter data (collecting meter data from EPLC and generating a simplified baseline based on historic values)
- **Settlement service** where NODES invoice the Buyer on behalf of the Seller and credit the Seller upon payment from the buyer
- **Rule Book** to govern the local DSO market which both the seller and the buyers sign up to. NODES market rules and product parameters facilitate so that DER owners can innovate and participate in a common market with EPLC (and IESO) as buyer(s).

The NODES rule book is developed to govern trading on NODES markets. The rule book contains market specific regulations that needs to be agreed upon and defined between EPLC and NODES in collaboartion with the IESO and the OEB during the earlier stages of the preparatory phase. These rules include guidelines and parameters regarding the market scheduling and alignment with IESO-administered markets, product information, minimum bid size, and baseline requirements among others.

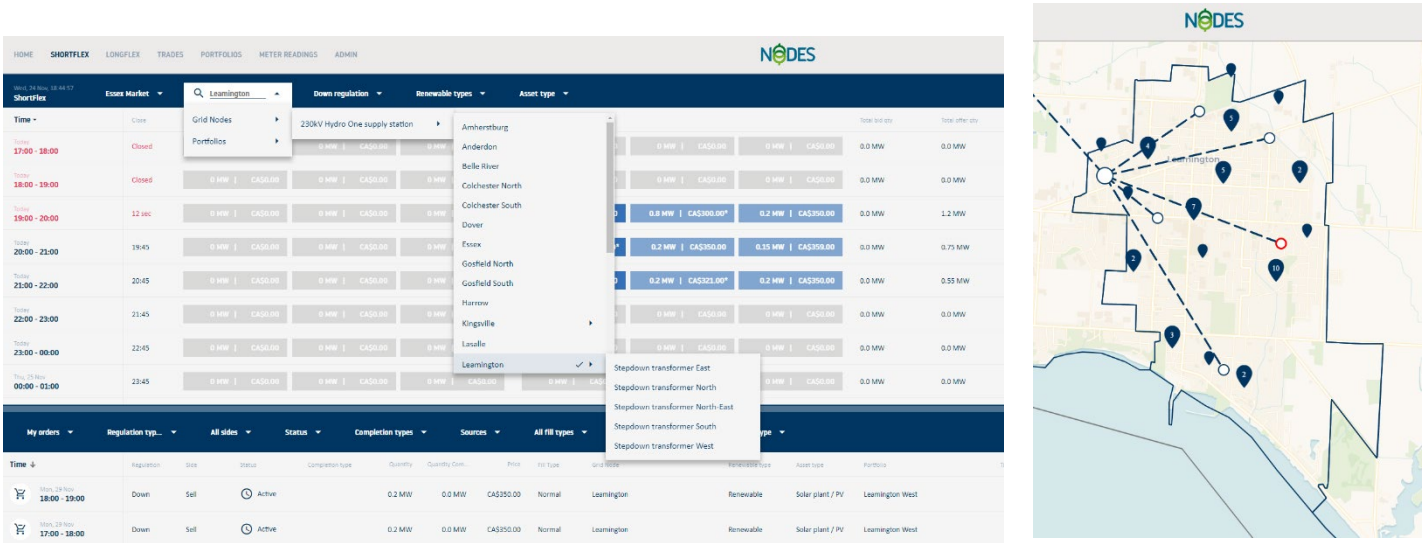


Figure 3 - Screenshots illustrating a congestion zones and associated order books below the 27.6 kV DS in Leamington. Order books are being defined and linked bottom up, meaning flexibility is offered from the lowest level of the grid up to the highest level of the grid. The buyer of flexibility can decide at which level (order book) they want to buy flexibility and all available flexibility below this level can be matched.

Moreover, NODES provides a stepwise process to onboard customers and approval procedures to test DER eligibility ahead of pilot project going live.

- Onboarding service via a registration portal called myNODES and in cooperation with the various projects on a more direct B2B approach.
- Required forms for prequalification can also be made available on myNODES for electronic registration of the market participants. Membership agreement and practical information like contact persons and bank details are maintained by NODES in its role as an independent market operator.
- Once a market participant has been signed up, the member may register DERs with NODES. These DERs are then verified and approved by the grid operator (corresponding to the grid level where the asset is connected) for trading on NODES. Once DERs have been verified they may be allocated into a trading portfolio and its flexibility offered as a bid into the market. Each portfolio bid is backed up with a baseline allowing NODES to verify delivery of the service against meter data.

- LongFlex availability contracts represent availability declarations and may be agreed via the NODESmarket platform, imported from other flexibility platforms (via API integration), or registered manually to reflect bi-lateral agreements.
- NODES operate a pay as bid, ShortFlex (activation market) where orders are continuously matched and cleared.
- NODES operate a settlement service where we invoice the buyer of flexibility on behalf of the seller and credit the seller once these invoices have been paid. Unmatched orders are sorted based on price and as such a merit order stack is available showing available volume at each price point. Matching of orders is being performed based on price within the specific location (order book).
- When a ShortFlex trade is done, trade confirmation is sent either via SMS, eMail or API. Multiple confirmations can be configured allowing to send messages at different timings i.e. at the time of trade, x minute before activation, or to both the flexibility provider and the asset owner. This information can also be used as a dispatch notification signal to the counterparts.
- Trade reports are available to the participants on an online basis and are supplied as part of the settlement documentation.

In addition, EPLC will be utilizing its geospatial analysis tool, SmartMAP, to determine patterns/constraints within its distribution system and send a signal to the Nodes Platform to purchase flexibility when needed. SmartMAP is a multi-faceted software that consists of engineering analysis, AMI technology, meter data management technology, and is considered an advanced distribution management system.

1.8.1.B. Outline work completed to date confirming/validating the feasibility of the project's technology (e.g. trials, third party validation, and expert comment). List any patents secured or applied for (include status).

Expert comments:

- NODES recognised as best practice in flexibility markets.
    - For more information, see here (38th minute).
- Evaluation of NODES by core stakeholders
    - A joint report by ENTSO-E and the European Associations representing DSOs (CEDEC, E.DSO, Eurelectric, GEODE), June2021.

Third party validations:

"We have enjoyed working with NODES to investigate new ways of procuring flexibility services. As part of our IntraFlex trial we have been investigating how to minimize the impact on DNO service procurement on the wholesale market as well as using the NODES platform to procure services closer to real time. This has been a great learning experience so far and we look forward to continuing to work together going forward." Matt Watson, Innovation and Low Carbon Networks Engineer, Western Power Distribution:

"NODES were great to work with during the IntraFlex project, showing a keen interest in participant feedback and a pragmatic approach to implementing this to continually improve the platform. ev.energy found NODES flexibility market to be a simple and effective tool for provide energy network valuable flexibility from smart electric vehicle charging, enabling a UK first for this type of close to real-time flexibility procurement." William Goldsmith, Head of Commercial & Grid Services, EV.Energy.

Under the Mitnetz market-based congestion management project, the demonstration project for using flexibility with a market-based congestion management approach showed a basic feasibility of the concept. The advantages of lower costs and less power adaption compared to conventional and RES curtailment. The flexibility which was offered voluntarily in this pilot had a significant higher effect on network congestions than conventional RES curtailment. This led to potential savings of around 40,000 Euro and 240 tons of CO2 on one day by using the flexibility market. For more information, see here.

1.8.1.C. Describe the current state of any programs/tools/research/technologies proposed to be undertaken, the state of development this project is intended to achieve, and activities required to establish commercial readiness. Please note which activities fall under the scope of this project.

NODES consider its technology readiness level (TRL) to be between 7 (Prototype ready for demonstration in an appropriate operational environment) and 8 (Actual technology completed and qualified through tests and demonstrations). The project aims to increase the technology readiness from level 7 to level 8 during the first operational phase of the project and close to TRL 9 during the second phase of the project.

Essex Powerlines' SmartMAP software is at a Technology Readiness Level of 7. The SmartMAP software exists in the market and has been demonstrated in an operational environment. The pilot project will include software development to create an algorithm for the purpose of sending a buy signal to the Nodes Platform when flexibility is needed to be purchased. Once developed, tested, and proven, the SmartMAP software will be ready to be leveraged in the DSO pilot project.

1.8.1.D. Check off all functionalities below that relate to the project, specifically around dispatching and compliance, telemetry and metering and settlement.

Dispatching and Compliance

A dispatching tool/software/technology that is able to receive offer data from DERs/DER resource aggregations (DERA) intending to demonstrate real-time[1] capabilities at the wholesale and distribution level.	☒
The dispatching tools/software/technologies is able to send dispatches, at random, from both the IESO and from the distribution system in accordance with IESO market rules: (5-min energy, 10/30- min operating reserve and regulation).	☒
The DER/DERA responds to dispatch in real-time to demonstrate the ability to meet both wholesale and distribution system needs independently and/or simultaneously[2]	☒
A non-resource owner/aggregator (such as the platform partner or third party) is able to verify compliance/non-compliance	☒
The project includes reporting on compliance with supporting evidentiary data	☒

Telemetry

The project demonstrates (via simulation/research etc.) how the IESO can receive aggregated telemetry from DERAs in accordance with market rules from a data granularity, data quality, privacy and cybersecurity for real-time visibility and forecasting. The project also demonstrates how data can be collected and used more efficiently by distributor(s).	☐
The project demonstrates what telemetry services will benefit the distribution system.	☐

Metering and Settlement

The project includes a research component on metering and settlement for DERAs at the wholesale and distribution levels	X
The research focuses on identifying all viable metering options that are compliant with market rules, standards and policies and that can be integrated with IESO metering business processes and systems	☐
The research includes potential alternatives (or amendments needed) to the above mentioned rules/standards/policies and the benefits/drawbacks of each, including the costs to implement.	☐
The research describes how other jurisdictions are dealing with real-time metering and settlement for DERAs	X

[1] "Real-time capabilities" means demonstrating actual, measureable, output changes in response to a dispatch instruction in accordance with market rules. Measuring compliance should not be done by the resource owner/aggregator.
[2] The IESO and the OEB are happy to work with proponents on what a potential "Call Order" can look like.

DER Operationalization (Optional)

The IESO and OEB recognize that there may be additional operational barriers not discussed above that can prevent DERs/DERAs from participating in wholesale markets and distribution systems. 'Please complete this optional section if your project addresses a barrier not identified above.

The project clearly identifies an operational barrier (not discussed above) and proposes a **demonstration**/ research/simulation on how the barrier can be overcome	☒
The projects/programs/tools/solutions/research/technologies benefits the wholesale and distribution system	☒

1.8.1.E. What makes your proposed programs/tools/solutions/research/technologies unique from and superior to those of your competitors and current baseline technologies? How exactly does the performance of your programs/tools/solutions/research/technologies compare against these solutions? Using the table below, demonstrate your understanding of the performance of these other programs/tools/solutions/research/technologies , and specify your performance goals.

Competitor Name	Measure (Technology)	Market design	DERs/Resources	Cost savings
Essex Powerlines Corporation	DSO Pilot project using NODES platform	Near- real time (availability/activation close to real-time) Coordination between DSO/IESO market to resolve existing grid constraints within EPLC service territory	Solar PV, battery storage, natural gas and diesel generators, co-gen, EV charger stations More opportunity for reduction in CO2e Allows for participation of smaller DER contributors	Incremental cost savings for utilities passed down to ratepayers Incremental cost savings for DER owners/market participants
Alectra Utilities	IESO York Region Non-Wires Alternative Demonstration Project	Auction (availability/tendering)	New and existing DER resources	Assumed cost savings for utilities/consumers
Hydro One	Vehicle-to-home (V2H) charging technology demonstration project	Availability (limited to DER use-case)	EV charger stations	Assumed cost savings for utilities/consumers

The performance factor most relevant to the DSO pilot project is the technology being used to operate the market, as well as the scalable near-real time market design. Essex Powerlines will utilize the Nodes platform to offer near real-time flexibility, helping resolve grid constraints and providing reliability.

1.8.1.F. Please describe how cyber security has been factored into your project and any standards/controls/tools that will be implemented to mitigate cyber security risk.

EPLC, as well its affiliate companies, Essex Energy Corporation and Utilismart Corporation, adhere to advanced cybersecurity standards and protocols. EPLC keeps up-to-date on cyber centric incident response plans, continues to use and stay relevant in security software (including anti-virus and firewalls), single-sign on with multi-factor authentication protocols and increased training on cyber security threats to mitigate human error, among others. Shared learnings from the DSO pilot project will include the identification of cybersecurity risks arising from hybrid participation, and the development of possible mitigation plans to address such risks for use in potential future scaled projects by the IESO and other local distribution companies.

The NODES Platform utilizes the Microsoft Azure Platform (certified on multiple levels with regards to system security) and other 3rd parties to comply with cyber security standards as well as protection of customer data and rights (including anti-virus, firewalls, infrastructure as code, multi-factor authentication, graphana monitoring services and more). NODES is devoted to continuously enhancing its security routines and updating its services according to industry standards and requirements. As part of the infrastructure design and maintenance, NODES works closely with dedicated Microsoft resources to ensure best practices are always applied.

1.8.2. Market

In this section, please describe the market that could utilize/implement the solution being proposed in this application.

1.8.2.A. Describe the target market. Please include references.

The DSO pilot project will first benefit prosumers in the Windsor-Essex region, including agriculture and other large industrial consumers. Once proven successful, the pilot project and proposed DSO framework can be scalable to other local distribution companies that also have flexibility constraints within their service territory. Essex Powerlines proposes to work collaboratively with the IESO and the OEB to disseminate information and details from the project and share the DSO market design in order to help curate the regulatory framework need for scalability across Ontario.

Overall, the target market that could utilize/implement the DSO market design being proposed would include local distribution companies. This would in turn, benefit ratepayers across Ontario.

1.8.2.B. What is the potential size, structure and trends of your target market?

Please include references.

The potential size of the primary target market includes the 63 other local distribution companies residing in Ontario, which would benefit millions of ratepayers. Current trends in the market include the need to create a more reliable and flexible grid, as well as the digitization of the distribution companies. As more severe weather events occur due to climate change, there is a greater need for resiliency. In addition, the trend of electrification of vehicles will serve as a challenge for utilities alike. The DSO market design will work to remove barriers of electrification while simultaneously promoting resiliency by enabling DERs to participate in the local market.

1.8.2.C. List current and potential customers in Ontario and please include level of interest and timeline for potential adoption by customers.

Please include references.

The DSO pilot project will be the first-of-its-kind in Ontario and as such, does not have a current customer base within Ontario jurisdiction. The DSO pilot project will be enabled using Nodes Platform, which currently serves customers within the European Market. Current customers of the Nodes platform have benefited from added flexibility within their grid system, as well as reduced costs for prosumers.

Essex Powerlines will act as the first customer in Ontario, testing the potential for the scalable DSO market design, and has a high level of interest for pursuing this endeavour. Customers within EPLC's service territory have been ascertained to participate in the pilot DSO project. If proven successful, the DSO market design will be scalable to other interested LDCs in Ontario, pending regulatory framework changes.

1.8.2.D. What are the non-regulatory and non-policy barriers to entry in your target market? How is this project designed to address those?

The non-regulatory and non-policy barriers to entry include existing capital and market expertise. Without a substantial fund or grant available, the project would not be feasible and therefore could not be adopted within EPLC service territory. As a result, available capital is the first and most relevant barrier to entry.

EPLC will work to gain the expertise and knowledge on the complexity of the market operations and rules. For instance, various IESO market rule amendments or exemptions will be required if the pilot is successful. This may include, but is not limited to, those IESO market rules, manuals and appendices pertaining to hybrid market (DSO/TSO) participant authorization and registration requirements (e.g. obtaining an OEB licence, prudential requirements, etc.) and introducing new class(es) of wholesale market participants (IESO Market Rules, Chapter 2); minimum size threshold (currently 1 MW), as well as general equipment and performance standards, equipment, testing, commissioning and monitoring requirements (IESO Market Rules, Chapter 4); implementing and maintaining appropriate communication methods and other interoperability protocols required to ensure compliance with applicable reliability standards including outage coordination between DSOs and the IESO (IESO Market Rules, Chapter 7); collection and validation of metering data and dual (DSO/TSO) participant settlement calculation (IESO Market Rules, Chapter 9); settlement of upstream transmission charges (IESO Market Rules, Chapter 10). Precedents for these types of amendments can be found in those recently made to facilitate electricity storage participation in the IESO-administered markets.

The project will also entail the development of forms of contracts between the DSO and the prosumer, while also being fully transparent with the IESO and OEB. The project addresses this barrier by working to develop an in-depth knowledge of market operations and utilizing the partnership with Nodes, as described more fully in section 1.8.1.A above, who have advanced experience implementing local DSO markets in the European market.

Lastly, a potential non-policy/regulatory barrier to entry includes stakeholder co-operation. EPLC has received letters of support from interested parties within the Leamington and surrounding areas, however, participation will be subject to due diligence. In addition, EPLC has been awarded funding through NRCan's ZEVIP program to provide funding for EV charger stations throughout the Windsor-Essex region. In Phase 2 of the DSO Pilot Project implementation, EPLC will put out a tender process to determine if any new EV Charger owners within the Municipality of Leamington would like to participate in the pilot market. EPLC is committed to creating a marketing outreach plan and risk mitigation strategy in Milestone 1 of the project to ensure there is adequate participation for a successful pilot project.

1.8.2.E. Outline the commercialization plan for the product, such as scaling up production and growing the company. Please include targets/thresholds that the projects needs to reach in order to commercialize/scale.

The DSO Pilot project will be conducted in a sample size area within the Essex Powerlines service territory. If the pilot is proven successful, EPLC will work in collaboration with the IESO and OEB to share market knowledge and information, including as pertaining to interconnections and interoperability, in order to frame a new iteration of the regulatory policies for DSO introduction and hybrid DSO/TSO participation in Ontario. Once regulatory barriers are removed, EPLC will be enabled to operate as a full-time DSO for the region of Windsor-Essex, having the ability to create flexibility by utilizing DERs assets in the surrounding territories. The framework and technology that is developed throughout the pilot project, can be further used to help transform other LDCs into DSOs.

Targets: proven success in large-scale pilot project (2) work with IESO/OEB to remove regulatory barriers based on success of project (3) work in partnership with NODES to commercialize technology "package" to be used with other LDCs across Ontario

1.8.2.F. Who specifically are your competitors and what is their market share?

Please include references.

DSO markets are currently non-existent in the province of Ontario. The DSO pilot project will be a first-of-its-kind and will offer a solution to the grid constraints that LDCs currently face within their respective region. Potential competitors could include other local distribution companies looking to perform as a DSO and utilizing existing assets within Essex Powerlines service territory; However, if proven successful, the DSO framework is meant to be scalable to other LDCs in order to allow for the fluid buying and selling of flexibility between LDCs in the future, thus creating resilient interconnected grids throughout Ontario (specifically regions of respective participating LDCs).

1.8.2.G. Describe your sales and distribution strategy to obtain the potential identified customers.

The distribution strategy involves leveraging existing relationships with the IESO and OEB to share the outcome of the DSO pilot project and help create the next iteration of the regulatory framework. The removal of existing regulatory barriers will allow for the scalability of the DSO project. EPLC will work to transfer knowledge to the IESO, OEB, and other LDCs interested in becoming a DSO by participating in industry-led events and hosting virtual and in-person webinars for knowledge dissemination. Technology utilized in the pilot project will be scalable to interested parties.

1.8.3. Business Model

1.8.3.A. Has there been an agreement reached to work together with key suppliers/partners after the pilot? **(I.e. an MOU/agreement level) If there are alternatives to these key partners/activities for the future, please describe them.**

EPLC and its project partners have signed a letter of intent to continue working together after the pilot project if proven successful and if regulatory changes are confirmed. Key partners include Essex Energy Corporation, Utilismart Corporation and NODES AS.

1.8.3.B. Please state whether the programs/tools/technologies are likely to be financially feasible for scaling following project completion. (I.e. Are there customers that are ready to purchase the product? What is the estimated payback period and underlying assumptions?) Claims need to be supported by citation, evidence and/or step-by-step calculations with stated assumptions on how the outcomes were derived. All equations need to be numbered.

The NODES market design gives grid operators the tools to buy flexibility in the right place, at the right time and at the right price. At the same time, the NODES Platform provides a venue for flexibility asset owners (DERs) to offer their flexibility during times of need and value stack assets. Revenue stacking de-risks the value of the asset as it provides access to several markets which there next creates additional revenue streams. Ultimately, revenue stacking can be used to shorten the return on the investment.

The tools used to create the DSO pilot project are financially feasible for scaling following the project completion. The integration into the IESO wholesale market enables emerging DERs to register assets to the NODES Platform after project completion, which provides a venue to participate both in local flexibility markets and alongside traditional resources in the wholesale market.

The estimated simple payback period is dependent on the utility distribution system need for flexibility and the number of existing DER owners willing to participate in the local market.

1.8.3.C. If the programs/tools/technologies are currently not financially feasible, please explain what will enable them to become commercially viable (e.g. lower technology cost). Please indicate if/how this project will address this.

Claims need to be supported by citation, evidence and/or step-by-step calculations with stated assumptions on how the outcomes were derived. All equations need to be numbered.

As stated above, the tools needed to pilot the DSO project will be financially feasible for scaling following project completion. Funding provided through this application by the Grid Innovation Fund will enable the DSO pilot project.

1.8.3.D. Please list any assumed grants/incentives for financial feasibility. If these grants/incentives were no longer available, would the project still be financially feasible?

The assumed grants/incentives for financial feasibility include the IESO Grid Innovation Fund. The project would not be conducted without funding, therefore rendering it non-feasible.

1.8.4. Regulatory Consideration(s)

In this section, fully describe the OEB Innovation Sandbox support and/or temporary relief from a regulatory requirement that will be needed in order for the project to proceed.

Please refer to Section 3 of the Application Guideline for information about OEB Innovation Sandbox support.

1.8.4.A. Please indicate any innovative arrangements included as part of the project that test new activities, services or business models that are not present in Ontario or contemplated by the current regulatory framework.

EPLC, together with participating DER owners and NODES AS are creating a business model arrangement in Ontario which already exists and has been proven to be robust and successful in Europe. This business model allows for passive generation capacity (DER owners) to be activated in a flexible manner using a software platform (NODES AS) which creates a market place in near real time and which offers a level of grid flexibility to the DSO (Essex Powerlines Corporation).

This arrangement will facilitate the testing of new DSO activities and services including resource (DER) procurement, resource stacking, and local market operations and administration including price-setting, scheduling and dispatch, etc.

The aforementioned arrangement incorporates elements of gird resiliency, reliability, innovation, constraint mitigation, efficient load management, and an integrated market evolution by incorporating, amongst other things, already existing generation assets with other elements such as solar PV and battery storage. The DSO (using the NODES AS platform) together with DER owners will ultimately deliver a net negative GHG emission impact as well as market flexibility that will positively impact grid management for the benefit of the ratepayer.
The pilot project will in no way detract from EPLC's duties to maintain the reliability and integrity of its distribution system nor to fulfill its service quality requirements to existing customers.

1.8.4.B. Please list all regulatory requirements within the OEB's jurisdiction that may prevent or impede the innovative arrangements being proposed, and describe how these regulatory requirements present barriers to the project moving forward

Regulatory requirements within the OEB's jurisdiction that may prevent or impede the innovative arrangements being proposed may include, but are not limited to, the following:

- EPLC submits that the proposed project and associated business activities fall within the scope of "distribution electricity" as defined in subsection 71(1) of the *Ontario Energy Board Act*, as further supported by the August 6, 2020 OEB Staff Bulletin on *Ownership and operation of behind-the-meter energy storage assets for remediating reliability of service* insofar as the pilot project is aimed in part at addressing distribution concerns to improve reliability for customers
- In the alternative, EPLC submits that the pilot project falls within the scope of services contemplated in subsection 29.1 of the Ontario *Electricity Act*, subsection 71(2) of the *Ontario Energy Board Act* and the Ontario Energy Board *Conservation and Demand Management Requirement Guidelines for Electricity Distributors (colloquially referred to as the CDM Guidelines, last updated August 11, 2016)* insofar as the project entails activities aimed at improving efficiency of the distribution system and a 1MW energy storage system that will defer specific capital spending for the distribution system and reduce the draw from the electricity grid.
- Continued support to enable distributors to seek distribution rate funding for CDM activities for the purpose of meeting identified distribution system needs can be found in the August 5, 2021 OEB Staff Discussion Paper, *Updating the Conservation and Demand Management Guidelines for Electricity Distributors (EB-2021-0106),*

which also recommends that "latitude" be provided in determining which types of "new and innovative categories" of CDM solutions are eligible for distribution rate funding.

- Notwithstanding, we understand that the OEB may not agree with EPLC's legislative and regulatory interpretations, in which case implementation of the pilot project could face the following regulatory barriers unless the identified exemptions are granted by the OEB
- If, and to the extent, DSO market operations and activities (e.g. resource procurement, value stacking, market operations and administration including, price-setting, scheduling and dispatch, etc.) are deemed by the OEB to be outside the scope of "distributing electricity", and are deemed by the OEB to not otherwise be captured under s.29.1 of the *Ontario Electricity Act*, an order under ss.71(1)(4) of the *Ontario Energy Board Act* may be required as well as an exemption from the standard accounting procedures relating to non-distribution activities set out in Article 330 of the *Accounting Procedures Handbook and G-2009-0300 Accounting Guidelines* on the basis that it would by unduly burdensome and not required for ratepayer protection.
- If and to the extend DSO participants (DERs) bypass the DSO level and provide flexibility directly at the wholesale level and are not deemed by the OEB to qualify as energy efficiency or load management activities under subsection 3.5.2 of the *Distribution System Code*, then an exemption from subsection 3.5.1 of the *Distribution System Code* (Bypass Compensation) to charge bypass compensation to customers may be required.
- An exemption may be required from subsection 3.6.1 of the *Distribution System code* (Upstream Transmission Connections) to charge capital contributions from beneficiaries for any new or modified transmitter-owned connection facilities that satisfy a 5MW or greater non-coincident peak demand that may be required to facilitate the pilot project
- Assuming the above exemptions are granted, no exemptions from licence conditions will be required
- No exemptions from the *Affiliate Relationships Code* are required as the design, procurement, and installation of the 1MW solar and 1MW battery storage unit at the Pollution Control Plant is being done by the applicant's affiliate, Essex Energy, in compliance with the *Affiliate Relationships Code.*

1.8.4.C. Please describe the OEB Innovation Sandbox support being sought in relation to any regulatory barriers to implementation.

EPLC is seeking OEB Innovation Sandbox support to assist with the regulatory barriers mentioned above in section 1.8.4.B. Overall, the barriers mentioned above will assist with:

- Identifying and addressing regulations that unnecessarily limit the ability of DERs to provide wholesale and distribution services
- Seeking opportunities to improve collection and dissemination of data to support planning, operations and enablement of consumers and third parties to create value for consumers
- Determining the appropriate role of LDCs and others for DER integration at the distribution level from a starting point of consumer interests and ratepayer value
- Enabling cost-effective and competitively procured Non-Wires Alternatives including energy efficiency and DERs
- Enabling fair competition in the provision of distribution level services
- Acting on near-term opportunities while being mindful of long-term implications
- Enabling fair competition at the distribution level as required
- Reviewing of the Affiliate Relationship Code to determine its effectiveness in separating regulated and non-regulated functions (as a consideration)
- Discussing open access rules for DERs and DER aggregations at the distribution level

1.8.4.D. If applicable, please describe the approach other markets/jurisdictions have taken to remove relevant regulatory/policy barriers.

EU energy policy framework – Clean energy package, Art. 32: "Member States shall provide the necessary regulatory framework to allow and provide incentives to distribution system operators to procure flexibility services…"

In **the UK**, the regulator has set out a change in the price control arrangements of the Distribution Network Operators (DNO). By providing a common set of objectives across the DNOs in the UK, the regulator has removed some of the risk associated to establishing innovative projects which could then be rolled out nationally.

- **How to set price controls that drive innovation and competition?** Ofgem considers that companies should innovate more to deliver short-term financial efficiencies within BAU activities, while the innovation stimulus should focus more on the energy system transition, increasingly coordinate with other public funders, and increase third-party involvement. Ofgem outlined some of the measures aimed at innovation and competition as part of the RIIO-ED2 decisions (e.g., a new innovation funding pot for future-facing strategic challenges and retained NIA funding). It highlighted that additional tools for driving innovation and competition may be developed during the RIIO-ED2 sector-specific methodology.
- **How to set price controls for a smart, flexible energy system**? Ofgem highlighted the important role of 'flexibility' markets and services that may increasingly offer lower-cost routes to delivering an output. It stressed the importance of DNOs in enabling these markets to develop, and expects the Open Networks Project to support development and coordination of flexibility markets.
- **How to set price controls in a big data environment?** Ofgem identified that the modern data environment and data access could enable a range of parties to take on new roles in delivering a fully decarbonised system. It will provide further guidance on how this area might affect the RIIO-ED2 methodology following the conclusion of its ongoing data best practice workstream and forthcoming consultation on a Whole Electricity Systems licence change.

More information on the this program can be found at the link below:
https://www.ofgem.gov.uk/sites/default/files/docs/2020/07/ed2_ssmc_overview.pdf.

In addition, the Federal Energy Regulatory Commission ("FERC") Order No. 2222 in the U.S was announced to help promote competition in electric markets by removing barriers for distributed energy resources. FERC Order No. 222 enables DERs to participate alongside traditional resources in the regional organized wholesale markets through aggregations, opening U.S. organized wholesale markets to new sources of energy and grid services (Source: https://www.ferc.gov/media/ferc-order-no-2222-fact-sheet). Under this new rule, regional grid operators must revise their tariffs to establish DER aggregators as a type of market participant, allowing them to register their resources under one or more participation models that accommodate the physical and operational characteristics of those resources (Source: https://www.ferc.gov/media/ferc-order-no-2222-fact-sheet). Each tariff must set a minimum requirement for DERs that does not exceed 100kW, and must also address technical considerations such as:

- Locational requirements for DER aggregations
- Distribution factors and bidding parameters;
- Information and data requirements;
- Metering and telemetry requirements; and

- Coordination among the regional grid operator, the DER aggregator, the distribution utility and the relevant retail regulatory authority.

Sources:

- https://www.ferc.gov/news-events/news/ferc-opens-wholesale-markets-distributed-resources-landmark-action-breaks-down
- NTD: "Power Transfer Distribution Factors (PTDF) indicate the incremental change in real power that occurs on transmission lines due to real power transfers between two regions. These regions can be defined by areas, zones, super areas, single buses, injection groups or the system slack."
- https://www.federalregister.gov/documents/2020/10/21/2020-20973/participation-of-distributed-energy-resource-aggregations-in-markets-operated-by-regional. Section 185.

1.8.4.E. If seeking OEB Innovation Sandbox support, please describe the potential for the project to provide clear benefits to consumers and the safeguards that will be in place to provide a reasonable degree of consumer protection during the trial.

Essex Powerlines is seeking OEB Innovation Sandbox support for its DSO Pilot project. The pilot project will provide benefits to consumers by enabling a more reliable and flexible grid, enabling cost savings and potential reductions for rate payers, and enabling customer choice via electrification and conservation methods. Existing DER asset owners will have the choice to participate in the DSO market and the wholesale market, while addressing issues of hidden coupling and tier bypassing, ultimately helping create a more flexible grid while benefitting from monetizing their assets.

Essex Powerlines will ensure that there are clear safeguards for participating consumers during the project design and implementation phase. Market rules and regulations will be created to optimize benefits for the consumer and ratepayer at large, whilst also benefiting the grid. During Milestone 1 of the project, EPLC will engage with the IESO and the OEB to align the market rules and setup.

1.8.4.F. If seeking OEB Innovation Sandbox support, please describe within what timeline Sandbox support and (where applicable) a decision on any related exemption application is required in order for the project to proceed.

Essex Powerlines is seeking Sandbox support for its DSO pilot project. The timeline for support corresponds with the early phase of the project (Re: Milestone 1- Market design and Market rules). Without Sandbox support, the project would not be able to proceed.

Part 2: Evaluation Criteria

The details of the evaluation criteria are provided below for your reference. Further details can be found in the Application Guideline found here. Applicants with highly ranked applications will be provided with the opportunity to work with the Review Committee to refine their applications to address any questions and/or feedback. Once questions and/or clarifications have been addressed via an updated application, the Review Committee will bring high ranking applications forward for executive approval in Q1 2022.

Category	Evaluation Criteria	Weighting
Potential Impact	Significance of ratepayer cost reduction potential	10 points
Market Capability Building Impact	The project builds the skills and knowledge required by the market to accelerate the adoption of cost-effective DER solutions to meet the needs of customers and the electricity system	5 points
Market, program or technical advance	The project is testing a novel approach and advances the "state of the art" in Ontario	10 points
Project Team & Partners	The project team has the qualifications and experience required to execute a large-scale, strategic project. The project team provides evidence of appropriate partnerships, including a utility partner where appropriate. A minimum of three (3) partners (including lead applicant) have been listed and Letters of Support have been provided. Projects with a greater number of highly qualified, experienced and committed partners will be given greater points (due to the capacity building aspects that such projects offer).	15 points
Project funding	The project has secured funding additional to the funding requested from the IESO that is required to complete the project. The overall funding proposal satisfies IESO funding requirements (minimum 25% cash contributions from lead applicant and partners towards the total project value) and appropriately allocates risk between the proponent, partners and the IESO. The lead applicant is making a cash contribution toward the project. The financial ask of the IESO is a minimum of $1 million. The IESO's funding will not account for any more than 50% of total project costs.	10 points

Project purpose and outcomes	The project outcomes are aligned with the high-level objectives of this joint call and have the potential to influence regulatory evolution and wholesale market participation. The project timeline allows for outcomes to be made available so that the IESO and OEB may use the results for future planning initiatives.	5 points
Project design	The project's design is reasonable and likely to meet the stated objectives. The project satisfies the criteria of section 2 in the Application Guideline. The scope, work plan and scheduled tasks are contained in a clear and logical framework that supports successful completion of the project (for example, any DER assets or other resources included in the project scope have already been commissioned or will be commissioned in the near future).	15 points
Wholesale Market and Distribution Participation	The project demonstrates the prospect for mutual benefit to both the wholesale market and distribution systems and coordination between these systems. Projects that can test solutions under multiple project categories in Section 2.2 of the Application Guideline will be awarded greater points.	15 points
Regulatory Innovation	The project includes innovative arrangements that test new activities, services or business models for project proponents that are not currently present in the current regulatory environment or contemplated in the current regulatory framework. The application identifies regulatory requirements that may prevent or impede the innovative arrangements, activities or business models being proposed. Where regulatory barriers are identified, the application identifies the Sandbox support required to address regulatory barriers to implementation.	15 points

Part 3: Project Team & Partners

In this section, please outline the composition of the project team and list any project partners. Note the role that each person and organization participating in the project will play. Include the applicant organization in this table. If a third party is not yet part of the team, please identify the accountability they will be responsible for and enter TBD for the name and organization. Letters confirming the role and responsibilities of any and all partners must be included with the application. Please attach CVs for project team members as an appendix.

3.1 Project Team

Project team member	Organization and job title	Major accountability
Joe Barile	Essex Powerlines, General Manager	Senior Manager Sponsor
Anthony Clavet	Essex Powerlines, Manager of Engineering and Assets	Senior Engineer
Imtiaz Ahmed	Essex Energy Corporation, Software Integration Specialist	Project Manager/Engineer
Kelly Hext	Essex Energy Corporation, Software Development Supervisor	Software development
Patrick Casey	Essex Energy Corporation, Electrical Engineer	Market knowledge and DER connections
Sheldon Tracey	Essex Powerlines Corporation, Distribution and Asset Engineer	Distribution and Asset knowledge
Steve Ray	Utilismart Corporation, President	Senior Manager
Kosta Karagiannis	Avrio Consulting, President	Software Development
Svein Jørgen Sønning	Nodes, Head of Technology	Lead contact with project partner/market knowledge
Richard Sarti	Nodes, Director of Marketing and Sales	Lead contact with project partner/market knowledge
Sofia Eng	Nodes, Senior Project Manager	Project Manager
Sølve Ekblom Solheim	Nodes, System Architect and Developer	Software development

3.2 Project Partners

Organization	Project Role (e.g. participant, funder)	Contribution Amount	Contribution Type (Cash / in-kind)	If in-kind Contribution, please specify in what form (e.g. Domain Expertise Consulting, Equipment)	Status (Confirmed/Unconfirmed) *Please note that if you are invited to submit a proposal your partner must confirm their contribution in writing to the IESO.
NODES AS	Funder	$656,484	In-kind	Consulting, software development, licensing	Confirmed
Essex Energy Corporation	Funder	$2,376,307	Cash/In-kind	Consulting, software expertise and development	Confirmed
Utilismart Corporation	Funder	$25,000	In-kind	Consulting, software development	Confirmed

Essex Powerlines Corporation	Funder/participant	$1,148,598.10	Cash/In-Kind	Consulting/Equipment/Resources	Confirmed

*Note: Add rows as necessary

3.3 Project Proposal Part B

Using the space provided in this section, fully describe how the work for this project will be undertaken and what the outcomes of the work will be..

A. In one sentence, state the ultimate objective and the outcome of this project.

The ultimate objective and outcome of the DSO pilot project is to provide a scalable market design for activation of DER flexibility in near real-time to help achieve conservation and demand management goals while simultaneously creating a more reliable and resilient grid.

B. Use the templates provided in the Project Proposal Part B Excel File to provide additional details about your project's detailed budget, workplan, risk assessment, measuring results, quantifiable outcomes and process flow to achieve the project outcomes from successful completion of project objectives. Examples for each of these worksheets is provided in the document for your reference.

Please refer to the Project Proposal Part B- Excel File for information on the process flow, budget, work plan, measuring results, project risk profile, and quantifiable outcomes.

Process Flow: the process flow should demonstrate how your project will achieve its objectives. Your Process Flow should explain how the project's activities and deliverables lead to the desired immediate, intermediate, long term, and ultimate outcomes. The process flow should provide a complete picture of the project, and should reflect the more detailed description that is provided through the milestone schedule, the budget and work plan. The process flow should be attached to the proposal in a separate document appended to this proposal, and can be made using a variety of software tools. The completion of the Process Flow will assist you in designing the short- and long-term outputs and outcomes of your project.

Budget: The detailed project budget should provide information about all activities undertaken as part of the project and reflect the in-kind and cash contributions of the applicant and any and all project partners. Please refer to the Application Guideline posted on the Grid Innovation Fund website for information about eligible and ineligible expenses.

Work Plan: Please fill out the Work Plan tab according to the instructions in the file. The items that you include in this document must match the deliverables and major task areas described in the milestone section 3.3.

Measuring Results: Measuring Results captures the performance indicators of each activity/deliverable, its associated target results and the timeframe of the results. This complements Section 4A of the written proposal.

Project Risk Profile: The risk profile should include as many risks as you think may possibly impact the project scope, budget or timeline.

Quantifiable Outcomes: Please complete the Quantifiable Outcomes according to the instructions in the file. Please note that for each outcome, you will need to include which section of the proposal is the outcome described and substantiated.

3.4 Project Plan

Using the milestone table provided below, provide a milestone schedule listing the deliverables and major activities in each task area. Describe each of the major task areas for this project (e.g. program

design, development of training, measurement and verification, research, communications, knowledge transfer, etc.). Describe each of the major deliverables that will be provided to the IESO as part of this project. Please indicate which 3rd parties will also receive these deliverables, where applicable.

Milestones typically occur 3-6 times throughout the course of the project. For approved projects, milestone deliverables are submitted with a milestone report to the Grid Innovation Fund and form the basis for the release of funding. Consequently, please provide full, detailed description of deliverables. Milestone payments will not be made until all deliverables for that milestone have been satisfactorily completed.

The milestone schedule should be aligned with the completed worksheets as part of the Project Proposal Part B Milestone payments are based on the project costs incurred as described in the budget for that milestone.

For each deliverable listed for each milestone, please include activities, method of measurement and target results. An example is provided as part of the first milestone in section 3.5 below. If you have checked off any functionalities identified in section 1.8.1.D of this proposal, please include details on how you will demonstrate the results as a deliverable in the appropriate milestone(s).

For any OEB Innovation Sandbox guidance/regulatory relief that has been requested by the applicant as outlined in section 1.8.4, please clearly identify in which milestone the OEB Innovation Sandbox guidance/relief will need to be in place for the project to be successful.

3.4.A. If applicable, please provide a list of hardware/equipment that will be purchased and installed as part of this pilot project.

Equipment	Equipment Specification	Purchased (Yes/No)	Installed (Yes/No)	Installation Location *DO NOT PROVIDE RESIDENTIAL ADDRESSES*	Approximate Installation Date
Energy Storage System	1MW battery pack with energy management system (includes equipment, microgrid controller, power transformers, etc.)	No	No	Leamington Pollution Control Plant	Mar-April 2023
Energy Storage System	100kW-500kW battery pack with energy management system (includes equipment, microgrid controller, power transformers, etc.)	No	No	Various Locations	Mar-April 2023

3.4.B If applicable, please provide a list of demonstration sites / project participants of the pilot project and indicate if the sites/participants have been confirmed. If the sites/participants are not confirmed, please provide an approximate timeline of when it will be confirmed and what factors are dependent on the sites/participants confirmation.

Site	Location *DO NOT PROVIDE RESIDENTIAL ADDRESSES*	Status (Confirmed / Not Confirmed)	Approximate Confirmation	Factors impacting confirmation
1	132 Elliott St., Leamington ON	Letter of Support	January-March 2022	Subject to due diligence as initiative is approved and developed.
2	435 Seacliff Drive East, Leamington ON	Letter of Support	January-March 2022	Subject to due diligence as initiative is approved and developed.
3	194 Talbot St W, Leamington ON N8H 1N9	Not Confirmed	January-March 2022	Pending Letter of Support
4	1615 Union Avenue, Ruthven ON, N0P 2G0	Letter of Support	January 2022	Subject to due diligence as initiative is approved and developed.
5	360 Fairview Ave. W., Essex, ON N8M 1Y6	Letter of Support	January 2022	Subject to due diligence as initiative is approved and developed.

*Note: Add rows as necessary

Participant	Status (Confirmed / Not Confirmed)	Approximate Confirmation	Factors impacting confirmation
1	Confirmed/Letter of Support	January-March 2022	Subject to due diligence as initiative is approved and developed.
2	Confirmed/Letter of Support	January-March 2022	Subject to due diligence as initiative is approved and developed.
3	Pending Confirmation/ Letter of Support	January-March 2022	Pending Letter of Support
4	Confirmed/ Letter of Support	January 2022	Subject to due diligence as initiative is approved and developed.
5	Confirmed/ Letter of Support	January 2022	Subject to due diligence as initiative is approved and developed.
6	Confirmed/Letter of Support	February 2022	Subject to due diligence as initiative is approved and developed.
7	Confirmed/Letter of Support	February 2022	Subject to due diligence as initiative is approved and developed.
8	Confirmed/Letter of Support	February 2022	Subject to due diligence as initiative is approved and developed.

3.5 Milestone Description

Brief description of how this milestone advances the project:
This milestone is crucial to the success of the project, as it will be utilized to determine the DSO market design and market rules to ensure alignment with the IESO and OEB. In addition, baselines will be determined for data collection and reporting to measure the success of the project.

Detailed activities in each major task area that will be completed:
Please reference "Unique Line Item ID" for each activity as cited in the worksheet titled "2. Budget" as part of Project Proposal Part B document

Milestone 1: **Project Design**	Submission Date: **31/05/2022 (OEB Innovation Sandbox Support); 31/12/2022 (Project Design phases)**
IESO Contribution Amount: *Final project milestone value must represent a minimum of 10% of Fund grant*	$**89640**
Total Milestone Value:	$**179278.60**

1. Seek and receive regulatory guidance from the OEB's Innovation Sandbox as required
2. Establish DSO market design
    a. Develop DSO market design plan
    b. Review DSO market design plan with IESO
    c. Include Transmission-Distribution coordination protocol in market design
    d. Seek approval and confirmation of coordination protocol from IESO
3. Establish market rules and alignment with IESO/OEB
    a. Review market rules with IESO/OEB
4. Seek confirmation of market participants
    a. Reach out to new and existing DER owners in Municipality of Leamington for confirmation

    Essex Powerlines will be responsible for recruiting asset/DER owners, aggregators, flexibility service providers (FSPs) who will be participating in the pilot project. Once procured, Nodes will assist with the flexibility sellers through the process of registering on Nodes, signing membership agreements and understanding of the rulebook. Nodes will handle the onboarding of FSPs onto the platform, as well as the membership agreement and understanding of the Nodes Rulebook.

5. Establish Risk Mitigation Strategy and Marketing Outreach Plan to recruit potential participants and confirm market participants
6. Establish Baseline
    a. Data collection and analysis
7. Reporting
    a. Adjust final design as may be required as a result of the above tasks and produce a final design/scope document to guide market operations.

Quantifiable Objectives Advancing This Milestone

Please include any quantifiable objectives as described in project activities here i.e. survey responses, energy targets, procurement activities, widget installation etc

Activity	Method of Measurement	Target Result	Unit
* Establish DSO Market Design, including development of a Transmission- Distribution Coordination protocol	Confirmed market design with all parties, approval of coordination protocol with IESO	Approved market design	n/a
* Establish Market Rules	Confirmed alignment between all parties	Approved market rules	n/a
* Establish pilot market participants	Number of participants (DER owners)	3	participants
Establish Risk Mitigation Strategy and Marketing Outreach/ Customer Acquisition Plan	Confirmed risk mitigation strategy and marketing outreach plan. Outreach plan should lead to minimum of 5MW of capacity for Phase 1 of the pilot	Minimum of 5MW of aggregate capacity participating in phase 1 of pilot	n/a

Identified Risks and Risk Mitigation Strategy

As referenced in Worksheet titled "5. Project Risk Profile"

Risk ID	Identified Risk	Risk Mitigation Strategy
1	Lack of interest from potential program participants	Increase marketing efforts in the region to bolster DSO program participant interest. Provide incentive for potential participants and ensure a thorough understanding of benefits for both the participant and the distribution system.
2	Regulatory constraints	Be transparent with the IESO and OEB on project plan in order to determine regulatory barriers that need to be addressed via the OEB Sandbox. Work collaboratively to determine best practice for a DSO solution. Mitigate barriers in Milestone 1 for maximum program success.

Deliverables to IESO and OEB:

1. Market Design for approval (including transmission-distribution coordination protocol)

   Note: in the development of a transmission-distribution coordination protocol, IESO Market Manual 4.2, Appendix B "Short Notice Change Criteria" will be reviewed. This includes the timing and notification requirements for dispatch data (table B3). Also to review is the IESO Market Manual 7.3 for submission of outages.

2. Report for market design and rules including the following sections:

   a. Executive Summary

   b. Introduction

   c. Methodology

   d. Market design and market rules

   e. Baseline parameters for future data analysis

3. Marketing Outreach/ Customer Acquisition Plan (Phase 1- minimum 5MW Phase 2- minimum 10MW)

   Note: min. of 5MW of capacity must be available for offer during Phase 1, confirmed via Letters of Support from resource owners in Milestone 1. Of this, at least 50% must be non-GHG emitting resource capacity. IESO approval is required for battery energy storage systems planned to be installed at facilities tha have exiting generation assets with active FIT contracts. IESO may request discussions with FIT supplier and supporting documentation for proposed battery installations.

4. Letters of Support from recruited participants

5. The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this milestone

Brief description of how this milestone advances the project:

Once the market design is set and aligned with the IESO/OEB, development of the Nodes platform will have to be configured to work within Ontario jurisdiction. Likewise, SmartMAP development will take place to ensure buying signals from the LDC can be automated within Nodes platform. Lastly, EPLC will need to implement in-field upgrades and DER installations to maximize DSO pilot success. This includes Connection Impact Assessments, DER upgrades, and the solar PV/BESS solution referred to throughout the application.

Detailed activities in each major task area that will be completed:

Please reference "Unique Line Item ID" for each activity as cited in the worksheet titled "2. Budget" as part of Project Proposal Part B document

Milestone 2: **Software Development and in-field upgrades**	Submission Date: **31/03/2023**
IESO Contribution Amount: *Final project milestone value must represent a minimum of 10% of Fund grant*	**$2,761,307**
Total Milestone Value:	**$5,522,614.00**

1. Nodes Platform software upgrades
   a. Integration into IESO wholesale market
   b. Integration into SmartMAP
2. SmartMAP software upgrades
   a. Develop algorithm to recognize when flexibility is needed based on set of parameters
   b. Database (back-end) build out
   c. Develop algorithm to send buy signal and integrate into Nodes Platform
   d. Develop user interface
3. In-field upgrades
   a. Connection Impact Assessments

b. DER upgrades

c. Installation of 1MW solar and battery storage solution at the Leamington Pollution Control Plant

d. Installation of BESSs ranging from 150kW-800kW (IESO approval of the proposal installations is required prior to accruing costs related to this activity)

4. Validate performance capabilities prior to market launch

a. Stress testing

b. DSO expertise consulting

c. Test functionality

Quantifiable Objectives Advancing This Milestone

Please include any quantifiable objectives as described in project activities here i.e. survey responses, energy targets, procurement activities, widget installation etc.

Quantifiable objectives for Milestone 2 include:

- Functionality testing and stress testing to ensure valid performance capabilities of software prior to DSO market launch
- Completion of the solar PV/BESS solution at the Pollution Control Plant

Activity	Method of Measurement	Target Result	Unit
Functionality testing	Passes all testing for performance capabilities	Completed software application	
Installation of solar PV/BESS solution	Commissioned solar PV/BESS unit	Commissioned solar PV/BESS unit	

Identified Risks and Risk Mitigation Strategy

As referenced in Worksheet titled "5. Project Risk Profile"

Risk ID	Identified Risk	Risk Mitigation Strategy
3	Installation of solar PV + BESS on-time	EPLC has a detailed project management process that it follows to ensure projects are completed on time and within budget. EPLC is confident in commissioning the solar PV and BESS unit prior to market implementation in milestone 3.
4	Software development delays	EPLC has a detailed project management process that it follows to ensure projects are completed on time and within budget. Its affiliate organization, EEC follows similar protocols. The risk for software development delays is low.

Deliverables to IESO and OEB:

1. Summary Report on Milestone 2 including:

a. Report on success of software upgrades, including results of stress testing and functionality testing

b. Report on DER upgrades and field upgrades, including CIA and commissioning reports for 1MW solar and battery storage solution, and commissioning reports for the 150kW-800kW BESSs

c. The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this milestone

Brief description of how this milestone advances the project:

Project implementation will be a key milestone to test the DSO pilot project. The flexibility market will be in near real-time, testing real transactions and actual markets as an exercise for potential future-proof models.

Detailed activities in each major task area that will be completed:

Please reference "Unique Line Item ID" for each activity as cited in the worksheet titled "2. Budget" as part of Project Proposal Part B document

Milestone 3: **Project Implementation- Phase 1**	Submission Date: **29/02/2024**
IESO Contribution Amount: *Final project milestone value must represent a minimum of 10% of Fund grant*	$**386,246.40**
Total Milestone Value:	$**1,096,492.80**

1. Market demonstration with confirmed market participants (min. 5MW of offerable capacity, of which at least 50% is non-GHG emitting)

    a. Run pilot DSO market

While the market is live, Nodes will provide a functional market platform and metering system. This includes validating that flexibility has been delivered and providing the settlement services. Nodes will also provide technical and operational support to EPLC and to participating DER owners. In addition, during the trading phase, EPLC will need to place buy orders on the market to indicate the need for flexibility and allow for activation of flexibility. Meter readings can be submitted to the metering portal either by EPLC or DER/asset owners directly. The aggregators/DER owners will need to place sell orders in the market and deliver the flexibility that has been sold/traded. It is important to note that the Sequential market design will be trialed and tested in Milestone 3- Project Implementation Phase 1 of the DSO Pilot Project. The Sequential market design is outlined in Section 1.7.B.

2. Reporting

    a. Data collection and analysis

    b. Phase 1 report document

During Market Implementation Phase 1, it is expected that the market sees approx. 1700MW of flexibility.

Notes: IESO guidance to be sought when developing test case scenarios for wholesale market demonstrations. While the market is live, incorporate a min. of two demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve the wholesale market.

Quantifiable Objectives Advancing This Milestone

Please include any quantifiable objectives as described in project activities here i.e. survey responses, energy targets, procurement activities, widget installation etc

Activity	Method of Measurement	Target Result	Unit
Run pilot DSO market	Flexibility created	1700	MW

Identified Risks and Risk Mitigation Strategy

As referenced in Worksheet titled "5. Project Risk Profile"

Risk ID	Identified Risk	Risk Mitigation Strategy
5	Troubleshooting market, minimal activity from participants	Nodes AS has a wealth of knowledge and experience with localized DSO market operations. As such, EPLC will look to NODES for consulting and market knowledge on troubleshooting. In addition, EPLC will have additional resources added to its team to understand and mitigate any risk associated with the market operation. This risk is deemed low.

Deliverables to IESO and OEB:

- Finalized report on Milestone 3: Implementation Phase 1 Report, including but not limited to: flexibility created, quantifiable outcomes, learnings from sequential market design approach, learnings from Tx-Dx coordination approach, barriers encountered, savings created for customers ($), non-wires alternatives value to Essex Powerlines ($)
- Commentary on the following: With respect to the demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve in the wholesale market, comment on the order of events and the roles and responsibilities of the asset owners, the LDC (Essex) and the platform provided (NODES) that demonstrates that both the distribution and transmission systems do not face reliability issues resulting from this scenario
- The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone

Milestone 4: **Project Implementation- Phase 2**	Submission Date: **31/01/2025**
IESO Contribution Amount: *Final project milestone value must represent a minimum of 10% of Fund grant*	$**629,396.40**
Total Milestone Value:	$**1,258,792.80**

Detailed activities in each major task area that will be completed:

Please reference "Unique Line Item ID" for each activity as cited in the worksheet titled "2. Budget" as part of Project Proposal Part B document

Brief description of how this milestone advances the project:

Milestone 4: Project Implementation- Phase 2 advances the project by allowing for increased penetration in the DSO market. Additional DER owners will be approached to determine viability for the pilot project. Having additional DER assets join the market will allow for greater data and results on the benefits of DSO implementation.

1. Seek additional market participants
    a. Tender process to increase # of market participants (at least 50% must be non-GHG emitting resource capacity)
2. Confirm market participants
    a. Signed agreements with new/additional market participants
3. Market demonstration phase 2
    a. Run phase 2 of pilot market (with added resources)

    Phase 2 will trial and test the Integrated market design approach to DSO/IESO coordination, as outlined in section 1.7.B.

    IESO guidance to be sought when developing test case scenarios for wholesale market demonstrations

    While the market is live, incorporate a minimum of two demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve the wholesale market.
4. Reporting
    a. Data collection and analysis
    b. Phase 2 report document

Quantifiable Objectives Advancing This Milestone

Please include any quantifiable objectives as described in project activities here i.e. survey responses, energy targets, procurement

Activity	Method of Measurement	Target Result	Unit
Phase 2 of pilot demonstration	Flexibility created	2300	MW

Identified Risks and Risk Mitigation Strategy

As referenced in Worksheet titled "5. Project Risk Profile"

Risk ID	Identified Risk	Risk Mitigation Strategy
6	Lack of interest for new DSO participants	EPLC has been awarded funding through NRCan's ZEVIP program. As part of the program, EPLC will be distributing funds to approved ultimate recipients for the installation of EV Charger stations. EPLC will utilize these connections to help create interest in the DSO market and attract new participants. The risk level is for this is low.

Deliverables to IESO and OEB:

1. Finalized Report on Implementation Phase 2, including but not limited to: flexibility created, quantifiable outcomes, learnings from integrated market design approach, learnings from tendering process and customer engagement, learnings from Tx-Dx coordination approach, barriers encountered, savings created for customers ($), non-wires alternatives value to Essex ($)
2. Commentary on the following: with respect to the demonstration scenarios where a distribution need required the curtailment of offered energy or operating reserve in the wholesale market, comment on the order of events and the roles and responsibilities of the asset owners, the LDC (Essex) and the platform provided (NODES) that demonstrates that both the distribution and transmission systems do not face reliability issues resulting from this scenario
3. The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone

Brief description of how this milestone advances the project:

This milestone is critical for knowledge transfer and dissemination of the DSO pilot project. EPLC, in conjunction with Nodes, will identify the benefits and roadblocks experienced throughout the project. A report will be written on project outcomes, and EPLC will work collaboratively with the IESO and OEB to curate the next iteration of the regulatory framework, if the project is deemed successful and feasible within Ontario jurisdiction.

Milestone 5: **Project Completion, Knowledge Transfer**	Submission Date: **31/03/2025**
IESO Contribution Amount: *Final project milestone value must represent a minimum of 10% of Fund grant*	$**15,800**
Total Milestone Value:	$**31,600**

Detailed activities in each major task area that will be completed:

Please reference "Unique Line Item ID" for each activity as cited in the worksheet titled "2. Budget" as part of Project Proposal Part B document

1. Write report
    a. Include relevant market information, including benefits and constraints that occurred

EPLC will be responsible for driving the post project evaluation work. Nodes will work in collaboration with Essex Powerlines to obtain feedback from the participating aggregators/DER owners during or shortly after each pilot phase, share information on the types of analysis that other network operators have carried out as part of the post project assessments, and assist EPLC with accessing relevant market and trading data, where EPLC wishes to conduct quantitative analysis.

2. Collect and share results and lessons learned
    a. Share lessons learned with the IESO and OEB
    b. Work collaboratively with IESO and OEB to offer best practice solutions based on DSO pilot project results

Quantifiable Objectives Advancing This Milestone

Please include any quantifiable objectives as described in project activities here i.e. survey responses, energy targets, procurement activities, widget installation etc

Activity	Method of Measurement	Target Result	Unit
Carbon emissions*	Solar/BESS unit production	158 tonnes/year	CO2e

*Carbon emissions resulted from the entirety of the project will be calculated at the end of the 36 months.

Identified Risks and Risk Mitigation Strategy

As referenced in Worksheet titled "5. Project Risk Profile"

Risk ID	Identified Risk	Risk Mitigation Strategy
7	Inability to provide statistically significant results	Create baseline in milestone 1 and have measure/validation plan to follow throughout pilot project

Deliverables to IESO and OEB:

1. Finalized report on outcomes of the DSO pilot project, including but not limited to: lessons learned around technical, regulatory, market-related or administrative components as well as recommendations for other LDCs pursuing similar approaches. The report will also summarize outcome learning from the Phase 1 and Phase 2 final reports.
2. Meeting with the IESO and OEB to share lessons learned and market knowledge to help frame next iteration of regulatory policy
3. A DSO Pilot Assessment Report detailing various aspects of the project:
    a. Qualitative and quantitative assessment of costs and benefits of procuring services from DERs
    b. Assessment of operational efficiencies achieved by the pilot, including costs/savings to ratepayers
    c. Qualitative and quantitative analysis of mitigation of large build-out costs of assets by achieving flexibility
    d. Assessment of costs to EPLC associated with its contract to NODES and its own operation of DSO market
    e. Quantification of increased reliability and resiliency gained from pilot
    f. Coordination efforts/issues/resolutions between DSO and IESO
    g. Assessment on integrity and reliability of the grid at transmission and distribution levels
4. The IESO's DER Integration Demonstration Framework (excel workbook) completed as applicable to this Milestone
5. Hold Meetings with the IESO and OEB to share lessons learned and market knowledge to help frame next iteration of

regulatory policy.

Part 4: Measuring Results: Evaluation Measurement

4.A. Use the information provided in Section 3.3 and 3.4 to develop a detailed account of how the progress and impacts of this project will be accurately assessed. Fill in this information in the "4. Measuring Results" Worksheet in Project Proposal Part B.

Note: Measuring results requires a performance indicator to be established for each project outcome and deliverable as well as a plan for how it will be measured. This enables the IESO to monitor not only the progress of the project, but its effectiveness at achieving its objectives. The process flow and the project plan are useful guides in completing this table.

Measurement and evaluation of the activities described in your measuring results worksheet should be accounted for in the project budget. Proper measurement and evaluation is a very important element for Grid Innovation Fund projects, and therefore sufficient resources should be allocated for this purpose.

For measurement of energy savings, you should follow the IPMVP (International Performance Measurement and Verification Protocol) that the IESO uses as its standard.

4.B. Economic Development

In this section please describe the development of the labour force that will occur as a result of:

A. Creation of new jobs through this project*;
B. Number of jobs that this project will support excluding new job creation.
C. Learning of new skills by workers in existing positions;
D. Potential additional and/or indirect employment opportunities that may be created by you and your partner organizations

*Note: For A) and B) please provide an estimate of the duration of the employment that will be created (e.g.: 2 weeks, 6 months, 5 years, etc.)

A) The DSO pilot project will have positive economic benefits if proven successful. In order to run the program, a newly acquired Market Analyst role will be added to the Essex Powerlines team. The estimated duration of the employment is 1+years. If the project is proven successful, an additional 5-6 jobs will be created over the course of 5 years, with estimated duration of employment at 5+ years.

B) This project will support approximately 25 jobs across EPLC and its applicant partner organizations.

C) Employees in existing positions will gain new skills in various areas including, but not limited to: product development, DSO market operations, integration of DERs, and various flexibility models.

D) Additional employment opportunities may be created by EPLC and its partner organizations. Additional resources may include software developers for enhanced software development of SmartMAP and Nodes Platform, and market analysts and subject matter experts to help operate the DSO market to its fullest capacity.

Part 5: References

In this section, please provide three references that the IESO may contact to discuss your project. Examples of references could include: co-funders, or other parties who can attest to the strength of the project proposal and the project team. 3rd party project participants should not be listed as references.

Reference 1

Name:	John Avdoulos
Job Title:	President and CEO
Organization:	Essex Power Corporation
Relationship:	Affiliate Company
Email:	javdoulos@essexpower.ca
Phone:	519-999-0545

Reference 2

Name:	Steve Ray
Job Title:	Chief Operating Officer
Organization:	Essex Power Corporation
Relationship:	Affiliate Company
Email:	sray@essexpower.ca
Phone:	226-252-6263

Reference 3

Name:	Svein Jørgen Sønning
Job Title:	Head of Technology
Organization:	NODES AS
Relationship:	Partner Company
Email:	svein.jorgen.sonning@NODESmarket.com
Phone:	920-321-844

*Insert more if necessary

Part 6: Application Instructions

Use this list to verify that the requested items have been completed and included in your electronic package. Please use the following labeling convention for your electronic submissions: Please scan statements and materials that require signatures, as electronic versions of all materials are preferred. Additional materials will not be considered in your review unless specifically requested by IESO.

Submission check list:

1. Cover letter from applicant (signed by applicant executive with signing authority)
2. Completed Proposal Part A template (this file)
3. Completed Proposal Part B, which includes: Proposal Part B Cover, 1. Process Flow, 2. Budget, 3. Work Plan, 4. Measuring Results, 5. Project Risk Profile and 6. Quantifiable Outcomes
4. CVs of Project Team (max. 2 pages each)
5. Most recent audited financial statements of applying organization
6. Copy of the lead organization's certificate of incorporation
7. Signed final page of proposal Part A
8. Signed Letters of Support from all project partners to specify all cash and/or in-kind/ site demonstration commitments to the project.
9. Project Brief

☒ **Please acknowledge that the applicant has reviewed and understands the terms and conditions contained in the template Grid Innovation Fund Agreement posted here. The IESO will not be able to accommodate applicants' requests for changes to the terms and conditions. Successful project proponents will have one (1) week to review, sign and send the agreement back to the IESO for countersignature.**

Submit these files by the specified deadline to: gridinnovationfund@ieso.ca

List of Additional Documents attached to this proposal

Please list any other documents included in this proposal including Letters of Support from sites for proposals that involve piloting at specific sites

	All documents listed above are attached in this proposal.
	Letter of Support from Municipality of Leamington
	Letter of Support from Sun Parlour Homes
	Letter of Support from Union Water Supply System
	Letter of Support from Lakeside Produce
	Letter of Support from Grasshopper Energy
	Letter of Support from Sculler Energy Corp.
	Letter of Support from Skyline Energy

*Insert more if necessary

****PRINT, SIGN AND SCAN THIS PAGE (SIGNATURE REQUIRED) ****

Part 7: Declaration

I attest to the accuracy of the content of this proposal and the attached financial statements.

Signature:

Name:

Joe Barile, General Manager

Date:

March 11, 2022

Disclaimer

Receipt of an application to the Grid Innovation Fund does not constitute a commitment by the IESO to support the application, nor does it create a business relationship between the applicant, its partners and the IESO. Executive approval is required for the Grid Innovation Fund to provide any financial support to any project, and the IESO will not provide financial support for the work of applicants performed prior to executive approval of that project. The decision of the executive team is final and takes precedent over prior communications. Financial support from the IESO to an applicant to the Grid Innovation Fund will only be provided upon execution of the contribution agreement between the applicant and the IESO, and only according to the terms and conditions therein. The IESO and the OEB reserve the right to make public the names of applicants, the title and a description of their proposed project, the amount of funds applied for. All other information submitted by the applicant in their proposal application will be treated as confidential.

Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, Ontario, M5H 1T1

Phone: 905.403.6900
Toll-free: 1.888.448.7777
E-mail: customer.relations@ieso.ca

ieso.ca

@IESO_Tweets
linkedin.com/company/IESO

Ontario Energy Board
2300 Yonge St.
Toronto, Ontario, M4P 1E4

Toll-free: 1.877.632.2727
E-mail : publicinformation@oeb.ca
industryrelations@oeb.ca

oeb.ca

@OntEnergyBoard
linkedin.com/company/ontario-energy-board

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ONTARIO ENERGY BOARD

Project Proposal Part B Cover

Applicant:	Essex Powerlines Corporation
Project Title:	DSO Pilot Project
Part A: Document Checklist	Complete
Part B: Budget Summary	Complete
Part C: Milestone Summary	Complete

Part A: Document Checklist

Document ID	Worksheet Title	Description	Checklist (drop down selection)
1	1. Process Flow	The Process Flow is a process document that aims to provide structure and capture relationships between the project activities, project output, short term, intermediate and ultimate outcomes of the pilot project.	Complete
2	2. Budget	This document is the project budget that provides a detailed breakdown of activities within each task in every milestone, the associated costs for each activity and the contribution between partners, applicant and IESO towards the pilot project.	Complete
3	3. Workplan	The workplan is a Gantt chart that provides a description of specific activities that will be taking place during the course of the project timeline.	Complete
4	4. Measuring Results	"Measuring Results" aims to capture the performance indicators of each activity/deliverable, its associated target results and the timeframe of the results. This is also reflected in Section 4A of the written proposal.	Complete
5	5. Project Risk Profile	The project risk profile is a document to capture all the associated risks of the project that may impact the project timeline,scope or budget. The applicant is encouraged to be as detailed as possible in completing this document and provide risk mitigation strategies for the risks identified.	Complete
6	6. Quantifiable Outcomes	This document captures all the quantifiable outcomes with associated confidence intervals of the outcome upon successful completion of the project.	Complete

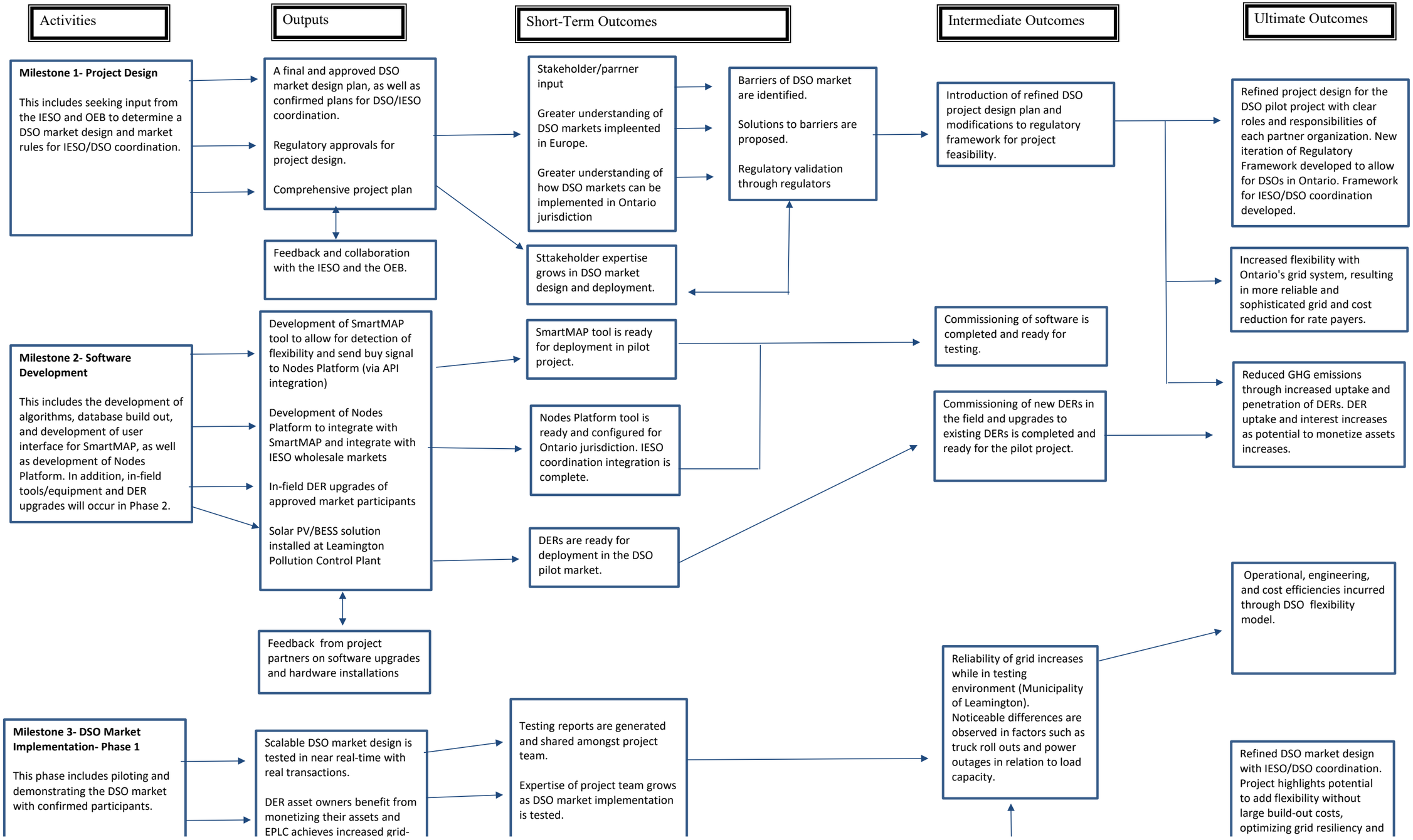
Part B: Budget Summary

Row ID	Organization Structure (drop down selection)	Company Name	Industry (drop down selection)	Applicant / Project Partner (drop down selection)	In-Kind / Cash Contribution (drop down selection)	Status (drop down selection)	Amount (Numeric Value)
1	Local Distribution Company	Essex Powerlines Corporation	Utilities	Applicant	In Kind	Confirmed	14388.4
2	Local Distribution Company	Essex Powerlines Corporation	Utilities	Applicant	Cash	Confirmed	$ 1,134,209.70
3	Private - For Profit	NODES	Energy	Project Partner	In Kind	Confirmed	$ 656,484.00
4	Private - For Profit	Essex Energy Corporation	Energy	Project Partner	In Kind	Confirmed	$ 137,900.00
5	Private - For Profit	Essex Energy Corporation	Energy	Project Partner	Cash	Confirmed	$ 2,238,407.00
6	Private - For Profit	Utilismart Corporation	Energy	Project Partner	In Kind	Confirmed	$ 25,000.00
						Total	$ 4,206,389.10

Part C: Milestone Summary

Milestone ID	Milestone Completion Month (Numeric Value)	Brief Milestone Description	IESO Contribution Amount (Numeric Value)	Milestone Amount (Numeric Value)
1	9	Project Design- determine DSO market design and market rules to ensure alignment with IESO & OEB	$ 89,639.30	$ 179,278.60
2	12	Software Development and in-field upgrades- software upgrades for integration into Nodes platform, DER upgrades, installation of DER	$ 2,761,307.00	$ 5,522,614.00
3	23	Project Implementation Phase 1- Run pilot DSO market, data collection and analysis	$ 386,246.40	$ 1,096,492.80
4	34	Project Implementation Phase 2- Run pilot DSO market with increased DER owner participants	$ 629,396.40	$ 1,258,792.80
5	36	Project Completion, Knowledge Transfer - Final report highlighting outcomes of project	$ 15,800.00	$ 31,600.00
		Total	$ 3,882,389.10	$ 8,088,778.20

1. Process Flow



level flexibility

System is modified to meet increased demands.

reliability, achieving GHG emission reductions through increased DER penetration, and resulting in cost savings for ratepayers.

Milestone 4- DSO Market Implementation- Phase 2

This phase is an extentoin of Market Implementation Phase 1, however with an increase in the number of DER owner market participants. Data from Phase 1 and Phase 2 will be reviewed, compared, and analyzed.

Scalable DSO market design is tested in near real-time with real transactions.. Increased market participants allow for increased flexibility and increased data for the project.

DSO market design is piloted within Municipality of Leamington, mitigating grid constraints.

Data analysis, collection and comparison will occur after Market Implementation Phase 1 and Phase 2.

A report will be written and shared with the IESO/OEB after Phase 2.

Testing reports after Phase 2 are generated and shared amongst project team.

Detailed learning opportunities through evaluation reports and data analysis. Results shared with IESO and OEB.

OEB adopts DSO framework and LDCs across Ontario transform into DSOs, collaborating with the IESO wholesale markets to create grid resiliency for customers across Ontario.

Milestone 5- Knowledge Transfer and Dissemination

Knowledge transfer and dissemination is the final phae of the project, outlining project successes, roadblocks and lessons learned. Informaiton and data from the project will be shared with the IESO and OEB.

A final report will be written and shared with the IESO/OEB after Phase 2 detailing the outcome of the DSO pilot project, inculding successes, roadblocks and lessons learned.

Knowledge opportunity for Essex Powerlines and other interested LDCs, IESO, and OEB.

Buy-in from IESO and OEB. Market knowledge further transferred to other LDCs.

Regulatory framework is developed based on outcomes of the project.

IESO/DSO Market efficiency achieved

2. Detailed Project Budget

Project Name: DSO Pilot Project

Organization Name: Essex Powerlines Corporation

Summary	Expected Commercialization Date (Months from project start date)	IESO Contribution	Total Partner Contribution	Total Milestone Value
Milestone 1	9	$ 89,639.30	$ 89,639.30	$ 179,278.60
Milestone 2	12	$ 2,761,307.00	$ 2,761,307.00	$ 5,522,614.00
Milestone 3	23	$ 386,246.40	$ 710,246.40	$ 1,096,492.80
Milestone 4	34	$ 629,396.40	$ 629,396.40	$ 1,258,792.80
Milestone 5	36	$ 15,800.00	$ 15,800.00	$ 31,600.00
Total	36	$ 3,882,389.10	$ 4,206,389.10	$ 8,088,778.20

PLEASE NOTE:

1.) Please refer to spreadsheet titled "2. Budget. Example" for example content to demonstrate format.
2.) The "Rate/Cost" X "Units" must match the value in the "Total Contribution (All Funders)" column.
3.) Unless specifically directed otherwise, do not include IESO services (such as M&V plan review) as an in-kind contribution.
4.) Please refer to the final page of the Application Guide available on IESO Grid Innovation Fund webpage for more information on eligible expenses.
5.) Final project milestone value must represent a minimum of 10% of Fund grant.
6.) Eligible labour costs are capped at a maximum $800/day (7.5 hours)
7.) In-kind and cash contributions consist of auditable, substantiated cash and non-cash contributions to the project that contribute substantially to the completion of the project.
8.) Add/Remove Milestones as required

Click red triangles on cells for important notes that will help you accurately complete this template.

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)	Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)	Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Total Contribution (All Funders)
1.1.1	1	Milestone 1: Project Design	1	Task 1: Seek Regulatory support from IESO & OEB	1	Activity 1: Meet with IESO & OEB	Month 2	Labour	Utilities	Essex Powerlines Corporation	$91	40	$ 3,646.00	$ 1,823.00	$ 1,823.00								$ 3,646.00
1.2.2	1	Milestone 1: Project Design	2	Task 2: Establish DSO Market Design	2	Activity 1: Develop DSO Market design plan	Month 7	Labour	Utilities	Essex Powerlines Corporation	$91	300	$ 27,345.00	$ 13,672.50	$ 13,672.50								$ 27,345.00
1.2.2.a	1	Milestone 1: Project Design	2	Task 2: Establish DSO Market Design (consulting)	2a	Activity 1a: Develop DSO market desing plan consulting	Month 7	Labour	Professional, scientific and technical services	Nodes	$200	600	$ 120,000.00	$ 60,000.00	$ 30,000.00		$ 30,000.00						$ 120,000.00
1.2.1	1	Milestone 1: Project Design	2	Task 2: Establish DSO Market Design	1	Activity 2: Review DSO Market design plan with IESO	Month 7	Labour	Utilities	Essex Powerlines Corporation	$91	40	$ 3,646.00	$ 1,823.00		$ 1,823.00							$ 3,646.00
1.3.1	1	Milestone 1: Project Design	3	Task 3: Estbalish market rules and alignment w/ IESO/OEB	1	n	Month 7	Labour	Utilities	Essex Powerlines Corporation	$91	40	$ 3,646.00	$ 1,823.00		$ 1,823.00							$ 3,646.00
1.4.1	1	Milestone 1: Project Design	4	Task 4: seek confirmation of market participants	1	Activity 1: Reach out to new and existing DER owners in Municipality of Leamington for confirmation and letters	Month 7	Labour	Utilities	Essex Powerlines Corporation	$67	20	$ 1,346.00	$ 673.00		$ 673.00							$ 1,346.00
1.5.1	1	Milestone 1: Project Design	5	Task 5: Establish Risk Mitigation Strategy/ Marketing Outreach Plan	1	Activity 1: Establish Risk mitigation strategy/marketing outreach plan	Month 8	Labour	Utilities	Essex Powerlines Corporation	$91	80	$ 7,280.00	$ 3,640.00	$ 3,640.00								$ 7,280.00
1.6.1	1	Milestone 1: Project Design	6	Task 6: Establish Baseline	1	Activity 1: Data collection and analysis	Month 8	Labour	Utilities	Essex Powerlines Corporation	$103	40	$ 4,123.20	$ 2,061.60	$ 2,061.60								$ 4,123.20
1.7.1	1	Milestone 1: Project Design	7	Task 7: Reporting	1	Activity 1: Adjust final design as required and finalize design/scope document for market operations	Month 9	Labour	Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20	$ 4,123.20								$ 8,246.40
Milestone 1 Summary												1240	$ 179,273.60	$ 89,639.30	$ 53,407.00	$ 6,142.00	$ 30,000.00	$ -	$ -	$ -	$ -	$ -	$ 179,273.60

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)	Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)	Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Total Contribution (All Funders)
2.1.1	2	Milestone 2: Software Development & In-field Upgrades	1	Task 1: Nodes platform software upgrades	1	Activity 1: Integration into IESO wholesale market (including functionality adjustments, new features, testing, platform integration, operations and support)	Month 9	Labour	Professional, scientific and technical services	NODES	$200	825	$ 165,000.00	$ 82,500.00	$ 41,250.00		$ 41,250.00						$ 165,000.00
2.1.2	2	Milestone 2: Software Development & In-field Upgrades	1	Task 1: Nodes platform software upgrades	2	Activity 2: SmartMAP integration to the NODES Platform and related adjustments (including functionality adjustments, new features, testing, operations and support (NEB platform integration)	Month 9	Labour	Professional, scientific and technical services	NODES	$200	825	$ 165,000.00	$ 82,500.00	$ 41,250.00		$ 41,250.00						$ 165,000.00
2.2.1	2	Milestone 2: Software Development & In-field Upgrades	2	Task 2: SmartMAP software upgrades	1	Activity 1: Develop algorithm to recognize when flexibility is needed based on set of parameters	Month 9	Labour	Professional, scientific and technical services	Essex Energy Corporation	$105	300	$ 31,500.00	$ 15,750.00					$ 15,750.00				$ 31,500.00
2.2.2	2	Milestone 2: Software Development & In-field Upgrades	2	Task 2: SmartMAP software upgrades	2	Activity 2: Database (back-end) build out	Month 9	Labour	Professional, scientific and technical services	Utilismart Corporation	$100	500	$ 50,000.00	$ 25,000.00							$ 25,000.00		$ 50,000.00
2.2.3	2	Milestone 2: Software Development & In-field Upgrades	2	Task 2: SmartMAP software upgrades	3	Activity 3: Develop algorithm to send buy signal and integrate into Nodes platform	Month 9	Labour	Professional, scientific and technical services	Essex Energy Corporation	$105	300	$ 31,500.00	$ 15,750.00					$ 15,750.00				$ 31,500.00
2.2.4	2	Milestone 2: Software Development & In-field Upgrades	2	Task 2: SmartMAP software upgrades	4	Activity 4: Develop user interface	Month 9	Labour	Professional, scientific and technical services	Essex Energy Corporation	$105	500	$ 52,500.00	$ 26,250.00					$ 26,250.00				$ 52,500.00
2.3.1	2	Milestone 2: Software Development & In-field Upgrades	3	Task 3: In-field upgrades	1	Activity 1: Connection Impact Assessments	Month 12	Labour	Professional, scientific and technical services	Essex Energy Corporation	$115,000	10	$ 150,000.00	$ 75,000.00					$ 75,000.00				$ 150,000.00
2.3.2	2	Milestone 2: Software Development & In-field Upgrades	3	Task 3: In-field upgrades	2	Activity 2: DER Upgrades (including integration to the NODES Platform)	Month 12	Material / Equipment / Hardware	Utilities	Essex Powerlines Corporation	$30,000	10	$ 300,000.00	$ 150,000.00	$ 150,000.00								$ 300,000.00
2.3.3	2	Milestone 2: Software Development & In-field Upgrades	3	Task 3: In-field upgrades	3	Activity 3: Installation of 1MW BESS solution systems	Month 12	Material / Equipment / Hardware	Professional, scientific and technical services	Essex Energy Corporation	$2,576,814	1	$ 2,576,814.00	$ 1,288,407.00						$ 1,288,407.00			$ 2,576,814.00
2.3.3.	2	Milestone 2: Software Development & In-field Upgrades	3	Task 3: In-field upgrades	3	Activity 3a: Installation of BESS solutions ranging from 150-800 kW	Month 12	Material / Equipment / Hardware	Professional, scientific and technical services	Essex Energy Corporation	$1,900,000	1	$ 1,900,000.00	$ 950,000.00						$ 950,000.00			$ 1,900,000.00
2.4.1	2	Milestone 2: Software Development & In-field Upgrades	4	Task 4: Validate performance capabilities prior to market launch	1	Activity 1: Stress testing	Month 12	Labour	Professional, scientific and technical services	Essex Energy Corporation	$103	50	$ 5,150.00	$ 2,575.00					$ 2,575.00				$ 5,150.00
2.4.1a	2	Milestone 2: Software Development & In-field Upgrades	4	Task 4: Validate performance capabilities prior to market launch	1a	Activity 1a: DSO expertise consulting	Month 12	Labour	Professional, scientific and technical services	NODES	$200	450	$ 90,000.00	$ 45,000.00	$ 22,500.00		$ 22,500.00						$ 90,000.00
2.4.2	2	Milestone 2: Software Development & In-field Upgrades	4	Activity 2: Test functionality	2	Activity 2: Test functionality	Month 12	Labour	Professional, scientific and technical services	Essex Energy Corporation	$103	50	$ 5,150.00	$ 2,575.00					$ 2,575.00				$ 5,150.00
Milestone 2 Summary												3822	$ 5,522,614.00	$ 2,761,307.00	$ 255,000.00	$ -	$ 105,000.00	$ -	$ 137,900.00	$ 2,238,407.00	$ 25,000.00	$ -	$ 5,522,614.00

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)	Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)	Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Total Contribution (All Funders)
3.1.1	3	Milestone 3: Project Implementation Phase 1	1	Task 1: Market Implementation	1	Activity 1: Run Phase 1 of pilot DSO market	Month 21	License Fees	Utilities	Essex Powerlines Corporation	$300	1700	$ 484,500.00	$ 242,250.00	$ 242,250.00								$ 484,500.00
3.1.1.a	3	Milestone 3: Project Implementation Phase 1	1a	Task 1: Market implementation (transaction fee)	1a	Activity 1: Run Phase 1 of pilot DSO market	Month 21	License Fees	Professional, scientific and technical services	Nodes	$300	1700	$ 25,500.00	$ 12,750.00	$ 12,750.00								$ 25,500.00
3.1.1.b	3	Milestone 3: Project Implementation Phase 1	1b	Task 1: Market implementation (DSO fee)	1b	Activity 1: Run Phase 1 of pilot DSO market	Month 21	License Fees	Professional, scientific and technical services	Nodes	$10,000	18	$ 180,000.00	$ 90,000.00	$ 10,008.00		$ 79,992.00						$ 180,000.00
3.1.1.c	3	Milestone 3: Project Implementation Phase 1	1c	Task 1: Market implementation (membership fee)	1c	Activity 1: Run Phase 1 of pilot DSO market	Month 21	License Fees	Professional, scientific and technical services	Nodes	$3,000	108	$ 324,000.00				$ 324,000.00						$ 324,000.00
3.2.1	3	Milestone 3: Project Implementation Phase 1	2	Task 2: Reporting	1	Activity 1: Data collection and analysis	Month 22	Labour	Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20	$ 4,123.20								$ 8,246.40
3.2.2	3	Milestone 3: Project Implementation Phase 1	2	Task 2: Reporting	2	Activity 2: Phase 2 Report document	Month 23	Labour	Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20	$ 4,123.20								$ 8,246.40
3.2.2a	3	Milestone 3: Project Implementation Phase 1	2	Task 2: Reporting	2a	Activity2a: Phase 1 Report document expertise	Month 23	Labour	Professional, scientific and technical services	Nodes	$200	330	$ 66,000.00	$ 33,000.00	$ 16,500.00		$ 16,500.00						$ 66,000.00
3..	3												$ -										$ -
3..	3												$ -										$ -
3..	3												$ -										$ -
3..	3												$ -										$ -
Milestone 3 Summary												4016	$ 1,096,492.80	$ 386,246.40	$ 289,754.40	$ -	$ 420,492.00	$ -	$ -	$ -	$ -	$ -	$ 1,096,492.80

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)	Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)	Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Total Contribution (All Funders)
4.1.1	4	Milestone 4: Project Implementation Phase 2	1	Task 1: Seek additional market participants	1	Activity 1: Tender process to seek additional DER asset owners to participate in market	Month 23	Labour	Utilities	Essex Powerlines Corporation	$105	40	$ 4,200.00	$ 2,100.00	$ 2,100.00								$ 4,200.00
4.1.2	4	Milestone 4: Project Implementation Phase 2	1	Task 1: Seek additional market participants	2	Activity 2: Signed participant agreements	Month 24	Labour	Utilities	Essex Powerlines Corporation	$105	20	$ 2,100.00	$ 1,050.00	$ 1,050.00								$ 2,100.00
4.2.1	4	Milestone 4: Project Implementation Phase 2	2	Task 2: Run pilot market phase 2	1	Activity 1: Run pilot market phase 2	Month 33	License Fees	Utilities	Essex Powerlines Corporation	$300	3300	$ 940,500.00	$ 470,250.00	$ 470,250.00								$ 940,500.00
4.2.1.a	4	Milestone 4: Project Implementation Phase 2	2	Task 2: Run pilot market phase 2 (transaction fee)	1	Activity 1a: Run pilot market phase2	Month 33	License Fees	Professional, scientific and technical services	Nodes	$300	3300	$ 49,500.00	$ 24,750.00	$ 24,750.00								$ 49,500.00
4.2.1.b	4	Milestone 4: Project Implementation Phase 2	2	Task 2: Run pilot market phase 2 (membership fee)	1	Activity 1b: Run pilot market phase2	Month 33	License Fees	Professional, scientific and technical services	Nodes	$10,000	18	$ 180,000.00	$ 90,000.00	$ 10,008.00		$ 79,992.00						$ 180,000.00
4.3.1	4	Milestone 4: Project Implementation Phase 2	3	Task 3: Reporting	1	Activity 1: Data collection and analysis	Month 33	Labour	Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20		$ 4,123.20							$ 8,246.40
4.3.2	4	Milestone 4: Project Implementation Phase 2	3	Task 3: Reporting	2	Activity 2: Phase 2 Report document	Month 34	Labour	Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20		$ 4,123.20							$ 8,246.40
4.3a.2a	4	Milestone 4: Project Implementation Phase 2	3a	Task 3: Reporting	2a	Activity 2: Phase 2 Report document expertise	Month 34	Labour	Professional, scientific and technical services	Nodes	$200	330	$ 66,000.00	$ 33,000.00	$ 16,500.00		$ 16,500.00						$ 66,000.00
4..	4												$ -										$ -
4..	4												$ -										$ -
Milestone 4 Summary												7168	$ 1,258,792.80	$ 629,396.40	$ 524,658.00	$ 8,246.40	$ 96,492.00	$ -	$ -	$ -	$ -	$ -	$ 1,258,792.80

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)	Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)	Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Total Contribution (All Funders)
5.1.1	5	Milestone 5: Project Completion, Knowledge Transfer	1	Task 1: Reporting	1	Activity 1: report on project outcomes (benefits/roadblocks/etc)	Month 35	Labour	Utilities	Essex Powerlines Corporation	$68	80	$ 5,440.00	$ 2,720.00	$ 2,720.00								$ 5,440.00
5.1.1a	5	Milestone 5: Project Completion, Knowledge Transfer	1	Task 1: Reporting	1	Activity 1a: report analysis	Month 35	Labour	Professional, scientific and technical services	Nodes	$200	90	$ 18,000.00	$ 9,000.00	$ 4,500.00		$ 4,500.00						$ 18,000.00
5.2.1	5	Milestone 5: Project Completion, Knowledge Transfer	2	Task 2: Share Lessons Learned	1	Activity 1: Share lessons learned with IESO/OEB	Month 36	Labour	Utilities	Essex Powerlines Corporation	$68	80	$ 5,440.00	$ 2,720.00	$ 2,720.00								$ 5,440.00
5.3.1	5	Milestone 5: Project Completion, Knowledge Transfer	3	Task 3: Knowledge transfer	1	Activity 1: Work collaboratively with IESO/OEB to offer best practice solutions based on DSO pilot project results	Month 36	Labour	Utilities	Essex Powerlines Corporation	$68	40	$ 2,720.00	$ 1,360.00	$ 1,360.00								$ 2,720.00
													$ -										$ -
5..	5												$ -										$ -
5..	5												$ -										$ -
5..	5												$ -										$ -
5..	5												$ -										$ -
Milestone 5 Summary												280	$ 31,600.00	$ 15,800.00	$ 11,300.00	$ -	$ 4,500.00	$ -	$ -	$ -	$ -	$ -	$ 31,600.00

														$ 3,882,389.10	$ 1,134,209.70	$ 14,388.40	$ 656,484.00		$ 137,900.00	$ 2,238,407.00	$ 25,000.00		

3. Work Plan

Project Name: Essex Powerlines Corporation DSO Pilot Project

Organization Name: Essex Powerlines Corporation

			Project Month # (Maximum project length is 36 months)																																	
Milestone	**Task Area**	**Activity / Deliverable**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Project Design	Seek regulatory support from IESO & OEB	Meeting with IESO/OEB for alignment																																				
	Establish DSO Market Design	Develop & review market design plan																																				
	Establish market rules and alignment with IESO/OEB	Review market rules with IESO/OEB																																				
	Seek confirmation of market participants	Letter of confirmation from participants																																				
	Establish baseline	Data collection & analysis																																				
	Reporting	Final design/scope document																																				
Software development and in-field upgrades	Nodes Platform software upgrades	Integration into IESO wholesale market																																				
	Nodes Platform software upgrades	SmartMAP integration to NODES and related adjustments																																				
	SmartMAP software upgrades	Develop algorithm for recognition of flexibility need																																				
	SmartMAP software upgrades	Database (back-end) build out																																				
	SmartMAP software upgrades	Develop algorithm for send signal and integration into Nodes platform																																				
	SmartMAP software upgrades	Develop user interface																																				
	In-field upgrades	Connection Impact Assessments																																				
	In-field upgrades	DER upgrades																																				
	In-field upgrades	installation of 1MW battery storage solution + additional BESS solutions																																				
	Validate performance capabilities prior to market launc	Stress testing																																				
Project Implementation-Phase 1	Market demonstration with confirmed market participar	Run pilot market																																				
	Reporting	Data collection & analysis																																				
	Reporting	Phase 1 report document																																				
Project Implementation-Phase 2	Seek additional market participants	Tender process to increase # of market participants																																				
	Confirm market participants	Signed agreements with new/additional market participants																																				
	Market demonstration phase 2	Run pilot market																																				
	Reporting	Data collection & analysis																																				
	Reporting	Phase 2 report document																																				
Project completion, knowledge transfer	Reporting	Include relevant market information (benefits/roadblocks/etc)																																				
	Collect and share results and lessons learned	Share lessons learned with IESO and OEB																																				
	Knowledge Transfer	Work collaboratively with IESO/OEB to offer best practice solutions based on DSO pilot project results																																				

4. Measuring Results

Project Name: DSO Pilot Project

Organization Name: Essex Powerlines Corporation

Click red triangles on cells for important notes that will help you accurately complete this template.

Ultimate Outcome	Ultimate Objective	Project/ Intermediate Objective	Immediate Objective	Activity/Deliverable	Performance Indicator	Method of Measurement	Target Results	Target Completion Date/Month
EPLC demonstrates LDC capability of performing as a DSO via a DSO/IESO coordination market design using Nodes Platform. Project success includes mitigating grid constraints outlined in EPLC's service territory specific to the Municipality of Leamington area. Expected outcome is SAIDI improvement by 40% and SAIFI improvement by 10%. Project success and outcomes lead to regulatory framework changes. EPLC works collaboratively with IESO and OEB to frame a new iteration of regulatory policies for the purpose of enabling an effiicient marketplace resulting in greater transparency, flexibility and reliability of the grid. In addition, DER owners are enabled to monetize their investments by participating in the market, and as such, DER ownership interest increases signficantly. GHG emission reductions are therefore realized as grid constraints are resolved with increase uptake of clean energy technology participating in DSO market. The pilot market is expected to see a reduction of 158tonnes CO2e/year.	DSO model is proven successful and available flexibility created on the grid removes local and provincial grid constraints. As a result, cost savings to customers are realized, GHG reductions are improved, and reliable and resilient grid is demonstrated.	*EPLC creates flexibility to improve grid constraints in Municipality of Leamington*	*Employees gain knowledge on DSO market operations*	*Initial DSO market design takes place*	*DSO market design appproved by all stakeholders*	*Approval from all stakeholders*	*100% buy-in and understanding from all stakeholders*	*month 9*
				Engage potential participants	*DER owners agree to participate in DSO pilot market*	*Signed agreements/letters of confirmation*	*4-5 active participants in the DSO market*	*month 7*
				software upgrades for Nodes platform and SmartMAP	*software testing completed*	*stress test/functionality testing*	*Functional software requirements for DSO deployment*	*month 9*
			Reduced GHG emissions resulting from increased grid reliability and increased DER penetration	*DER upgrades*	*DER integrate into Nodes platform*	*Integration completed*	*4-5 active participants in the DSO market*	*month 13*
				Installation & commissionning of solar/BESS solution to take part in pilot	*completed installation*	*participation in DSO market equating to solar production(kWh)*	*reduction in GHG emissions by 158tonnes CO2e*	*month 13*
		Decreased SAIDI/SAIFI, Increased GHG reductions	Increased efficiency of operations for EPLC distribution system resulting in reduced cost for rate payers	demonstration of DSO market - Phase 1	*improved SAIDI/SAIFI with increased available flexibility*	*SAIDI/SAIFI*	*Reduction in SAIDI by 40%, SAIFI reduction by 10%*	*month 23*
				Data analysis and reporting on Phase 1	*Comparison from baseline measurments*	*baseline vs. actual*	*Improved efficiencies in Leamington service area (speciic to M27 feeder constraints)*	*month 23*
			DERs enabled in the market to provide flexibility in exchnage for monetization of assets	*Data analysis and reporting on Phase 2*	*Solicit more DER owners to participate in DSO pilot market*	*Increased # of DER owner participants measured against increase flexibility*	*Increased flexibility resulting in further improvements in grid constraints*	*month 36*

5. Project Risk Profile

Risk ID	Milestone Impacted	Project Task	Project Impact (Scope, Budget,Timeline)	Description of Risk	Severity of Risk (drop down selection)	Likelihood of Risk (drop down selection)	Risk Classification (Calculated - DO NOT ENTER)	Risk Mitigation Strategy
1	Milestone 1	1.4.1	Scope	Lack of interest from potential program participants	Moderate	Unlikely	4	Increase marketing efforts in region to bolser DSO program participant interest. Provide incentives for potential participants. Ensure a thorough understanding of benfits for both participants and distribution system as a whole
2	Milestone 1	1.1.1	Scope	Regulatory Constraints	Significant	Possible	2	Be transparent with the IESO and OEB on project design and plan in order to determine regulatory barriers that need to be addressed via the OEB sandbox. Work collaboratively to determine best practice for a DSO solution.
3	Milestone 2	2.3.3	Timeline	Installation of BESS delay	Minor	Unlikely	5	EPLC has a detailed project management process that it follows to ensure projects are completed on time and within budget. EPLC is confident in commissioning the solar PV and BESS unit prior to market implementation phase in milestone 3.
4	Milestone 2	2.1.1-2.2.4	Timeline	Software development delay	Moderate	Unlikely	4	EPLC, as well as its affiliate Essex Energy, have a detailed project management process that it follows to ensure projects are completed on time and within budget.
5	Milestone 3	3.1.1	Scope	Potential for error in running pilot, minimal activity from participants	Moderate	Unlikely	4	Nodes has experience with DSO market operations and will act as a consultant on program implementation. In addition, EPLC will have additional resources working on its team to understand and mitigate any risk associated with market operations. Program design will also help mitigate risk.
6	Milestone 4	4.1.1	Scope	Lack of interest for new DSO participants	Minor	Unlikely	5	EPLC has been awarded funding through NRCan's ZEVIP program. As part of the program, EPLC will be distributing funds to approved ultimate recipients for the installation of EV charger stations. EPLC will utilize these connections to help create interest in the DSO market and attract new participants.
7	Milestone 5	5.1.1	Scope	Inability to provide statistically significant results	Significant	Unlikely	3	Baseline measures and measuring/validation plan will be included in Milestone 1.

6. Quantifiable Outcomes

Please note the difference between project outcome and objectives. Successful completion of project objectives advances the success of project outcomes. For example, the installation of 20 widgets in residential homes is a project objective, ***not*** a project outcome. If the widget leads to energy savings, then the outcome of the project is the energy savings realised from using the widgets. This spreadsheet aims to capture all the quantifiable **outcomes** upon successful completion of the pilot

		95% Confidence Interval				
Metrics	**Section Referenced in Written Proposal**	**Lower Bound**	**Upper Bound**	**Expected Result**	**Units**	**Qualitatitive Description (if applicable)**
Emission Reductions	1.7.I	153	163	158	tonnesCO2e	This is on a per annual basis and is only subject to the pilot project. Emissions reductions increase as more DER resources take part in the DSO market
Peak Load Reduction	1.7I				kWh	*Once project particpants are confirmed, these values will be configured.
Peak Load Shifting	1.7.I				kWh	*Once project particpants are confirmed, these values will be configured.
Bill Savings	1.7.G	$ 24,243.30	$35,211.92	$29,727.61	CAD$ per Bill	
Reliability Improvement SAIFI	1.7.G	0.45	0.48	0.47	hours	
Reliability Improvement SAIDI	1.7.G	0.4	0.6	0.5	hours	
Jobs Supported	4.B	20	30	25	Jobs	
Jobs Created	4.B	2	10	6	Jobs	
Additional Available Capacity / Energy	1.7.H	1,000	30	2,000	kW / kWh	
Active Participants		2,800	7,000	4,900	Participants	While the pilot will have approximately 2-8 participants in total, we are measuring the impact to customer base due to the pilot DSO project. In this case, approx. 4900 "participants" will benefit from improved reliability.
Policy Change	1.8.4	N/A	N/A		N/A	Results from the DSO pilot project will be shared with IESO/OEB to support updates to regulatory policy
Note: Add/Delete Metrics as required						

Appendix C

Essex Powerlines Corporation

EB-2024-0022/EB-2024-0096

EPLC Milestone 1 Report

GIF Milestone Report Part A

Project Title: DSO Pilot Project (PowerShare)
Organization: Essex Powerlines Corporation
Milestone: 1
Project ID #:

SUBMISSION DATE: JUNE 26, 2024

Milestone Due Date (from the Contribution Agreement): May 31, 2024
Contract Termination Date: March 31, 2026

ieso
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1. Project Description

Project Title	Essex Powerlines DSO Pilot Project (PowerShare)
Organization	Essex Powerlines Corporation
Milestone Number	1
Total Number of Milestones	6
Milestone Payment Amount *must match amount on invoice (before HST) and cannot exceed contracted amount	$89,639.30
Submitter Name	Anthony Clavet
Contact information	aclavet@essexpowerlines.ca
Milestone Submission Date	June 26, 2024
Milestone Due Date (in original/amended contract)	May 31, 2024
Contract Termination Date (in original/amended contract)	March 31, 2026

Provide 1. A description of your project, and 2. State why you are doing this project.

The project ("PowerShare") will enable Essex Powerlines Corporation ("EPLC") to perform as a Distribution System Operator ("DSO") with a scalable market design for activation of DER flexibility in near real-time. Using the NODES platform, DER owners will be able to monetize their investments by selling excess or stored generation as flexibility to support grid resilience.

PowerShare will harness existing, and incentivize additional, DER flexibility in the grid as a non-wires alternative ("NWA"). Constraints in the Leamington area will be used to benchmark NWA performance of a DSO market while maintaining reliable service delivery to customers. Higher geographic and grid levels will be considered for market participation or simulation to demonstrate T-D coordination between DSO and IESO markets.

Essex Powerlines and partners propose to solve two major issues or barriers with this project: first, it will resolve local constraints on Essex Powerlines' grid and second, it will remove existing barriers related to DERs and assess their potential impacts on distribution system assets and market participation. Moreover, the project will test the coordination of DSO/IESO markets, helping solve grid constraints at a local, regional, and provincial level.

Milestone Description: Copy and paste the text from your Contribution Agreement below.

This milestone is crucial to the success of the project, as it will be utilized to determine the DSO market design and market rules to ensure alignment with the IESO and OEB. In addition, baselines will be determined for data collection and reporting to measure the success of the project.

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2. Milestone Submission Attachments

The deliverable description must match milestone deliverables as outlined in the Contribution Agreement Table and Proposal. If multiple deliverables are contained in a single document, specify the page numbers/sections that reflect the specific deliverable.

ID	Deliverable Description	File Attachment Name	Section/Page Number
1	Milestone Report Part A	Essex Powerlines – GIF Milestone 1 Report Part A.docx	This document
2	Milestone Report Part B	Essex Powerlines – GIF Milestone 1 Report Part B.xlsx	NA
3	DER Integration Demonstration Framework	Essex Powerlines – DER Integration Demonstration Framework.xlsx	NA
4	Report for Market Design and Rules	[Package] Report on Market Design and Rules for Submission.pdf	Pages 1-17
5	Market Design for Approval	Same as above	Pages 18 and beyond

3. Project Technical Progress and Lessons Learned

In the following tables, summarize the key lessons learned. This information is intended to inform future work in the same area. The lessons generated will be used to inform the success of future GIF projects by identifying areas of concern / unknown barriers, inform broader industry to enhance success and avoid failure. Do not delete entries from previous milestones, rather, add new rows for the new milestone and populate the fields. Please be detailed in your description.

MS (Milestone): Milestone Number

Category (Cat): Cat 1=Customer/Participation Reach, 2=Data, 3=Process, 4=Project Management (Budget, Scope, Timeline), 5=Technology Interoperability/Integration, 6=Other

ID: Unique ID for each lesson learned

Challenge Description: A detailed description of the challenge and how it impacted the project

Resolution: A detailed description on how the challenge was resolved, the thought process behind the resolution and describe the resources used to resolve the challenge.

MS	Cat	ID	Challenge Description	Resolution (if applicable)
1	5	1	Meters Used; Required Metering or Telemetry Equipment availability in-field, sufficiency for DSO purposes, and accessibility to participants	Wholesale metering is not available nor accessible for most distribution-connected participants. IESO required telemetry is a major barrier to service provision by distribution-connected DERs. EPL decided to leverage existing AMI systems and set the maximum metering granularity to 15 minutes - metered intervals longer than 15 minutes are not considered for the project. The sampling rate of a Flexibility Service Provider's ("FSP") meters will be increased to 5 minutes, subject to EPL's metering infrastructure capabilities and constraints. In cases where an FSP cannot have a 5-minute sample rate, but otherwise needs to be evaluated at 5-minute granularity, the 15-minute sample rate will be averaged over the three 5-minute intervals. Reference to 5-minute metering granularity shall include the three 5-minute interval average metric (35IA, 15/3, other notation). The 15-minute granularity applies to all ShortFlex and LongFlex settlements such that delivery for a 30-minute product interval is the average of the two 15-minute intervals' delivery percentage. For regularity, where 5-minute metering is available it is summed to 15-minute for purposes of settlement.

				This design is supported by NODE's experience in European markets where a combination of DSO meters and FSP-provided sub-meters are used in settlement. Additionally, all metering activities are supported by existing systems provided to EPL by Utilismart. NODES uses data submitted by Utilismart from EPL's meters to validate delivery of the service against the offered amount on the NODESmarket Platform. Note: the use of existing metering was of particular interest in engagements with the Ministry of Energy throughout Milestone 1.
1	3	2	TD interoperability; how/when do communications with IESO happen	With the intention to implement and inform ongoing exploration of the Transmission-Distribution protocols, including through the TDWG, this project simulates submission of DSO activity and qualified participant offers following the Availability Declaration Envelope (ADE) submission process and the IESO gate closure 2-hours ahead of dispatch. NODES simulates a submission to the IESO at 10:00:00 day-ahead of dispatch of: the quantities of DSO contracted services (also called "LDC-directed") at a 'floor price', and the remaining available Qualified offers from each portfolio in price/quantity pairs. The DSO gate closure is at 125 minutes prior to dispatch. NODEES has 5 minutes to prepare, and at 120 minutes prior to dispatch (respecting the IESO's Mandatory Window), NODES simulates a final submission to the IESO of: LDC directed quantities at the floor price, and remaining Qualified offers from each portfolio that were submitted prior to the ADE submission. Data submissions to the IESO will occur on-request, during live demos, and during milestone submissions.
1	3	3	DSO commercial responsibility for assets in IAMs; DSO and platform provider hesitant	EPL and NODES share a hesitance to represent assets in IAMs. This function is termed as a 'superaggregator', a top-level aggregator for an area or local market which represents an additional layer of aggregation of direct assets and aggregations, potentially from different FSPs, to IAMs. A superaggregator would bear commercial responsibility for these assets. The T-D protocol in the project was designed with wholesale eligibility being an additional qualification that participants can opt in to test and demonstrate. (See T-D Coordination Methodology section 3.3 and NODES Schedule 5 section 2.4 for

				more on qualification for wholesale demonstration) Offers from qualified portfolios are then 'forwarded' to the simulated IESO for evaluation against purchasing scenarios rather than represented or 'superaggregated' by the DSO. EPL and NODES are interested in exploring combining offers across portfolios and potentially FSPs in later market designs and consider this to be an element to explore with the IESO and OEB since this will be affected by the concerns of commercial responsibility taken on by an LDC in an IAM. In this model, the commercial responsibility could be forwarded from the IESO market participating flexibility platform to the FSPs with aggregated assets. If this is solved in a satisfactory way, superaggregation would allow smaller portfolios and FSPs to access the IESO market, thus enhancing their potential revenue. This would contribute to further volumes and increased competition in the market for both DSO and the IESO.
1	4	4	Defining Maximum/Ceiling Price	To capture the full range of potential prices offered by distribution-connected DERs, the maximum price is undefined in the market rules. However, for procurements such as LongFlex tenders, the maximum activation price is set default at $2000/MWh whereas the budgetary allotment for ShortFlex activation is average $300/MWh less 5% for platform fees per the Budget.
1	4	5	Moving activities from planning/design milestones into demonstration milestones to reflect work, carry over of development work throughout the project	Working with NODES and Utilismart, the project benefits from spreading development through the market operation phases of the project. Particularly, activities that have been split between Milestones 3 and 4 were done so to reflect the second round of development necessary to implement the "Integrated Coordination" and other program or software enhancements which will come to the fore after use by end-users (participants and EPL staff). Continued development and user feedback marked as a lesson learned for future project submissions.
1	5	6	Identifying voltage regulation and thresholds for non-exporting and <10kW exporting DERs on the Distribution System, difficulty applying Conditions of Service of the LDC as a default standard like the IESO's "Voltage Variations" Grid Connection Requirements (Chapter 4)	Identifying the source of the standards or ranges for voltage variations as first the project-specific CIA/SIA study, then any connection agreements with LDC, then an LDC-accepted site/facility owner-approved DER Operation Plan if voltage ranges are an unresolved concern.
1	1	7	Territory Expansion Lesson	PowerShare's expansion to the entire service territory of EPL is driven by two factors: capacity constraints are existing or

				forecasted in all areas of our territory, and a market scale constraint. The scale constraint emerged from focusing specifically on EPL's service area in Leamington, which excludes many large load or generator customers that exist on shared EPL feeders ("hybrid feeders" per TDWG definitions).
1	4	8	Defining Participant Payment Cycles within Milestone Payment Structure	The Milestone-based payment cycle of the GIF leads the default payment of participants to follow milestones. However, from feedback from participant candidates that provided letters of support during application, advice from NODES from European markets, and from the dedication to accessibility of the market, EPL decided to conduct settlement and payment of participants on a monthly cycle. It was EPL's view that extended periods of service provision (and thus accrual of costs) by participants without payment would be a significant barrier to non-traditional market participants. This extends only to participants, whereas market-related invoices from project partners will align with Milestone submission. For example, the 5% market fee will be invoiced at the end of the milestone rather than monthly.
1	2	9	Baseline methodology and custom baseline methodology, considering IESO baseline methodology	NODES has a basic and accessible default baseline methodology of the five preceding weekdays based on EPL's meter data which is provided daily to NODES by Utilismart for each approved asset's meter. Baselines are evaluated at 15-minute granularity (see "meters used" lesson for more). Participants may nominate an alternative baseline capacity to better reflect their particular operations or asset type. EPL must agree to the proposed alternate baseline. EPL and NODES may conduct spot checks on alternate baselines and may suspend the participant from the platform until the baseline may be verified. From engagement with participant candidates that provided letters of support during application and with candidate aggregators, there was a clear desire to test alternatives to the IESO baselines. EPL and NODES intend to conduct variance analysis on the IESO baselines against the default baselines for settlement, to the extent appropriate.

				NODES' settlement formula from Schedule 5 of the Platform Rules: $BL_d^h = \begin{cases} \sum_{i=1,d-i\notin[\text{sat,sun}]}^{7} \frac{MD_{d-i}^h}{5} & if\ d \notin [\text{sat, sun}] \\ MD_{d-7}^h & if\ d \in [\text{sat, sun}] \end{cases}$ *where* BL_d^h *is the baseline value of day d and interval h and* MD_d^h *is the metered value of the day d and interval h*
1	3	10	Appropriate incentivization of service delivery, following the "least cost, no penalties or deposits" principle: Availability and Activations Payment Reduction Schedules	It is a leading goal of the Project to reduce to the extent possible any fees or charges required of Participants. This is prioritized to incentivize participation and enable relatively small DERs to participate with a minimal structural deficit. This determination was informed by stakeholder engagement with EPL customers and participant candidates which routinely discussed the cost barriers to wholesale market participation as a major concern. The Activation Payment (ShortFlex/energy) reduction schedule provides 100% payment for 90%+ delivery of the ShortFlex Contract Capacity. The reduction schedule drops quickly under 90% delivery, such as between 80-89.99% which provides 65% payment. Delivery of less than 40% of the ShortFlex Contract Capacity provides 0% payment. This schedule is designed to incentivize participants to deliver while also respecting the absence of penalty fees for under delivery. The Availability Payment (LongFlex/capacity) reduction schedule is calculated monthly on average delivery percentage of ShortFlex offers arising from a LongFlex contract. Unmatched ShortFlex offers provide full credit, matched ShortFlex provide credit depending on average delivery percentage, and unavailable ShortFlex offers provide no credit. This schedule is designed to incentivize participants to ensure ShortFlex offers are available for each contracted half hour Delivery Period. Availability payments are more drastically affected by unavailable ShortFlex periods than under delivery of particular periods. This schedule follows the same payment reduction as Activation Payment. Regular or repeated under delivery by a participant will prompt questioning from EPL, and potentially escalate to termination of the participant's eligibility to the Project market if it cannot be addressed.
1	3	11	Grid Nodes identification / Grid Node Representation Granularity; how to represent the Distribution	NODES provided examples of common hierarchies in European markets, which are often voltage or jurisdictional boundaries.

			System in a nodal hierarchy, informing the NODES Platform map and assignment of resources to the nodes	EPL originally planned to model granular portions of the distribution system as 'sections' created by automatic reclosers and to dynamically reassign those sections to a distribution feeder parent node. Challenges to this approach were appropriately representing the complex 'sections' of the distribution system in the platform in a simplified visual manner, and that the live reassignment is overly complex without automated checks between SCADA/SmartMAP/NODESmarket. SCADA integrations are dependent on EPL's ongoing Digital Utility and Joint Control Room projects. The resolution is to use feeders as the lowest node level which provides the benefits of being logistically manageable when network switching takes place and easy to understand visually on the platform. Live switching is an item marked for future exploration.
1	4	12	Participant Contracts: how to define eligibility or ineligibility, defining the role of the DSO versus Platform/Settlement Provider in intake and operation	PowerShare builds on the learnings from the publicly available York Region NWA contracts and program rules. Despite major differences in program design such as York having an auction-based procurement process versus PowerShare's open intake process, many elements were transferable. In particular, participant eligibility and ineligibility. PowerShare rules build further in defining the roles of the DSO (EPL) and the Platform/Settlement Provider (NODES). The PowerShare contract does not provide for payments to participants, which are instead conducted under NODES membership agreement. PowerShare's contract manages eligibility to access or offer services to the NODES Platform and this forms the primary method for the DSO to manage Flexibility Service Providers (FSP) and their assets. An asset may only make offers if they fulfil the requirements under the DSO contract. PowerShare also positioned the DSO to be in control of the registration process, where once an FSP has signed the DSO contract they are then connected with NODES to set up payment details and sign the platform membership agreement.
1	1	13	Clear Participant preference for ICI eligibility	An important lesson from the intake process with various participant candidates is their nearly universal interest in whether PowerShare participation is 'stackable' with ICI eligibility/activities. It is, and the team will be examining to the extent possible any coincidence of DSO needs with ICI peaks.

				In addition, many participant candidates expressed interest or curiosity in stacking market participation between DSO and IESO markets.
1	3	14	Asset Approval, Flexibility of Platform to enroll/disenroll or assign assets	Related to the learning on grid node identification, the flexibility of the Platform was harnessed to reinforce the discretion of the DSO in the approval, assignment, or removal of an asset from the platform. Once contracts are signed, each asset and its meter number must be approved by the DSO when assigning it to a node before it can begin trading with that asset. This ensures DSO control and visibility to the assets before they are added to existing portfolios.
1	3	15	Defining Wholesale Simulation: triggers for purchases, qualification of offers	Given that there is no integration with IESO tools and all activities are on a simulated basis, the PowerShare team endeavoured to capture the life cycle of simulated offers from qualification of assets to formation of offers and activation. Following engagement with GIF and IESO staff, PowerShare defines a two-step "qualification" for IESO offers. First, a portfolio must be tagged as 5-minute dispatchable. That portfolio must then offer at least 2 consecutive half-hour blocks of 100kW to meet the IESO's hourly offer duration and to simulate FERC 2222 compatibility. These offers are then forwarded, or 'seen' by the simulated IESO at T-2 hours. Activation can happen at any time after T-2 (IESO "Mandatory Window"). Engagement with IESO staff helped to identify price as the best trigger for activation rather than outages or capacity/quantity needs, since these are generally reflected in the prices. PowerShare has defined variable price triggers based on forecast Shadow Prices and a Market Clearing Price proxy adapted to the half-hourly market. More information is available in the Transmission-Distribution Coordination Methodology document. PowerShare noted that the $100 Shadow Price trigger used in the York Region NWA pilot did not result in a simulated wholesale activation and thus adapted to variable price triggers in an effort to capture more simulated IESO activity.
1	3	16	Adapting the Availability Declaration Envelope alongside DSO purchases, "LDC-directed quantities"	For the resources in PowerShare, the ADE is established such that real-time schedules will not exceed the quantity offered in the day-ahead timeframe. This principle is managed by the simulated IESO observing a limit on the qualified offers by qualified portfolios at the quantity offered in the ADE. The DSO also submits its "LDC-directed" quantities alongside the ADE submissions. These are submitted to reflect the total quantity of DSO purchases at ADE, regardless whether those

				portfolios or offers were qualified to be forwarded to the simulated IESO. If an otherwise qualified offer is made after the ADE, it is not made available to the simulated IESO to respect the assumed ADE submission of zero.
1	6	17	Embedded Distributor Considerations	It is a general learning of the project that being an Embedded Distributor is a confounding (though surmountable) challenge to Transmission-Distribution coordination for local energy markets. Connection Agreements must be leveraged to the extent they allow any flexibility-related activity and are a first step towards Host-Embedded distributor coordination since they must cooperate at the Connection Impact Assessment stage of connecting an asset. This step typically inserts delays into the process of connecting a new asset and may be a stage where the distributors may share information or availability of flexibility services from the asset, respecting negotiated limits or characteristics.
1	3	18	Adapting Outage Notifications for Forced and Planned Outages in a flexibility market	The Outage Notification process in PowerShare is managed by the DSO contract, as NODES does not have a forced/planned outage logic outside of managing them during contract formation. PowerShare adapted to this process by defining a forced outage as any outage affecting a 'matched' contract (in ShortFlex or LongFlex), with planned outages managed by refraining from making offers. Since participants are free to withdraw their unmatched ShortFlex offers, the DSO is only expecting the availability of matched offers to be delivered. Participants are expected to provide up to 48 hours notice of a Forced Outage, or to notify the DSO of it within 24 hours of its occurrence. Participants are not charged a fee for an outage; however the affected portions of the contract will be settled at zero percent delivery. The DSO may request additional information regarding a reported or suspected Forced Outage. The extent and frequency of Forced Outages may be considered in a future development of a 'reliability ranking' for local market participants but this will be manually tracked for purposes of the demonstration. Such a ranking could serve as a weighted parameter for selection of tender or service responses by FSPs.
1	3	19	Aggregator Portfolios / Flexibility of Approved Assets - differences	Using the NODESmarket functionalities, each Participant places their asset(s) in a Portfolio, which is the level used to generate

			of an Aggregator and a Direct Participant's portfolio management	baselines and make offers to the market. Functionally, Participants are free to arrange their assets as they like since they are held to the quantity of their offer rather than an assigned capacity of their assets. The enduring difference between Direct or Aggregator Participants would be the application of a Type/Technology Approval for their assets. This would be a sample of assets of the same technology selected by the DSO to demonstrate the dispatchability and market acceptance of that technology which the DSO can apply to other assets of the same type. The DSO must still approve each asset before it can be assigned to a portfolio, but it may simplify expanding an Aggregator's roster by leveraging the previously conducted testing.
1	3	20	Aggregator Portfolios, Prevention of Double Counting	Given the flexibility of Portfolios and the ability to transfer approved assets seamlessly between them, NODES implemented a check to prevent double-counting of assets via the Meter Point ID. This is used to prevent gaming or double-counting of services provided by an asset which might have appeared in multiple portfolios without that check, since it would contribute its asset baseline to the Portfolio baseline. A weighted delivery factor was considered as an alternate solution which would preserve the ultimate flexibility of portfolios while respecting the relative size of the concurrent offers (i.e. 5 MW, 3 MW, and 2 MW offers from three Portfolios which share an asset, the asset provides 50%, 30%, and 20% of its delivered flexibility to the Portfolios respectively). This is noted as a potential future enhancement for technology aggregators.
1	3	21	Testing, Standby and Activation Instructions adaptation to DSO platform functionalities	The NODESmarket platform does not provide 'standby notices' for activation. The only pre-matching information a participant would receive is whether they have a LongFlex obligation or a scheduled test. Notifications upon matching or X minutes before delivery is entirely defined by the Participant. For instance, if for operational reasons the Participant only wants to be notified 15 minutes before delivery, but not upon matching, that is possible for them. The test process is aligned to be the platform's "Market Acceptance" testing and the DSO's delivery test. The DSO and Participant agree on the time and quantity of the test, matching in the ShortFlex market. The Participant ensures they receive the notification of activation per their set preferences and then responds with delivery. This verifies the deliverability of the Participant's flexibility to the requirements of the DSO,

				and further testing may occur to confirm the ability of the Portfolio to be dispatchable with less than 2 hours notice for purposes of simulated IESO purchasing.
1	1	22	Onboarding Lessons	General learnings from recruitment discussions and onboarding processes include that many potential candidates were interested in the extent a Local Energy Market could help with justify net-new energy assets. This included interest from OEM or service providers in expanding their portfolio and local businesses interested in reducing energy expenses or to generate new revenues. Timing of onboarding in NODES' experience is that it takes approximately a month from the first meeting. This generally holds true in PowerShare, but can be as long as three months if a Participant requires accommodations to the process or the DSO contract.
1	1	23	Technology Aggregators, like EV OEMs are interested in programs like PowerShare but scale poses challenge to integration	There is a great interest in Technology Aggregators like EV charger and electric water heater OEMs in programs like PowerShare. The challenge seems to be developing integrations by the OEMs is limited by scale; one in particular remarked that Windsor-Essex County would be a scale better suited to develop a Demand Response program.
1	5	24	Hydrogen is not mature enough to source hydrogen-fuelled generation units or a reasonably priced supply in appropriate quantities for Local Market Demonstration	Despite the acceleration and interest in hydrogen projects, hydrogen is uneconomical in our modelling of a H2 fuelled unit operated on a rental basis and offering into PowerShare. The price of Hydrogen transportation and storage is a major impediment, since the points of supply are so far from the potential generation unit.
1	1	25	Finding Candidates for participation is the biggest challenge	Participation candidates like small and medium-sized businesses often do not consider energy/flexibility services as a main component of their business, and thus poses a challenge for recruiting capacity to a local energy market until capacity building or maturation can occur in the market. Although we assume this will come with time, NODES' European market experience has shown that the true scaling opportunity for flexibility is in residential. Large commercial/industrial assets want to be a small player in a national market rather than a large player in a local market; traditional capacity reservation is more aligned with their activation expectations since it minimizes interruptions to business. This notion is also discussed in the learning on Flexibility First. That said, large commercial/industrial assets are participating in local markets and have learned to use the activation price as a mechanism to illustrate their willingness to offer flexibility. A typical bidding profile could be comprised of a low/average reservation price

				and a high activation price. This would in turn reflect the FSPs expected frequency of activations (more information in the next section). Aggregations of residential "Internet-of-Things" demand response capable devices and their business models require maturation of machine learning/automation-based aggregators, given the high volume of devices and relatively small capacity. In other markets, NODES has explored the concept of a Flex Register which allows for the prequalification of technology and assets for flexibility services, serving also as a touchpoint to monitor or control data between TSO and DSO.
1	6	26	Flexibility First; application to distribution grid services	Informed by lessons from NODES' European markets, Flexibility First is an approach to Non-Wires Solutions which centers consumer choice and benefit. Value is captured in an open market based on the degree of voluntarism with which the grid service is provided, which sorts solutions into tiers which can sequence tool use in solving constraints or issues. The sequence where severity of the constraint/distribution issue increases: - 'Yellow Issue', solved with low-cost, highly voluntary flexibility such as a residential aggregator (thermostats, electric hot water systems, EVs). - 'Orange Issue', solved with higher cost, less voluntary flexibility such as C&I. - 'Red Issue', solved with all available flexibility and regulatory tools such as non-firm connections, interruptible rates. Emphasizing voluntarism in program design will lead to scaling and sorting of services into these tiers and will reduce the number or severity of involuntary flexibility provision such as through a non-firm connection. Ultimately there is a cost to solving grid constraints and by relying on involuntary solutions from customers, that cost is downloaded to them such as through lost production for C&I resources. See also the Regulatory Lesson re: Flexible Connection Agreements. A risk noted in this approach is that programs which allow a utility to access cheap or no-incremental-cost flexibility such as through traditional thermostat programs may reduce the liquidity in the market for those flexible assets. If these solutions form the lowest rung of the solution ladder, it may

				create a more difficult path towards maturation of other technology aggregators as they are directly competing with a DSO or TSO for those services.
1	5	27	Technical barriers to IoT and residential technology aggregators	Supported by learnings from Flexibility providers in Norway (i.e. Tibber), there are a number of challenges in the path to enabling residential flexibility at-scale. First is that the aggregators of these IoT technologies believe it is unreasonable to expect 1-second or other high granularity from a 1 kW scale asset the same as grid scale resources. Second is a suite of technical barriers: lack of data transparency and open protocols from device manufacturers, grid technical requirements being poorly matched to new kinds of assets, lack of standardization and scalability between markets, lack of investment certainty specifically for local flexibility which need to move from pilots to attract this kind of aggregator investment. Third is a "UX trilemma" where these aggregators must handle the grid service complexity with simple language to the end user, ensure ongoing engagement, and providing value. Ultimately making the customers understand the service and demonstrating the value for them to participate is a difficult balancing act.
1	1	28	Disseminating Results, Designs, and Principles to Industry including LDCs	LDCs are highly interested in PowerShare, publicly and privately. Industry conferences such as EDA's EDIST, CanREA's Energy Transition Hub Summits, and DistribuTECH have been integral to sharing the messaging and principles of PowerShare such as Flexibility First, the ability of LDCs to create and support Local Energy Markets, and the transition to DSOs.
1	3	29	Ramp Rate considerations	Given the market design and the under-delivery reduction methodology, Project decided to not consider ramp rate and the participant is expected to provide 100% of their offer at the contracted time regardless of ramp rate. Participants are encouraged to manage the ramp rate and consider any impacts on costs in their price and payment expectations.
1	3	30	Defining DSO Gate Closure vis-à-vis IESO Gate Closure	Defining the gate closure, or default 'expiry' of ShortFlex offers in PowerShare was a debate in the market design stages between two and three hours whether to mirror the IESO Mandatory Window or to provide additional time between DSO gate closure for the simulated IESO to receive the qualified dispatch data. The project settled at 125 minutes before dispatch hour, respecting the Mandatory Window and providing the time for NODES to provide the simulated IESO with the qualified offers and DSO information. Per TDWG, the DSO submits at some

				time prior to the Mandatory Window an "LDC-directed quantity" for all the local market activity within this period. Wholesale-qualified offers are also prepared and made visible to the simulated IESO in the 5-minute period. This is possible only because of the simulated nature of T-D coordination, and we expect that live coordination may have a longer time period unless reliably automated and technically integrated. NODES has experience with the latter in Sweden and Norway markets.
1	2	31	Identify Deadband for Dispatches/Activations	Reference to the 'Dispatch Instructions in Real Time Market' PDF shared by the IESO on March 1, 2023, facilities in this pilot that are less than 30 MW, the IESO expects facilities to operate as close as possible to the dispatch instruction. PowerShare hopes that findings from this project will help inform what a reasonable deadband for DER facilities would be, noting the IESO's interest in a +/-2% deadband. Operation as close as possible to the dispatch instruction will be supported and incentivized by the stepwise reduction of payment by % delivery.

4. Project Regulatory/Policy Considerations and Lessons Learned

Projects with an electricity distributor as lead proponent or partner: please ensure that the electricity distributor completes – or provides input – to this section.

In the following tables, summarize regulatory lessons learned, including any unanticipated legislative or regulatory barriers that were encountered and if/how any barriers were addressed in the project. The lessons generated may be used to inform regulatory and policy initiatives associated with innovative actitivies. Do not delete entries from previous milestones, rather, add new rows for the new milestone and populate the fields. Please be detailed in your description.

MS (Milestone): Milestone Number

ID: Unique ID for each lesson learned

Challenge Description: A detailed description of the challenge and how it impacted the project.

Response: A detailed description on how the challenge was addressed or resolved (if applicable), the thought process behind the response and describe the resources used to respond to the challenge.

MS	ID	Challenge Description	Response (if any)
1	1	Reporting of DSO activations in embedded generation categories	Essex Powerlines continues to include all embedded generation injections in monthly submissions if those injections offset the LDC's internal load. This portion of the LDC's load would not be accounted for by IESO upstream wholesale meters, and therefore the IESO depends on the LDC's submission to determine total monthly load (which is used as an input to calculate their Class B GA charges and IESO admin fee charges as well). While the embedded generator's participation in the pilot program may impact how they operate, it would not have an impact on the LDC's submission requirements.
1	2	Resource Exclusivity with IESO Markets	It is recognized that this is an understandable provision for the purposes of the Grid Innovation Fund, given concerns of double-dipping or subsidizing market participants unfairly. However, this was a challenge to recruitment where a significant constituency of mature energy market participants are unable to continue their regular business processes within the IAMs if they want to provide local flexibility. There is one example of a <100kW site that was part of an IAM aggregation which reallocated their portfolio to participate, largely driven by an interest in DSO models and local flexibility market learnings. Participant candidates were commonly interested in the extent of 'stacking' local and wholesale markets, such as capacity commitments outside of the IESO Capacity Auction availability windows.

1	3	DSO concerns representing assets to the Wholesale market in a "Superaggregation" model	EPL and NODES share a hesitance to represent assets in IAMs. This function is termed as a 'super aggregator', a top-level aggregator for an area or local market which represents an additional layer of aggregation of direct assets and aggregations to IAMs. A super aggregator would bear commercial responsibility for these assets, which is a risk to distributors. See technical learning "DSO commercial responsibility for assets" for more. In a theoretical design discussion, the IESO proposed that it would be possible to "translate" non-performance penalties to resource owners in a 'super aggregation' model. The LDC retains a preference for not being commercially responsible for IAM participants given the current risk models. EPL and NODES are interested in exploring combining offers across portfolios in later market designs and consider this to be an element to explore with the IESO and OEB since this will be affected by the concerns of commercial responsibility taken on by an LDC in an IAM.
1	4	Defining a mechanism for recovery of cost of energy and capacity services within Local Energy Market Demonstration	This is a pending matter with the OEB and may be subject to change. With legal counsel, EPL has made Application (EB-2024-0096) to the OEB for a deferral and variance account (DVA) to record the cost of grid services within the PowerShare local energy market, net of GIF funding and of HOEP. For discussion, LDCs incurring a cost of power for LDC-procured grid services for energy is unaccounted for in the current settlement processes. This will require investigation and maturation of the settlement pathways between the IESO and LDCs. Also for discussion, there is an attribution question which asks to whom the cost and benefits of operating a local energy market should be assigned. Whether it is entirely localized within the LDC, if it includes Host Distributors, the region, or the province as a whole is an important design for the use of DERs as NWSs - particularly within local energy market structures.
1	5	"Non-firm" Connection Agreements are becoming the “silver bullet” but become regulatory tools or ‘free flexibility’ which reduces the incentive to procure	Supported by learnings from European markets where non-firm connection agreements are becoming more popular, involuntary actions such as 'non-firm' disconnections compete with development of voluntary flexibility options. Non-firm

		voluntary flexibility (potentially reduce liquidity)	connections are not 'free flexibility' as they asymmetrically impose the costs of grid management actions on the customer/business which may have had no choice but to accept the non-firm agreement to receive a connection. These management costs should be borne more equally by all customers rather than imposed upon individual customers. In addition, the use of non-firm connection agreements, contrarily to market-based flexibility, gives no guarantee of dispatching the asset with the lowest dispatch cost, due to the absence of a prices signal. These solutions can form an important rung in the active management ladder, but the place for non-firm agreements should be after market-based processes to encourage growth and confidence in the 'lower' more voluntary flexibility services. Alternatively, non-firm connections could be coordinated with market, enabling the non-firmly connected grid user to pay for other grid users to provide flexibility instead of itself, and thus creating a price signal. See also learning on 'Flexibility First' for more on emphasizing voluntarism in grid service provision.

5. Project Victories

This section captures project victories that you wish to celebrate. For example, increasing head count, securing additional project funding or even a successful technology demonstration from your organization that is outside the scope of this project. Do not delete entries from previous milestones, rather, copy the table for the new milestone and populate the fields.

Milestone 1

Achievement 1: Developing the Market Rules Package

The preparation of the Market Rules Package was a showcase in collaboration between Essex, NODES, IESO staff, and many stakeholders like the OEB and Ministry of Energy. The staff engaged in developing the rules received exposure and context to many elements of the energy sector, deepening their competencies in exciting ways. Some learning elements include aspects of the IESO Market Rules, the Transmission-Distribution Working Group's DSO-TSO coordination protocols, OEB processes such as RRR and licensing, and the important learnings from foundational demonstrations like the York Region Non-Wires Alternative project.

Completing the Package required a clear understanding of the roles of a DSO, a platform service provider, and the customer/Flexibility Service Provider (FSP).

For NODES, the biggest challenge related to the Market Rules achievement was to reconcile two markets (the DSO and simulated IESO) with different metering and dispatch granularities and qualifications into a single market pathway for FSPs. This was a novel addition to NODES' markets.

Achievement 2: Developing Internal Competency on DSOs and Transmission-Distribution Coordination

Developing internal competency on DSOs and Transmission-Distribution Coordination has been a significant achievement in PowerShare which showcases the collaborative efforts of Essex Powerlines, NODES, the Independent Electricity System Operator (IESO), and other stakeholders. The project team engaged deeply with the IESO's Transmission-Distribution Working Group to develop essential T-D coordination protocols, ensuring the project aligned with regulatory and operational standards.

By seeking to resolve local constraints and addressing barriers related to Distributed Energy Resources (DERs), the project is set to demonstrate effective coordination between DSO and simulated IESO markets. Understanding this coordination is crucial for enhancing grid resilience and reliability. The integration of the NODES platform enables DER owners to monetize their flexibility, contributing to grid stability and market efficiency.

Moreover, the project team gained valuable insights into the complexities of market design and rules, enhancing their understanding of the roles and responsibilities within a DSO framework. This experience has equipped Essex Powerlines and its partners with the knowledge and skills necessary to navigate and influence the evolving energy market landscape in Ontario, positioning them among leaders in the transition towards more dynamic and responsive energy distribution systems.

Achievement 3: Presenting the PowerShare Initiative at EDIST for the Energy Industry in Ontario

The PowerShare initiative marked a significant milestone when it was co-presented by the Independent Electricity System Operator (IESO), Essex Powerlines, and NODES at the Electricity Distributors Association's (EDA) 2023 EDIST conference. This collaborative presentation showcased the innovative aspects of the PowerShare project, emphasizing its potential as a scalable model for local distribution companies (LDCs) of all sizes.

The presentation highlighted the success of PowerShare in addressing local energy constraints through a dynamic and flexible market model. By detailing the coordination efforts between DSOs and TSOs, the presenters were able to demonstrate how the project integrates distributed energy resources (DERs) to enhance grid reliability and efficiency. This was supported by insights from the IESO on the Grid Innovation Fund, the provincial energy outlook, and a remark that "PowerShare is key to understanding how to unlock DERs" as well as testing coordination protocols.

Feedback from the conference attendees underscored the perceived scalability of the PowerShare model. Participants from various LDCs expressed interest in adopting similar approaches within their jurisdictions, recognizing the potential for widespread application. The warm reception and interest garnered from attendees was certainly an achievement. Overall, the presentation at EDIST served as a major moment for the PowerShare project by reinforcing its position as a forward-thinking solution and cementing wider industry interest in the project.

Achievement 4: Perceived as a Scalable Model for Small, Medium, and Large LDCs, as well as Beyond Ontario

PowerShare has been widely recognized for its scalability and adaptability, making it a model for local distribution companies (LDCs) of all sizes. The project has been presented to global audiences at DistribuTECH 2023 and 2024, European audiences at Nordic Flexibility Day and Nordic Energy Day 2023, Canadian audiences at the CanREA Energy Transition Hub and EDIST 2023, as well as represented at conferences in Los Angeles, Montreal, and others.

The collaborative efforts between Essex Powerlines, NODES, and the IESO were pivotal in crafting a comprehensive market rules package that can be scaled and replicated across different jurisdictions. This foundational work ensures that LDCs can work towards adopting similar models, benefiting from shared insights and best practices. Feedback from the various conference attendees reinforced the perception of PowerShare-like markets as a versatile and scalable solution – with PowerShare serving as a Flexibility Market touchpoint in North America. Representatives from various LDCs expressed interest in implementing the model within their regions.

6. Looking Back

Knowing what you know now, what specific decisions/actions would you have changed/taken differently? Do not delete entries from previous milestones, rather, copy the table for the new milestone and populate the fields.

Milestone 1

Reflection 1: Balancing Technical and Regulatory Focus

During the initial stages of work the project team initially concentrated heavily on technical details such as the setup of market rules and operational integrations in SmartMAP, which is the DSO operational tool hub for Essex Powerlines. This focus on the program framework and technical infrastructure was necessary to support DSO functionalities like the meter data submission to NODES or to manage the intake process.

However, this intense focus on technical details resulted in the team not immediately recognizing the requirement of submitting a request for a Deferral and Variance Account (DVA) to the Ontario Energy Board for the specialized circumstances of PowerShare. Perhaps the team understood the OEB's May 31, 2022 letter confirming PowerShare is considered distribution activity by OEB Staff as sufficient regulatory guidance; allowing the team to so intensely focus on the technical and rule design of the project. However, once the DVA application was proven essential for regulatory compliance and the financial arrangement of the project, the manner of structuring the DVA was not clear to the team.

The PowerShare team recognizes that while their focus on the technical aspects was necessary, an earlier submission of the DVA could have garnered more timely regulatory feedback and possibly accelerated regulatory approval processes to recover the cost of power. This insight has been incorporated into the project's ongoing and future phases, ensuring a closer alignment between technical development and regulatory submissions to enhance project execution and scalability.

See Regulatory/Policy Lesson "Defining a mechanism for recovery of cost of energy and capacity services within Local Energy Market Demonstration" for more discussion of the DVA.

Reflection 2: Expanding project area, overly focused on Leamington constraints

PowerShare was designed with a focus on existing constraints in the Leamington area. The highly localized approach was beneficial for focusing the project team on specific issues, but inadvertently limited the scope of the project market and its applicability to the larger, notably constrained Essex County region.

Given the immediate needs and significant constraints of Leamington, the area was a logical starting point for deploying the Local Energy Market demonstration. However, the narrow focus restricted the integration of numerous and diverse Distributed Energy Resource (DER) assets across Essex Powerlines' service territory. Additionally, Project learnings and engagement with aggregators highlight that aggregators require a larger market scale to begin effective integration. Additionally, according to the

learnings of NODES in European projects, aggregated residential resources are essential for scaling Local Energy Markets and integrating electrified resources. The limited geographic area posed a challenge for attracting and incorporating these aggregators.

Looking back, the team acknowledges that an expanded geographic scope could have provided valuable insights into the scalability of the DSO model and its applicability to regions experiencing similar constraints earlier. A wider market area would have facilitated better integration of diverse DER assets, enhanced market competition, and improved market liquidity at the early stages of PowerShare. This lesson is essential for future iterations of Local Energy Markets where a more inclusive, regional, or cross-LDC approach could enhance the attractiveness and effectiveness of a Local Energy Market.

Reflection 3: Transforming Initial Interest into Active Participation

PowerShare made a specific effort to engage potential participants and stakeholders during this Milestone. We held detailed discussions and engagements early on to ensure all participant candidates understood the market design and the participant-facing technical aspects of the platform. Cross-team market design work covered permissive asset participation requirements, metering requirements, product duration, and minimum bid sizes to enable a diverse array of distribution-connected assets. These early meetings highlighted the importance of engaging DER asset owners in the Leamington area - a focus that remained central throughout the market design process.

During the project application phase, we received many letters of support from potential participants indicating strong initial interest. However, these expressions of support did not always translate into active participation. Despite our extensive groundwork, there is always room for improvement. This experience highlights the importance of continuous and wide participant outreach, not just for initial engagement but throughout the project lifecycle.

Looking back, we recognize the opportunity to further enhance participant outreach. Engaging a broader range of participants earlier and increasing the frequency of our engagement activities might have facilitated earlier trading and attracted more candidates. Nonetheless we recognize the significant effort put forth understanding that we operated at our highest capacity given the constraints.

7. Collaboration & Acknowledgement

In the table below, acknowledge exceptional individual contributions from the project team and partners. For example, acknowledging the individual contributor that conceived and implemented a solution to a challenge applicable to this milestone, ideation of novel methodology/process that improved the success of the project, or contributed valuable domain knowledge that mitigated a problem in the future. Do not delete entries from previous milestones, rather, copy the table for the new milestone and populate the fields.

Milestone 1

Contributor 1 Name & Organization: Jacob Godfrey, Essex Power Corporation

In this milestone we would like to acknowledge Jacob Godfrey who played a crucial role in the success of the project through his meticulous preparation and coordination efforts. Jacob's dedication in crafting agendas, spearheading meetings, and preparing minutes for nearly all project meetings reveals the work of a phenomenal coordinator. His diligent work provided a clear and consistent record of our progress and decisions, ensuring that our discussions were organized and documented thoroughly.

Despite onboarding to PowerShare well after the GIF submission and design, Jacob hit the road running as the primary drafter and coordinator of the market rules package - a fundamental component of our project. His efforts in organizing and reflecting the outcomes of design workshops in the rules package were instrumental in shaping the project's framework between the DSO and Platform Rules. Jacob's ability to coordinate between various stakeholders and ensure that all points were captured and addressed significantly contributed to the project's success thus far, and the primary achievement of Milestone 1.

Jacob’s diligent work not only facilitated smoother project operations but also ensured that we maintained a high level of organization and clarity throughout our efforts. His contributions exemplify the collaborative spirit and commitment to excellence that drive our project forward.

Contributor 2 Name & Organization: Guro Grøtterud, NODES

We would like to acknowledge the exceptional contributions of Guro Grøtterud, whose expertise and project management skills have been invaluable to the PowerShare initiative. Guro brought extensive regulatory experience in European flexibility markets and distribution-transmission coordination, which significantly informed and enriched our project and approach to the energy transformation in Ontario.

Guro’s insights into the development and implementation of Flexible Connection Agreements and the Flexibility First approach were particularly impactful. Her deep understanding of these areas helped us navigate complex challenges and align our strategies with proven practices from European markets. By

sharing her experiences and lessons learned from NODES' projects, Guro provided us with a broader perspective that enhanced our planning and execution.
Moreover, Guro played a crucial role in NODES' project management side following the example of her colleague, Sofia Eng, who provided great value as a NODES' Project Manager during the inception of PowerShare.

Guro's expertise and leadership have been crucial in advancing our project. Her contributions not only improved our regulatory and operational strategies but also fostered a collaborative environment through her willingness to share her knowledge.

Contributor 3 Name & Organization: IESO Staff

Our team would like to make a special acknowledgement of the IESO Staff which have had a hand in supporting this project. Not only the Grid Innovation Fund team, who have contributed greatly to the visibility and successful growth of PowerShare thus far, but also a few notable contributors to PowerShare-IESO coordination (non-exhaustive):

- Angeli Jaipargas; for expert insight to IESO market operations and how best PowerShare can identify and simulate the most impactful elements, as well as guidance in capturing the market metrics with the greatest value to the IESO.
- Ali Golriz; for significant contributions to the understanding of Transmission-Distribution coordination design in PowerShare as well as presenting informed and thoughtful questions on the design of the project.

The contributions of all IESO and GIF Staff cannot be entirely enumerated here, but the PowerShare team would like to recognize their efforts in support of the project.

8. Additional Information

Please provide any information here that is not covered elsewhere in this report (include photos where available).

9. Administration (IESO STAFF USE ONLY)

Report & Submitted Attachments Approved	☐ **Yes**	☐ **No**

Payment Amount
Amount:

Signature of Fund staff (IESO)

_____

Name:
Date:

_____

Name:
Date:

Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, Ontario M5H 1T1

Phone: 905.403.6900
Toll-free: 1.888.448.7777
E-mail: customer.relations@ieso.ca

ieso.ca

@IESO_Tweets
facebook.com/OntarioIESO
linkedin.com/company/IESO

ieso
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Powering Tomorrow.

Detailed Project Budget

Project Name: DSO Pilot Project

Organization Name: Essex Powerlines Corporation

Summary	Expected Submission Date (Months from project start date)	IESO Contribution	Total Partner Contribution ((	Total Milestone Value
Milestone 1	27	$ 89,639.30	$ 89,639.30	$ 179,278.60
Milestone 2	27	$ 146,825.00	$ 146,825.00	$ 293,650.00
Milestone 3	36	$ 586,283.90	$ 910,283.90	$ 1,496,567.80
Milestone 2A	32	$ 2,313,407.00	$ 2,313,407.00	$ 4,626,814.00
Milestone 4	46	$ 730,433.90	$ 730,433.90	$ 1,460,867.80
Milestone 5	47	$ 15,800.00	$ 15,800.00	$ 31,600.00
Total	47	$ 3,882,389.10	$ 4,206,389.10	$ 8,088,778.20

PLEASE NOTE:

1.) The "Rate/Cost" X "Units" must match the value in the "Total Contribution (All Funders)" column.

2.) Unless specifically directed otherwise, do not include IESO services (such as M&V plan review) as an

3.) Please refer to the final page of the Application Guide available on IESO Grid Innovation Fund webpag eligible expenses.

4.) Final project milestone value must represent a minimum of 10% of Fund grant.

5.) Eligible labour costs are capped at a maximum $800/day (7.5 hours)

6.) In-kind and cash contributions consist of auditable, substantiated cash and non-cash contributions to th substantially to the completion of the project.

Click red triangles on cells for important notes that will help you accurately complete this template.

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)
1.1.1	1	Milestone 1: Project Design	1	Task 1: Seek Regulatory support from IESO & OEB	1	Activity 1: Meet with IESO & OEB	Month 2	Labour
1.2.1	1	Milestone 1: Project Design	2	Task 2: Establish DSO Market Design	1	Activity 1: Develop DSO Market design plan	Month 12	Labour
1.2.1.a	1	Milestone 1: Project Design	2	Task 2: Establish DSO Market Design (consulting)	1.a	Activity 1a: Develop DSO market desing plan consulting	Month 12	Labour
1.2.2	1	Milestone 1: Project Design	2	Task 2: Establish DSO Market Design	2	Activity 2: Review DSO Market design plan with IESO	Month 12	Labour
1.3.1	1	Milestone 1: Project Design	3	Task 3: Estbalish market rules and alignment w/ IESO/OEB	1	Activity 1: Review DSO Market Rules with IESO/OEB	Month 12	Labour
1.4.1	1	Milestone 1: Project Design	4	Task 4: seek confirmation of market participants	1	Activity 1: Reach out to new and existing DER owners in Municipality of Leamington for confirmation and letters	Month 13	Labour
1.5.1	1	Milestone 1: Project Design	5	Task 5: Establish Risk Mitigation Strategy/ Marketing Outreach Plan	1	Activity 1: Establish Risk mitigation strategy/marketing outreach plan	Month 12	Labour
1.6.1	1	Milestone 1: Project Design	6	Task 6: Establish Baseline	1	Activity 1: Data colleciton and analysis	Month 12	Labour
1.7.1	1	Milestone 1: Project Design	7	Task 7: Reporting	1	Activity 1: Adjust final design as required and finalize design/scope document for market operations	Month 26	Labour

Milestone 1 Summary

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	Milestone ID	Milestone Description	Task ID	Task Areas	Activity ID	Activity Detail	Due Date	Cost Classification (drop down selection)
2.1.1	2	Milestone 2: Software Development	1	Task 1: NODES platform software upgrades	1	Activity 1: Integration into IESO wholesale market (including functionality adjustments, new features, testing, platform integration, operations and support)	Month 9	Labour
2.1.2	2	Milestone 2: Software Development	1	Task 1: NODES platform software upgrades	2	Activity 2: SmartMAP integration to the NODES Platform and related adjustments (including functionality adjustments, new features, testing, operations and support, DER platform integration)	Month 13	Labour
2.2.1	2	Milestone 2: Software Development	2	Task 2: SmartMAP software upgrades	1	Activity 1: Develop algorithm to recognize when flexibility is needed based on set of parameters	Month 9	Labour
2.2.2	2	Milestone 2: Software Development	2	Task 2: SmartMAP software upgrades	2	Activity 2: Database (back-end) build out	Month 13	Labour
2.3.1	2	Milestone 2: Software Development	3	Task 3: Validate performance capabilities prior to market launch	1	Activity 1: Stress testing	Month 13	Labour

2.4.1	2	Milestone 2: Software Development	4	Task 4: Consulting for DSO design expertise	1	Activity 1: DSO expertise consulting	Month 14	Labour
2.5.1	2	Milestone 2: Software Development	5	Task 5: Reporting	1	Activity 1: Summary report on Milestone 2 including report on success of software upgrades, results of stress testing, and functionality testing.	Month 27	Labour
Milestone 2 Summary								

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	**Milestone ID**	**Milestone Description**	**Task ID**	**Task Areas**	**Activity ID**	**Activity Detail**	**Due Date**	**Cost Classification** (drop down selection)
3.1.1	3	Milestone 3: Project Implementation Phase 1	1	Task 1: Market Implementation	1	Activity 1: Run Phase 1 of pilot DSO market	Month 30	License Fees
3.1.1.a	3	Milestone 3: Project Implementation Phase 1	1	Task 1: Market Implementation (transaction fee)	1.a	Activity 1: Run Phase 1 of pilot DSO market	Month 30	License Fees
3.1.1.b	3	Milestone 3: Project Implementation Phase 1	1	Task 1: Market Implementation (DSO fee)	1.b	Activity 1: Run Phase 1 of pilot DSO market	Month 30	License Fees
3.1.1.c	3	Milestone 3: Project Implementation Phase 1	1	Task 1: Market implementation (membership fee)	1.c	Activity 1: Run Phase 1 of pilot DSO market	Month 30	License Fees
3.2.2	3	Milestone 3: Project Implementation Phase 1	2	Task 2: In-field upgrades	2	Activity 2: DER Upgrades (including integration to the NODES Platform)	Month 30	Material / Equipment / Hardware
3.3.1	3	Milestone 3: Project Implementation Phase 1	3	Task 3: Validate performance capabilities prior to market entrance	1	Activity 1: Test functionality	Month 30	Labour
3.4.1	3	Milestone 3: Project Implementation Phase 1	4	Task 4: SmartMAP software upgrades	1	Activity 1: Develop algorithm to send buy signal and integrate into NODES platform	Month 24	Labour
3.4.2	3	Milestone 3: Project Implementation Phase 1	4	Task 4: SmartMAP software upgrades	2	Activity 2: Develop user interface	Month 24	Labour
3.5.1	3	Milestone 3: Project Implementation Phase 1	5	Task 5: NODES platform software upgrades	1	Activity 1: Integration into IESO wholesale market (including functionality adjustments, new features, testing, platform integration, operations and support)	Month 24	Labour
3.5.2	3	Milestone 3: Project Implementation Phase 1	5	Task 5: NODES platform software upgrades	2	Activity 2: SmartMAP integration to the NODES Platform and related adjustments (including functionality adjustments, new features, testing, operations and support, DER platform integration)	Month 24	Labour
3.6.1	3	Milestone 3: Project Implementation Phase 1	6	Task 6: Consulting for DSO design expertise	1	Activity 1: DSO expertise consulting	Month 31	Labour
3.7.1	3	Milestone 3: Project Implementation Phase 1	7	Task 7: Reporting	1	Activity 1: Data collection and analysis	Month 31	Labour
3.7.2	3	Milestone 3: Project Implementation Phase 1	7	Task 7: Reporting	2	Activiy 2: Phase 1 Report document	Month 31	Labour
3.7.2.a	3	Milestone 3: Project Implementation Phase 1	7	Task 7: Reporting	2.a	Activity2a: Phase 1 Report document expertise	Month 31	Labour
Milestone 3 Summary								

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	**Milestone ID**	**Milestone Description**	**Task ID**	**Task Areas**	**Activity ID**	**Activity Detail**	**Due Date**	**Cost Classification** (drop down selection)
2A.1.1	2A	Milestone 2A: BESS Installation & In-field Upgrades	1	Task 1: In-field upgrades (BESSs)	1	Activity 1: Procurement and Installation of BESSs including solutions up to 1 MW and ranging from 150-800 kW	Month 31	Material / Equipment / Hardware
2A.1.2	2A	Milestone 2A: BESS Installation & In-field Upgrades	1	Task 2: In-field upgrades	2	Activity 1: Connection Impact Assessments	Month 32	Labour
2A.2.1	2A	Milestone 2A: BESS Installation & In-field Upgrades	2	Task 3: Reporting	1	Activity 1: Summary report on Milestone 2A including report on success of software upgrades, results of stress testing, and functionality testing.	Month 32	Labour
Milestone 2A Summary								

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	**Milestone ID**	**Milestone Description**	**Task ID**	**Task Areas**	**Activity ID**	**Activity Detail**	**Due Date**	**Cost Classification** (drop down selection)
4.1.1	4	Milestone 4: Project Implementation Phase 2	1	Task 1: Seek additional market participants	1	Activity 1: Tender process to seek additional DER asset owners to participate in market	Month 31	Labour
4.1.2	4	Milestone 4: Project Implementation Phase 2	1	Task 1: Seek additional market participants	2	Activity 2: Signed participant agreements	Month 32	Labour

4.2.1	4	Milestone 4: Project Implementation Phase 2	2	Task 2: Run pilot market phase 2	1	Activity 1: Run pilot market phase 2	Month 42	License Fees
4.2.1.a	4	Milestone 4: Project Implementation Phase 2	2	Task 2: Run pilot market phase 2 (transaction fee)	1.a	Activity 1a: Run pilot market phase 2	Month 42	License Fees
4.2.1.b	4	Milestone 4: Project Implementation Phsae 2	2	Task 2: Run pilot market phase 2 (membership fee)	1.b	Activity 1b: Run pilot market phase 2	Month 42	License Fees
4.3.1	4	Milestone 4: Project Implementation Phase 2	3	Task 3: In-field upgrades	1	Activity 2: DER Upgrades (including integration to the NODES Platform)	Month 42	Material / Equipment / Hardware
4.4.1	4	Milestone 4: Project Implementation Phase 2	4	Task 4: Validate performance capabilities prior to market entrance	1	Activity 1: Test functionality	Month 42	Labour
4.5.1	4	Milestone 4: Project Implementation Phase 2	5	Task 5: SmartMAP software upgrades	1	Activity 1: Develop algorithm to send buy signal and integrate into NODES platform	Month 35	Labour
4.5.2	4	Milestone 4: Project Implementation Phase 2	5	Task 5: SmartMAP software upgrades	2	Activity 2: Develop user interface	Month 35	Labour
4.6.1	4	Milestone 4: Project Implementation Phase 2	6	Task 6: Consulting for DSO design expertise	1	Activity 1: DSO expertise consulting	Month 42	Labour
4.7.1	4	Milestone 4: Project Implementation Phase 2	7	Task 7: Reporting	1	Activity 1: Data collection and analysis	Month 42	Labour
4.7.2	4	Milestone 4: Project Implementation Phase 2	7	Task 7: Reporting	2	Activity 2: Phase 2 Report document	Month 43	Labour
4.7.2.a	4	Milestone 4: Project Implementation Phase 2	7	Task 7: Reporting	2.a	Activity 2: Phase 2 Report document expertise	Month 43	Labour
Milestone 4 Summary								

Unique Line Item ID [Milestone].[Task].[Activity] (Autogenerated-DO NOT ENTER)	**Milestone ID**	**Milestone Description**	**Task ID**	**Task Areas**	**Activity ID**	**Activity Detail**	**Due Date**	**Cost Classification** (drop down selection)
5.1.1	5	Milestone 5: Project Completion, Knowledge Transfer	1	Task 1: Reporting	1	Activity 1: report on project outcomes (benefits/roadblocks/etc)	Month 44	Labour
5.1.1.a	5	Milestone 5: Project Completion, Knowledge Transfer	1	Task 1: Reporting	1.a	Activity 1a: report analysis	Month 44	Labour
5.2.1	5	Milestone 5: Project Completion, Knowledge Transfer	2	Task 2: Share Lessons Learned	1	Activity 1: Share lessons learned with IESO/OEB	Month 45	Labour
5.3.1	5	Milestone 5: Project Completion, Knowledge Transfer	3	Task 3: Knowledge transfer	1	Activity 1: Work collaboratively with IESO/OEB to offer best practice solutions based on DSO pilot project results	Month 45	Labour
Milestone 5 Summary								

in-kind contribution.
ge for more information on

he project that contribute

Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)
Utilities	Essex Powerlines Corporation	$91	40	$ 3,646.00	$ 1,823.00		$ 1,823.00		
Utilities	Essex Powerlines Corporation	$91	300	$ 27,345.00	$ 13,672.50	$ 13,672.50			
Professional, scientific and technical services	NODES	$200	600	$ 120,000.00	$ 60,000.00	$ 30,000.00		$ 30,000.00	
Utilities	Essex Powerlines Corporation	$91	40	$ 3,646.00	$ 1,823.00		$ 1,823.00		
Utilities	Essex Powerlines Corporation	$91	40	$ 3,646.00	$ 1,823.00		$ 1,823.00		
Utilities	Essex Powerlines Corporation	$67	20	$ 1,346.00	$ 673.00		$ 673.00		
Utilities	Essex Powerlines Corporation	$91	80	$ 7,280.00	$ 3,640.00	$ 3,640.00			
Utilities	Essex Powerlines Corporation	$103	40	$ 4,123.20	$ 2,061.60	$ 2,061.60			
Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20	$ 4,123.20			
			1240	**$ 179,278.60**	**$ 89,639.30**	**$ 53,497.30**	**$ 6,142.00**	**$ 30,000.00**	**$ -**

Industry (NAICS) Classification (drop down selection)	Service Provider [Product or Service Provider]	Rate/Cost [$/hr] or [$/unit]	Units	Total Cost (Calculated)	Total Contribution (IESO)	Essex Powerlines Corporation (Cash)	Essex Powerlines Corporation (In-Kind)	NODES (In-Kind)	NODES (Cash)
Professional, scientific and technical services	NODES	$200	577.5	$ 115,500.00	$ 57,750.00	$ 28,875.00		$ 28,875.00	
Professional, scientific and technical services	NODES	$200	412.5	$ 82,500.00	$ 41,250.00	$ 20,625.00		$ 20,625.00	
Professional, scientific and technical services	Essex Energy Corporation	$105	300	$ 31,500.00	$ 15,750.00				
Professional, scientific and technical services	Utilismart Corporation	$100	500	$ 50,000.00	$ 25,000.00				
Professional, scientific and technical services	Essex Energy Corporation	$103	50	$ 5,150.00	$ 2,575.00				

Professional, scientific and technical services	NODES	$200	45	$ 9,000.00	$ 4,500.00	$ 2,250.00		$ 2,250.00	
Utilities	Essex Powerlines Corporation	$103	0						
			1885	**$ 293,650.00**	**$ 146,825.00**	**$ 51,750.00**	**$ -**	**$ 51,750.00**	**$ -**

Industry (NAICS) Classification (drop down selection)	**Service Provider [Product or Service Provider]**	**Rate/Cost [$/hr] or [$/unit]**	**Units**	**Total Cost (Calculated)**	**Total Contribution (IESO)**	**Essex Powerlines Corporation (Cash)**	**Essex Powerlines Corporation (In-Kind)**	**NODES (In-Kind)**	**NODES (Cash)**
Utilities	Essex Powerlines Corporation	$300	1700	$ 484,500.00	$ 242,250.00	$ 242,250.00			
Professional, scientific and technical services	NODES	$300	1700	$ 25,500.00	$ 12,750.00	$ 12,750.00			
Professional, scientific and technical services	NODES	$10,000	18	$ 180,000.00	$ 90,000.00	$ 10,008.00		$ 79,992.00	
Professional, scientific and technical services	NODES	$3,000	108	$ 324,000.00				$ 324,000.00	
Utilities	Essex Powerlines Corporation	$30,000	5	$ 150,000.00	$ 75,000.00	$ 75,000.00			
Professional, scientific and technical services	Essex Energy Corporation	$103	25	$ 2,575.00	$ 1,287.50				
Professional, scientific and technical services	Essex Energy Corporation	$105	200	$ 21,000.00	$ 10,500.00				
Professional, scientific and technical services	Essex Energy Corporation	$105	300	$ 31,500.00	$ 15,750.00				
Professional, scientific and technical services	NODES	$200	247.5	$ 49,500.00	$ 24,750.00	$ 12,375.00		$ 12,375.00	
Professional, scientific and technical services	NODES	$200	412.5	$ 82,500.00	$ 41,250.00	$ 20,625.00		$ 20,625.00	
Professional, scientific and technical services	NODES	$200	315	$ 63,000.00	$ 31,500.00	$ 15,750.00		$ 15,750.00	
Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20	$ 4,123.20			
Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20	$ 4,123.20			
Professional, scientific and technical services	NODES	$200	330	$ 66,000.00	$ 33,000.00	$ 16,500.00		$ 16,500.00	
			5521	**$ 1,496,567.80**	**$ 586,283.90**	**$ 413,504.40**	**$ -**	**$ 469,242.00**	**$ -**

Industry (NAICS) Classification (drop down selection)	**Service Provider [Product or Service Provider]**	**Rate/Cost [$/hr] or [$/unit]**	**Units**	**Total Cost (Calculated)**	**Total Contribution (IESO)**	**Essex Powerlines Corporation (Cash)**	**Essex Powerlines Corporation (In-Kind)**	**NODES (In-Kind)**	**NODES (Cash)**
Professional, scientific and technical services	Essex Energy Corporation	$4,476,814	1	$ 4,476,814.00	$ 2,238,407.00				
Professional, scientific and technical services	Essex Energy Corporation	$15,000	10	$ 150,000.00	$ 75,000.00				
Utilities	Essex Powerlines Corporation	$103	0						
			11	**$ 4,626,814.00**	**$ 2,313,407.00**	**$ -**	**$ -**	**$ -**	**$ -**

Industry (NAICS) Classification (drop down selection)	**Service Provider [Product or Service Provider]**	**Rate/Cost [$/hr] or [$/unit]**	**Units**	**Total Cost (Calculated)**	**Total Contribution (IESO)**	**Essex Powerlines Corporation (Cash)**	**Essex Powerlines Corporation (In-Kind)**	**NODES (In-Kind)**	**NODES (Cash)**
Utilities	Essex Powerlines Corporation	$105	40	$ 4,200.00	$ 2,100.00	$ 2,100.00			
Utilities	Essex Powerlines Corporation	$105	20	$ 2,100.00	$ 1,050.00	$ 1,050.00			

Utilities	Essex Powerlines Corporation	$300	3300	$ 940,500.00	$ 470,250.00	$ 470,250.00				
Professional, scientific and technical services	NODES	$300	3300	$ 49,500.00	$ 24,750.00	$ 24,750.00				
Professional, scientific and technical services	NODES	$10,000	18	$ 180,000.00	$ 90,000.00	$ 10,008.00			$ 79,992.00	
Utilities	Essex Powerlines Corporation	$30,000	5	$ 150,000.00	$ 75,000.00	$ 75,000.00				
Professional, scientific and technical services	Essex Energy Corporation	$103	25	$ 2,575.00	$ 1,287.50					
Professional, scientific and technical services	Essex Energy Corporation	$105	100	$ 10,500.00	$ 5,250.00					
Professional, scientific and technical services	Essex Energy Corporation	$105	200	$ 21,000.00	$ 10,500.00					
Professional, scientific and technical services	NODES	$200	90	$ 18,000.00	$ 9,000.00	$ 4,500.00			$ 4,500.00	
Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20		$ 4,123.20			
Utilities	Essex Powerlines Corporation	$103	80	$ 8,246.40	$ 4,123.20		$ 4,123.20			
Professional, scientific and technical services	NODES	$200	330	$ 66,000.00	$ 33,000.00	$ 16,500.00			$ 16,500.00	
			7588	**$ 1,460,867.80**	**$ 730,433.90**	**$ 604,158.00**	**$ 8,246.40**		**$ 100,992.00**	**$ -**

Industry (NAICS) Classification (drop down selection)	**Service Provider [Product or Service Provider]**	**Rate/Cost [$/hr] or [$/unit]**	**Units**	**Total Cost (Calculated)**	**Total Contribution (IESO)**	**Essex Powerlines Corporation (Cash)**	**Essex Powerlines Corporation (In-Kind)**	**NODES (In-Kind)**	**NODES (Cash)**
Utilities	Essex Powerlines Corporation	$68	80	$ 5,440.00	$ 2,720.00	$ 2,720.00			
Professional, scientific and technical services	NODES	$200	90	$ 18,000.00	$ 9,000.00	$ 4,500.00		$ 4,500.00	
Utilities	Essex Powerlines Corporation	$68	80	$ 5,440.00	$ 2,720.00	$ 2,720.00			
Utilities	Essex Powerlines Corporation	$68	40	$ 2,720.00	$ 1,360.00	$ 1,360.00			
			290	**$ 31,600.00**	**$ 15,800.00**	**$ 11,300.00**	**$ -**	**$ 4,500.00**	**$ -**

Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Oakville Hydro Energy Services (Cash)	DBA Landmark Infrastructure Energy Canada Inc (Cash)	Total Contribution (All Funders)	Actual Spend	Task Complete (Y/N)	Additional Context/Rationale (if applicable)
						$ 3,646.00	7,356.51	Yes	
						$ 27,345.00	54,423.85	Yes	
						$ 120,000.00	120,000.00	Yes	
						$ 3,646.00	7,356.51	Yes	
						$ 3,646.00	7,356.51	Yes	
						$ 1,346.00	10,218.99	Yes	
						$ 7,280.00	12,194.58	Yes	
						$ 4,123.20	10,525.92	Yes	
						$ 8,246.40	16,431.76	Yes	for this milestone we incurred $19,865 in other consultant, legal and misc charges.
$ -	$ -	$ -	$ -	$ -	$ -	$ 179,278.60	245,864.63		

Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Oakville Hydro Energy Services (Cash)	DBA Landmark Infrastructure Energy Canada Inc (Cash)	Total Contribution (All Funders)	Actual Spend	Task Complete (Y/N)	Additional Context/Rationale (if applicable)
						$ 115,500.00			
						$ 82,500.00			
$ 15,750.00						$ 31,500.00			
		$ 25,000.00				$ 50,000.00			
$ 2,575.00						$ 5,150.00			

						$ 9,000.00			
						$ -			
$ 18,325.00	$ -	$ 25,000.00	$ -			$ 293,650.00	-		

Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Oakville Hydro Energy Services (Cash)	DBA Landmark Infrastructure Energy Canada Inc (Cash)	Total Contribution (All Funders)	Actual Spend	Task Complete (Y/N)	Additional Context/Rationale (if applicable)
						$ 484,500.00			
						$ 25,500.00			
						$ 180,000.00			
						$ 324,000.00			
						$ 150,000.00			
$ 1,287.50						$ 2,575.00			
$ 10,500.00						$ 21,000.00			
$ 15,750.00						$ 31,500.00			
						$ 49,500.00			
						$ 82,500.00			
						$ 63,000.00			
						$ 8,246.40			
						$ 8,246.40			
						$ 66,000.00			
$ 27,537.50	$ -	$ -	$ -	$ -	$ -	$ 1,496,567.80	-		

Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Oakville Hydro Energy Services (Cash)	DBA Landmark Infrastructure Energy Canada Inc (Cash)	Total Contribution (All Funders)	Actual Spend	Task Complete (Y/N)	Additional Context/Rationale (if applicable)
	$ 1,242,957.00			$ 22,450.00	$ 973,000.00	$ 4,476,814.00			
	$ 63,750.00			$ 3,750.00	$ 7,500.00	$ 150,000.00			
						$ -			
$ -	$ 1,306,707.00	$ -	$ -	$ 26,200.00	$ 980,500.00	$ 4,626,814.00	-		

Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Oakville Hydro Energy Services (Cash)	DBA Landmark Infrastructure Energy Canada Inc (Cash)	Total Contribution (All Funders)	Actual Spend	Task Complete (Y/N)	Additional Context/Rationale (if applicable)
						$ 4,200.00			
						$ 2,100.00			

						$ 940,500.00			
						$ 49,500.00			
						$ 180,000.00			
						$ 150,000.00			
$ 1,287.50						$ 2,575.00			
$ 5,250.00						$ 10,500.00			
$ 10,500.00						$ 21,000.00			
						$ 18,000.00			
						$ 8,246.40			
						$ 8,246.40			
						$ 66,000.00			
$ 17,037.50	$ -	$ -	$ -	$ -	$ -	$ 1,460,867.80	-		

Essex Energy Corporation (In-Kind)	Essex Energy Corporation (Cash)	Utilismart Corporation(In-Kind)	Utilismart Corporation (Cash)	Oakville Hydro Energy Services (Cash)	DBA Landmark Infrastructure Energy Canada Inc (Cash)	Total Contribution (All Funders)	Actual Spend	Task Complete (Y/N)	Additional Context/Rationale (if applicable)
						$ 5,440.00			
						$ 18,000.00			
						$ 5,440.00			
						$ 2,720.00			
$ -	$ -	$ -	$ -	$ -	$ -	$ 31,600.00	-		

PowerShare

Report for Market Design and Rules

Essex Powerlines Corporation DSO Pilot Project

GIF Milestone 1 Deliverable

Contents

Executive Summary

PowerShare has a division of rules between Market Registration/Eligibility and Market Operation. This division was decided with the understanding that NODES has existing market knowledge and operational requirements for their Platform, and that EPL would be required to control the registration process to ensure suitability of Participants.

Market Registration is governed by Essex Powerlines' "PowerShare Eligibility Rules" document and enforced by a "Participant Contract" between the Participant and the DSO. It was decided that a contractual relationship between the Participant and DSO would be desirable to enforce provisions of the rules, manage termination, and serve as the gate for continued access to the Platform.

Market Operation is governed by NODES' "NODES Market Rulebook" (General Terms and Schedules 1-6) and enforced by a "Membership Agreement" between the Participant and NODES. These rules dictate the operation of the market platform and set up the structure of activations, including enablement of 5-minute intervals and activations in cases where F. The NODES General Terms and Schedules 1-4, and 6 were provided in the August rules review, but are also available if requested.

The PowerShare T-D Coordination Methodology contains internal operational details re: coordination with the simulated IESO. Arrangements such as Day Ahead Commitment Process alignment, proposals for simulated IESO purchases (wholesale need for flexibility), and submission and qualification of ShortFlex offers to simulated IESO market. This document has "Appendix B: Scenarios for the simulated IESO purchases" is the result of collaboration with IESO staff to capture simulated IESO needs for local flexibility. This document is considered living and is subject to continued coordination with the IESO.

Introduction

Definitions, Clarity

Existing Ontario market terms were included in *Section 1.10 – Project Market Products Explained* to illustrate and compare the market's ShortFlex and LongFlex in response to OEB Staff comments in the summer 2023 rule review.

Registration process was simplified to "Application / Registration" and reordered to reduce the total number of steps. For instance, a registrant will be issued the Participant Contract and the NODES Membership Agreement simultaneously to prepare for the Market Acceptance Testing which is now combined DER testing (per the IESO DER Integration Demonstration workbook, where the participant is eligible to participate in simulated IESO services) and Platform testing to confirm operability and participant configurations.

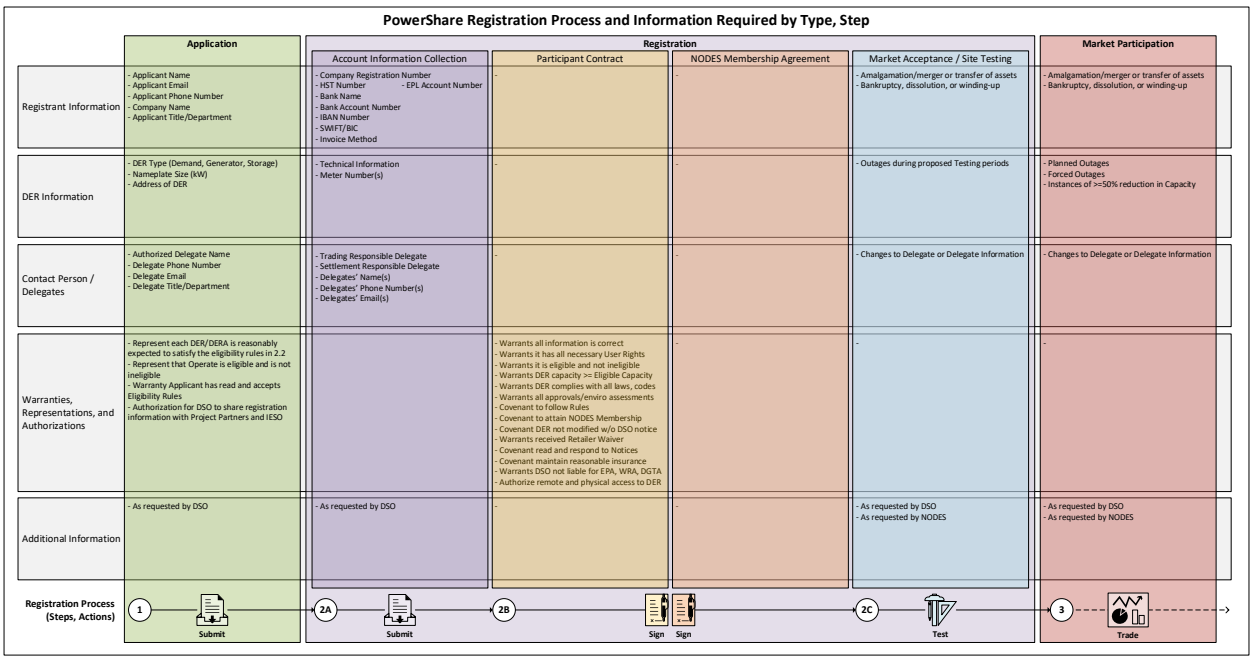


Figure 1 - Chart outlining proposed steps of registration process, not representative of final process

Flexibility was centered as the main terminology in respect of energy, capacity, or other electricity services. Flexibility was defined as "A modification of generation or consumption patterns provided by individual or aggregated assets as a service to the DSO, in order to alleviate congestion on the distribution or transmission networks".

Aggregations were clarified to a standard that requires each Aggregator operate a single Contributor List from which they can group Contributor DERs into DER Aggregations on the Platform. Geographic or grid limitations may apply to restrict grouping across defined zones – managed on the Platform via node orderbooks. Portfolios are not required to be the same resource type but must each adhere to all registration requirements.

Permitted Resources, Generator Resources do not include variable generation. Variable Generation Resources may not participate without a Storage Resource.

DER Capacity for the purposes of an Application was defined as the Nameplate Capacity. Participants are free to offer any amount of flexibility to the platform and are not capped by or required to offer the full Nameplate Capacity of a DER.

There is no formal "Maximum Energy Price" or "Maximum Availability Price" determination, so to provide flexibility in testing market strategies on the advice of NODES. For example, higher prices were methodically tested in other NODES markets to determine effects of enticement or market acclimation.

Hour Ending terminology used in the rules to align with the IESO.

T-D Coordination, OR Participation

OR Ramp Rate requirements were determined to not be a necessary requirement given stepped payment reductions for performance levels. Resources with a Ramp Rate must accommodate this ramping within their order timing.

OR scenarios can be tested during Market Acceptance Testing with the use of shorter notice period for alternative Activation Instructions. The intention is to demonstrate capability of OR participation rather than to enforce the capability.

Metering Data granularity for the project market is set at 15 minutes as a maximum in order to retain a lower burden for participation. This granularity was identified by the Internal Engineering Working Group as achievable by all standard EPL meters, though there may be certain meters which are able to increase granularity. The sampling rate of FSP meters will be increased to 5 minutes, subject to EPL's metering infrastructure capabilities and constraints.

Testing for OR availability, specifically 10-minute dispatch for availability-capable resources was suggested by IESO Staff. These are possible but have been regarded as future coordination since the assets would not have previous experience with IAMs or energy markets. Including these scenarios in Market Acceptance Testing is planned but would not be disqualifying for assets. Further, the intention is to include and unlock assets that may not meet all present requirements for OR.

Test Activations are targeted to fall within a 10% dead-band of the activated quantity to align with the IESO's proposed compliance dead band. The target is not disqualifying, respecting the stepwise payment reductions. Performance up to offer capacity will be incentivized by payment reductions for under delivery and EPL will engage with all participants to provide deliverable offers to the market.

Methodology

Building on Existing Learnings

Previous projects and industry learnings were drawn on, including specific elements from the York Region Non-Wire Alternative Demonstration ("York"), while also introducing significant innovations to tailor the program rules to PowerShare's specific goals. One key aspect of this adaptation was the incorporation of criteria for participant eligibility and ineligibility, a proven component in York Region's approach, ensuring that only the right entities participate and maintaining operational consistency and efficiency. Additionally, new roles of the Distribution System Operator (DSO) and the Platform/Settlement Provider (NODES) were defined to build on designs from York but suiting PowerShare's market

design and open intake process.

Moreover, PowerShare innovated beyond these foundational elements, notably in how it structured the financial interactions. PowerShare manages payments through NODES via membership agreements, centering the independent marketplace of NODES in financial transactions and providing a dispute process for Flexibility Service Providers ("FSPs"). Another significant innovation was giving the DSO the authority to control the registration process. This change enhances oversight capabilities and ensures a more integrated and regulated entry for Flexibility Service Providers (FSPs) into the network, crucial for maintaining the integrity and reliability of the services provided.

These strategies reflect a methodical approach to program rule creation, ensuring that PowerShare not only leverages proven components from past initiatives but also customizes new solutions to meet its specific needs. This blend of adaptation and innovation forms the backbone of PowerShare's methodology in establishing effective and sustainable program rules.

Plan re: Market Fees

It is a leading goal of the Project to reduce to the extent possible any fees charges required of Participants. This is prioritized to incentivize participation and enable relatively small DERs to participate with a minimal structural deficit. This determination was informed by stakeholder engagement with EPL customers and participant candidates which routinely discussed the cost barriers to wholesale market participation as a major concern.

Market Design and Market Rules

PowerShare Eligibility Rules by Section, in Brief

Section 1. Introduction

- 1, 1.1-1.4, brief introduction to project and project partners
- 1.5-1.6 – Project Objectives and Project Area
- 1.7 – Participants responsible for DER Viability, not DSO
- 1.8 – introduction to DSO website, NODES as the trading platform, method of Notice
- 1.9 – introduction and process of registration (Application, Registration), Participants, introduction of the Participant Contract and NODES Membership Agreement
- 1.10 – Market Products explained, introduction of ShortFlex and LongFlex
- 1.11 – Participants must have an EPL account number or receive a temporary number for future customers
- 1.12– Aggregators, in general free to arrange contributor DERs (CDERs) on platform; CDERs cannot be in multiple aggregations

Section 2. Eligibility Requirements

- 2.1.1-2.1.2 – Registrant eligibility for all Participants (Direct AND Aggregator), must be a corporation
- 2.1.3 – Registrant may be a "registered market participant" in IESO Market or other IESO programs provided no active obligations; ICI allowed
- 2.2.1 – DER asset eligibility requirements, at least 1 kW, not variable without storage
- 2.2.2 – DER ineligibility. An asset cannot use coal, actively trade in IESO markets, or be rate regulated

Section 3. Registration Process and Requirements

- 3.1- process of application, review, eligibility notice, registration, signing contracts, DER/A test
- 3.1.1 – Application process. First step. Basic information about company and DER/A
- 3.1.2 – Registration Permission Notice sent by DSO, basic eligibility and first consideration of DER capacity
- 3.1.3 – Registration process. Detailed information of DERs and Operator.
- 3.1.4 – Contract issuance. One Membership Agreement and One Contract per Participant. Contract prevails over Rules.
- 3.1.5 – Market acceptance testing. Aligned w/ NODES to conduct a single test. NODES will set up an environment to test platform notices, and energy delivery. Up to two tests can be done. No payment for tests.

Section 4. Registration Administration by DSO

- Registration in any period will automatically follow to subsequent periods.
- 4.1 – registration review, each step up to DSO, may ask for additional information, manner of submission, registration in English, re-application is permitted

Section 5. Project Market

- 5.1 - Market Operation Period, during project the periods will be 2023 and 2024, specific start/end dates determined by DSO, participants required to inform DSO of changes during operation periods
- 5.2 - Market Determination Report, report by DSO setting market parameters such as Application Opening Date, Market Start/End Dates, and availability price.

Section 6. Test Activations

- 6.1 - Test Activations performed at DSO discretion, scheduled during normal business hours, tested for up to four hours.
- 6.1.1 – Market acceptance tests conducted during registration via simulated buy/sell orders on NODES. Scheduled with the Operator, must respond on platform at least 20 hours ahead of test to confirm. Follow instructions on the platform. DSO may issue further instructions with less then 2 hours notice to test OR operability or other scenario.
- 6.1.2- Performance related test activations can be conducted at discretion of DSO if asset regularly fails to fulfill energy orders, can suspend asset on platform,
- 6.1.3 – test performance requirements, test target within 10% of quantity activated
- 6.2 – tests are unpaid

Section 7. Changes to Contributor DERs

- How DERAs can change their contributor list
- 7.1 – Contributor List as per Contract before Trading Eligibility Date, as per Platform following Trading Eligibility Date
- 7.2-7.3 adding or exchanging CDERs done by change request to DSO, valid once accepted or de-registered on Platform
- 7.4 – DSO approval of change requested pre- and post-eligibility dates.

Section 8. Project Review and Amendments

- DSO may amend the project, rules, or contract template at any time without liability.

Section 9. Confidentiality

- DSO information given to participants is confidential
- Participant information that is not publicly available is confidential but may be shared with NODES, released according to MFIPPA or FIPPA, certain information may be published on website (operator name, location, etc), or shared with IESO, governments, or DSO partners/contractors.

Section 10. Additional Rules

- 10.1 Reserved Rights –
  - DSO may require additional information within 5 days of request,
  - DSO may verify any information from participant with a third party,
  - DSO may waive any nonmaterial noncompliance with Rules, including extending deadlines
  - DSO may change the rules, form of contract, or change/suspend the project without liability

    - DSO not liable for delays in delivering market or registration
    - DSO may withdraw eligibility if operator ceases to be eligible
    - DSO may withdraw a participant contract without penalty prior to execution by both parties
    - DSO may enrol any number of participants and makes no guarantee to prices for market services, but recognizes that a participant has a reasonable expectation to not operate at a deficit if acting prudently and reasonably in an open market
    - DSO may cancel or suspend any or all of the market for any reason
- 10.2 Assignment, registration may not be assigned to another person without consent of the DSO
- 10.3 termination, applicant/registrant may terminate prior to executing contract, DSO may terminate any incomplete registration, for any breach of representations/warranties prior to contract execution.
- 10.4 General,
    - Application information may not be changed by participant except for contact information
    - DSO has no liability to anyone whatsoever except a participant contract is executed
    - DSO not liable to pay any costs under any circumstances, registrant waives Claims against DSO
    - DSO determination of eligibility does not constitute acceptance of authenticity or sufficiency of the Registration or a waiver of any DSO rights
    - DSO not liable for any Claim by registrant or third party resulting from DSO exercising any rights
    - Registrant waives any entitlement to recover damages against DSO or project partners for any reason
    - DSO not liable for any interruption or fault of the Platform, any loss or damage as result of usage of Platform, or any Force Majeure
- 10.5 Interpretation, basic information, such as references to time, inclusivity of gender, etc.

Glossary

Shared between Rules and Contract.

PowerShare Participant Contract by Section, in Brief

Article 1 - Interpretation

- 1, 1.1-1.7, general terms including currency, time, number, laws, and extended meaning of DSO sole and unfettered discretion
- 1.8 replacement of provisions deemed invalid prior to arbitration
- 1.9 reference to exhibits and appendices as part of contract

Article 2 – Eligibility to Project Market

- 2.1 eligibility as a separate consideration, some Contracted DERs may be ineligible at DSO discretion
- 2.2 DSO election to pay eligible participant fees in market
- 2.3 DSO full and exclusive authority for the management and provision of eligibility to the Project Market
- 2.4 Participant agree that each asset on the Platform must be deemed eligible to conduct transactions
- 2.5 Participant agree that each asset on the Platform is a Contracted DER to conduct transactions

Article 3 – Representations of Participant

- 3.1 various representations and warranties the participant is providing regarding itself
- 3.2 various representations and warranties the participant is providing regarding each Contracted DER
- 3.3 various covenants of the Participant
- 3.4 representations by the DSO that it is relying on participant representations to be valid, and it makes no representations to the number or extent of any market activity

Article 4 – Outage Management

- 4.1 planned outages- participant to manage unmatched offers in the market, encouraged to notify DSO
- 4.2 forced outages are anything which prevents management as a planned outage, including any affecting an already matched offer/formed contract
- 4.3 failure to provide notice as participant default

Article 5 – Contract Operation and Administration

- 5.1 parties may amend contract and appendices by written agreement
- 5.2 participant representatives able to act on behalf participant
- 5.3 DSO determined eligibility of additional Contracted DERs, may require amendment to Appendix
- 5.4 record retention of 7 years
- 5.5 audit rights of DSO to review all data and systems of Contracted DERs
- 5.6, 5.7 inspection of DER by DSO allowed, not waiver of compliance with laws
- 5.8 notices to participant and DSO at prescribed coordinates, manner
- 5.9 meter access and data sharing

- 5.10 no payment to participants for platform services under eligibility contract
- 5.11 exceptional payment obligations for participant, such as DSO nominating CIA fees

Article 6 – Events of Default

- 6.1 list of events of participant default
- 6.2 remedies of DSO for participant default, including suspension of payments or activity on platform
- 6.3 immediate termination for some events of default
- 6.4 DSO events of default, particularly failure to conduct its duties required within 30 days of written notice
- 6.5 remedies of participant, including termination in event of DSO default
- 6.6 remedies non-exclusive

Article 7 – Force Majeure

- 7.1, 7.2 events of force majeure and exclusions
- 7.3 covid 19 not force majeure
- 7.4, 7.5 invoking force majeure, effect of invocation

Article 8 – Term and Termination

- 8.1 contract effect at signing, expires March 31, 2026 if not extended.
- 8.2 right to terminate if funding lapsed

Article 9 – Confidentiality

- 9.1 disclosure of confidential information
- 9.2 privacy legislation, keeping records secure

Article 10 – Indemnification and Liability

- 10.1 DSO, partners, and sponsors indemnified against claims, demands, suits, losses, etc.
- 10.2 participant to assume defence of claim in instances of indemnification
- 10.3 limitations of liability in case of special loss, platform functionality failure, sponsor funding failure
- 10.4 IESO specifically not liable

Article 11 – Dispute Resolution

- 11.1 informal dispute resolution with Senior Conference prior to arbitration
- 11.2-11.7 arbitration, powers of arbitrator, procedure, decision and appeal, preclusion of actions, class arbitration

Article 12 – Miscellaneous

- 12.1 contract prevails with inconsistency with Rules, rules may be amended by DSO from time to time
- 12.2 entire eligibility agreement includes terms and conditions, exhibits, appendices
- 12.3 survival of some provisions past contract end
- 12.4 amendment and waivers must be provided in writing by the party bound thereby

- 12.5 contract may not be assigned by participant to another
- 12.6 contract binding on successors and assigns
- 12.7 assurances to help continue the proper operation of contract
- 12.8 severability and invalidity by arbitration
- 12.9 governing law of the Province of Ontario and applicable Federal laws.
- 12.10 no rights or remedies to third party beneficiaries
- 12.11 time of the essence
- 12.12 preparation of agreement by DSO not construed in favour of the Participant when interpreting
- 12.13 counterparts and electronic signatures allowed.

Exhibit A - Glossary

Shared between Rules and Contract.

Exhibit B - Grid Performance Requirements

General requirements of assets to perform within while interacting with or providing flexibility to the Distribution system.

Appendix A – Participant Information

Registered details of the Participant and its delegates.

Appendix B – Contracted DER/As

Registered details of the Participant's Direct DERs and DER Aggregation Types or Technologies.

Appendix C – Additional Terms

Empty appendix to include any special terms or conditions on the Contract.

NODESmarket PowerShare Specific Regulations (Schedule 5) by Section, in Brief

Article 1 - Introduction

- 1.1-1.5, schedule for PowerShare-specific rules on the NODES platform, introduction to EPLS as DSO and Buyer, NODES and EPL simulating IESO Purchases, Market Operation periods, introduction to services in Market (ShortFlex, LongFlex, Simulated IESO Energy Market Service, Simulated ShortFlex/LongFlex Order Service, and IESO Information Service)

Article 2 – Product and Service Descriptions

- 2.1 Definitions
  - 2.1.1 30-minute delivery period, description of Settlement and Trading Days,
  - 2.1.2 ShortFlex open 7 days prior to Delivery Date
- 2.2 ShortFlex products settled under Schedule 2
- 2.3 LongFlex Products
  - 2.3.1 settled under Schedule 2
  - 2.3.2 buyer announces LongFlex procurements by market message, including deadlines, maximum ShortFlex expiry, and selection method of proposals
  - 2.3.3 buyer initiates LongFlex contract allocation by publishing bid on Platform
  - 2.3.4 sellers respond to LongFlex bids with offers which must specify activation and reservation price equal or lower than the maximum Activation Price and Reservation Price in bid, respect maximum ShortFlex expiry, and specify any planned outages in the timeframe of the contract
  - 2.3.5 buyer will rank LongFlex offers according to selection methods: reservation price competition, activation price competition, or an individually specified selection method
  - 2.3.6, 2.3.7 LongFlex contracts formed on buyers' acceptance of offer and contract between the Buyer and Seller, not NODES
  - 2.3.8 contract allocation process can be varied by NODES in consultation with the IESO and consent of EPLC
  - 2.3.9 flexibility reserved for a delivery periods in LongFlex contracts are no longer reserved upon IESO Market Gate Closure (EPLC Gate Closure for ShortFlex orders that do not qualify as a Simulated IESO Energy Market Offer)
  - 2.3.10 Buyer may make LongFlex Public or Private, which for the project means "visible to other Buyers, such as Simulated IESO"
- 2.4 Simulated IESO Energy Market Service
  - 2.4.1 ShortFlex Offers, including those matched by EPLC before 10:00:00 day ahead of Delivery are made visible to the Simulates IESO Energy Market Service (SIEMS), but matched offers cannot be matched again
  - 2.4.2 how ShortFlex offers are qualified for the SIEMS if they are tagged as 5-minute dispatchable portfolios, expire no more than 115 minutes before delivery, and it submitted no later than 10:00:00 day preceding delivery
  - 2.4.3 qualified offers from the same portfolio may be "bundled" (not aggregated) into a single SIEMS offer if it covers a 60 minute period, has total capacity of 0.1 MW or more, and if the higher capacity offer can be partially filled

    - 2.4.4-2.4.6 characteristics of a SIEMS offers such as 60 minutes starting HH:00:00, dispatchable, and proper expiry times, NODES simulated SIEMS offers are transmitted and matched in one or several 5-minute periods, EPLC as buyer for SIEMS contracts
- 2.5 Simulated ShortFlex/LongFlex Order Service
    - 2.5.1 NODES simulated IESO places bids for LongFlex and ShortFlex contracts, EPLC as buyer
- 2.6 IESO Information Service
    - 2.6.1 NODES transmits or records information on EPLC purchases to IESO.

Article 3 – Trading and Settlement

- 3.1 Baseline Capacity Nominations
    - 3.1.1, 3.1.2 NODES calculates a default Baseline Capacity which is a simple average of metering data for corresponding period over preceding five weekdays
    - 3.1.3, 3.1.4 members may nominate alternative baselines if approved by EPLC, for which it must retain an audit trail
    - 3.1.5 EPLC can request NODES to investigate concerns with baselines, following 2.1.3 of Schedule 2, where if a member does not respond NODES may suspend member from Platform
- 3.2 Trading
    - 3.2.1 participants to manage outages per the Participant Contact, send notice when reasonable
    - 3.2.2 outage notices to NODES will be considered intention to cancel or amend the contract for Section 5 of Schedule 2
    - 3.2.3 NODES may cancel contracts for prescribed times if agreement between Buyer and Seller
    - 3.2.4 Seller should remove unmatched offers from Platform during periods of outages
- 3.3 Delivery
    - 3.3.1-3.3.3 metering measurement period shall be 5 or 15 minutes, based on data provided by EPLC
    - 3.3.4 sellers authorize NODES to use metering data to validate delivery
    - 3.3.5 Activation Price reduction based on delivery %, i.e. if validated for 90%+ delivery, Seller received 100% of Activation Price
    - 3.3.6 Reservation Price reduction based on the average delivery percentage across all ShortFlex contracts arising from each LongFlex Contract for the shorter of the LongFlex duration or one calendar month, where cancelling a ShortFlex offer generated by a LongFlex is 0% delivery, otherwise stepwise reduction
- 3.4 Payments
    - 3.4.1 NODES will calculate payments due to or from each member, then issue invoices each month within 10 settlement days from the end of the calendar month, buyers pay invoiced within 30 calendar days from date of invoice, and issue payment to Sellers within 5 settlement days from buyer payment
- 3.5 PowerShare Market Registration Rules
    - 3.5.1 EPLC's Market Eligibility Rules and Participant Contracts are considered agreements member is party to for 2.1.2 of General Terms
- 3.6 Membership and Participation

    - 3.6.1 NODES will consult EPLC to admit members to Platform as they see fit
    - 3.6.2 to be admitted to Platform, EPLC must have approved applicant's assets per Eligibility Rules
    - 3.6.3 members must company with the Rules and Contract for all market activity, and stricter standard applies between Schedule 5 and the EPLC Rules and Contract
    - 3.6.4 members must notify NODES immediately if any criteria for membership at any time is not fulfilled
    - 3.6.5 EPLC is the only buyer initially, but can nominate others as a buyer
    - 3.6.6 sellers must undertake a successful test trade, orders placed before the test trade are invalid, and the contract for test activation is not eligible for payment
    - 3.6.7 NODES may terminate membership with 2 days notice to the Member if EPLC approves n writing a just cause for termination
    - 3.6.8 membership shall cease unless EPLC and NODES otherwise determine and members are notified
    - 3.6.9 removed application of terms which allow NODES to determine membership in sole discretion and a three-month convenience membership termination or a one-month just cause termination by NODES
- 3.7 Definitions and Interpretations
    - 3.7.1 European references in NODES rules shall be replaced like-for-like with a Canadian equivalent
    - 3.7.2 definition of contract in Schedule 1 does not affect the interpretation of Participant Contract or "Contract" under the Eligibility Rules
    - 3.7.3 "Reservation Price" means the same thing as "Availability Price"
    - 3.7.4 references to time are in 24-hour EDT (UTC-4) except for NODES Operational Support Hours in Schedule 3
- 3.8 Fees
    - 3.8.1 non-application of a fee schedule to all members, reflecting fee payments through GIF
    - 3.8.2 EPLC to cover Contract Transaction Fees during project
    - 3.8.3 no cancellation fees during project
- 3.9 Market Data
    - 3.9.1 EPLC and IESO may use any Market Data from the Project in its general business activities and to disclose to EPLC and IESO
- 3.10 Personal Data
    - 3.10.1 personal data of members will be dealt with according to NODE's Privacy Policy available on its website,
    - 3.10.2 each member must have valid legal basis for the transfer of any personal data from it to NODES
- 3.11 Governing Law and Dispute Resolution
    - 3.11.1, 3.11.2, governing law shall be Ontario and applicable Canadian federal laws
    - 3.11.3 informal dispute resolution through a Senior Conference before Arbitration
    - 3.11.4 general terms for arbitration, appointment and powers of arbitrator, arbitration procedure, and decision and no appeal.

Baseline Parameters for Future Data Analysis

- Coincidence of Local/Regional Need with provincial peaks re: ICI
    - Full coincidence with ICI peaks, examine extent of redundancy
- Frequency of Simulated IESO Activations
    - If not sufficient quantity/frequency of activations, revisit and consider a lower threshold than the variable triggers
- Frequency, Timing, and Severity of DSO Overrides of Simulated IESO Activations
    - Timeline of activity determines whether it would be captured in an outage notice, or would have been captured in DSO DER limits and/or NWA Schedule (per TDWG T-D Protocols)
- Frequency and Quantity of Qualified ShortFlex Offers being forwarded to, activated by, Simulated IESO
    - Interest or ability to provide wholesale-like services such as 5-minute dispatchability, 10/30 min OR
- Preference of FSPs or availability of offers at least 1 hour in duration
    - General analysis of whether offers would have been more available to the simulated IESO if aggregated across portfolios to meet requirements (100kW, 1 hour, short notice dispatch)

Rules Package for Submission

For submission and final considerations, the following project documents are appended to this report below:

- PowerShare Eligibility Rules,
- PowerShare Participant Contract,
- NODESmarket PowerShare Specific Regulations, and
- PowerShare Transmission-Distribution Coordination Methodology.

PowerShare

Market Eligibility Rules

Essex Powerlines Corporation DSO Pilot Project

Version 1.0 – 2023-09-12

Contents

1. Introduction

These Rules set out the eligibility requirements and registration processes of the Market associated with the Essex Powerlines Corporation DSO Pilot Project (the "**Project**") developed by Essex Powerlines Corporation ("**EPLC**") through the Grid Innovation Fund of the Independent Electricity System Operator ("**IESO**") and the Innovation Sandbox of the Ontario Energy Board ("**OEB**") and carried on with partners NODES AS ("**NODES**"), Essex Energy Corporation ("**EEC**"), and Utilismart Corporation ("**USC**"). EPLC is the Distribution System Operator for the Project ("the "**DSO**").

Capitalized terms used in these Rules, unless the context otherwise requires, have the meaning ascribed to those terms in the Appendix A - Glossary of Terms attached hereto.

The Rules are intended to provide interested parties with information about:

- Project objectives and scope;
- Project Market eligibility requirements;
- Structure of the Project and the Project Market;
- the Participant Contract(s) to be entered into between a Registrant and the DSO; and
- Project timelines.

These Rules pertain to Phase 1 of the market operation (anticipated to be the Market Operation Period beginning in 2023), and may be amended, superseded, or replaced prior to Phase 2 of the market operation (anticipated to be the Market Operation Period beginning in 2024) or any operation period thereafter as defined by EPLC. If the Rules have not been amended, superseded, or replaced, these Rules will be deemed to be continued. These Rules include the Appendices attached hereto:

Appendix A – Glossary of Terms
Appendix B – Electricity Retailer Waiver
Appendix C – Mock Project Market Timeline
Appendix D – Participant Contract
Appendix E – DSO Coordinates.

1.1 ABOUT THE IESO

The IESO ensures there is enough power to meet the province's electricity needs in real time, operating the electricity grid and markets, while forecasting and monitoring demand for electricity – and coordinating resources and services to meet that demand. It achieves a reliable power system in an efficient manner by balancing the supply of and demand for electricity in Ontario through the IESO-Administered Markets (also referred to collectively as the "**Wholesale Markets**"), planning for the province's medium-and long-term energy needs, and securing clean sources of supply to meet those needs. The IESO also facilitates innovation that improves the cost-effectiveness and reliability of the province's electricity system, including demonstration projects, that help achieve these objectives.

The IESO is governed by an independent board of directors whose chair and directors are appointed by the Government of Ontario. Its fees and licenses to operate are set by the Ontario Energy Board ("**OEB**") and it operates independently of participants in the electricity market.

The IESO Grid Innovation Fund advances innovative opportunities to achieve electricity bill savings for Ontario ratepayers by funding programs that either enable customers to better manage their energy

consumption or reduce the costs associated with maintaining reliable operation of the province's grid. The Project is supported by funding from the IESO's Grid Innovation Fund.

1.2 ABOUT THE OEB

The Ontario Energy Board is a government agency which acts as Ontario's independent regulator of the electricity and natural gas sectors. The OEB protects consumers and makes decisions that serve the public interest. Its goal is to promote a sustainable and efficient energy sector, for today and tomorrow. The OEB is an independent entity with a Board of Directors, a Chief Executive Officer, and a Chief Commissioner which are appointed by the Lieutenant Governor in Council.

The OEB establishes electricity and natural gas rates in the province. It oversees energy companies to ensure they comply with the rules, publishes data on utilities' performance, and monitors how well the wholesale electricity market is working.

Alongside the IESO, the OEB issued a Joint Targeted Call for Proposals to the GIF. The OEB provides regulatory guidance to GIF project proponents.

1.3 ABOUT ESSEX POWERLINES CORPORATION

Essex Powerlines Corporation (EPLC) is a licensed utility based in Southwestern Ontario, Canada. EPLC provides safe and reliable power to over 30,000 customers in the Town of Amherstburg, the Town of LaSalle, the Municipality of Leamington, and the Town of Tecumseh.

As a leader of the energy industry, EPLC is continuously implementing innovative projects that assist in adapting to climate change, boosting economic growth, and reducing overall costs for ratepayers. Through projects like Charge Up Windsor-Essex and PowerShare and via collaboration with utilities, companies and communities, Essex Powerlines is paving the path towards a bright and sustainable future.

EPLC as the DSO will request and purchase flexibility on the market platform. During the Project, it expects to assess the costs and benefits of procuring services from DERs outside IESO Markets, contrast savings to ratepayers to large transmission infrastructure costs, quantify reliability and resiliency gains from the project, and preview local-provincial market coordination procedures, among other goals.

1.4 ABOUT NODES AS

NODES is an independent market operator. NODES operates a digital marketplace for a sustainable energy future, where grid owners, producers and consumers of energy can trade decentralised Flexibility. NODES addresses key trends and challenges in the energy system, such as an increased share of renewable power production, increased volumes of decentralised generation and a rapid change in customer behaviour.

NODES released its integrated market design in 2018 and has since been demonstrating how this market design can pave the way for a flexible energy system and shape the energy market of the future. NODES' market design allows all types of flexibility to be sold bottom-up and bought top down. It gives all assets, and all flexibility technologies, the opportunity to compete on equal terms in an open and transparent market.

NODES' role within the Project is to operate a marketplace where sell and buy orders are matched and settled, conducted according to the NODES Market Rules. Review *Schedule 2 – Trading and Settlement Rules* and *Schedule 5 – Market Specific Rules* for more information on order matching, settlement, and the Project Market operation.

1.5 PROJECT OBJECTIVES

EPLC has initiated a Project to demonstrate the capabilities of a Local Distribution Company ("**LDC**") to perform as a Distribution System Operator through the implementation of a local near-real time energy market utilizing Distributed Energy Resources ("**DER**"s) in the project target area. Enablement of DERs as a Non-Wires Alternative ("**NWA**") can defer, reduce, or avoid capital or operating costs associated with distribution networks as well as transmission network and resource infrastructure.

The objectives of the Project include:

1. Providing a scalable market design for activation of DER flexibility in near real-time to help achieve conservation and demand management goals;
2. Allowing new and existing DER owners to monetize their assets within the Market, simultaneously reducing barriers for the participant while cost effectively developing DERs as NWAs;
3. Supporting grid resiliency and reliability; and
4. Testing the coordination of DSO/IESO markets, helping solve grid constraints at local, regional, and provincial levels.

1.6 PROJECT AREA

The Project begins with a focus on the Leamington service area of EPLC, the south-eastern part of the Essex-Windsor Region.

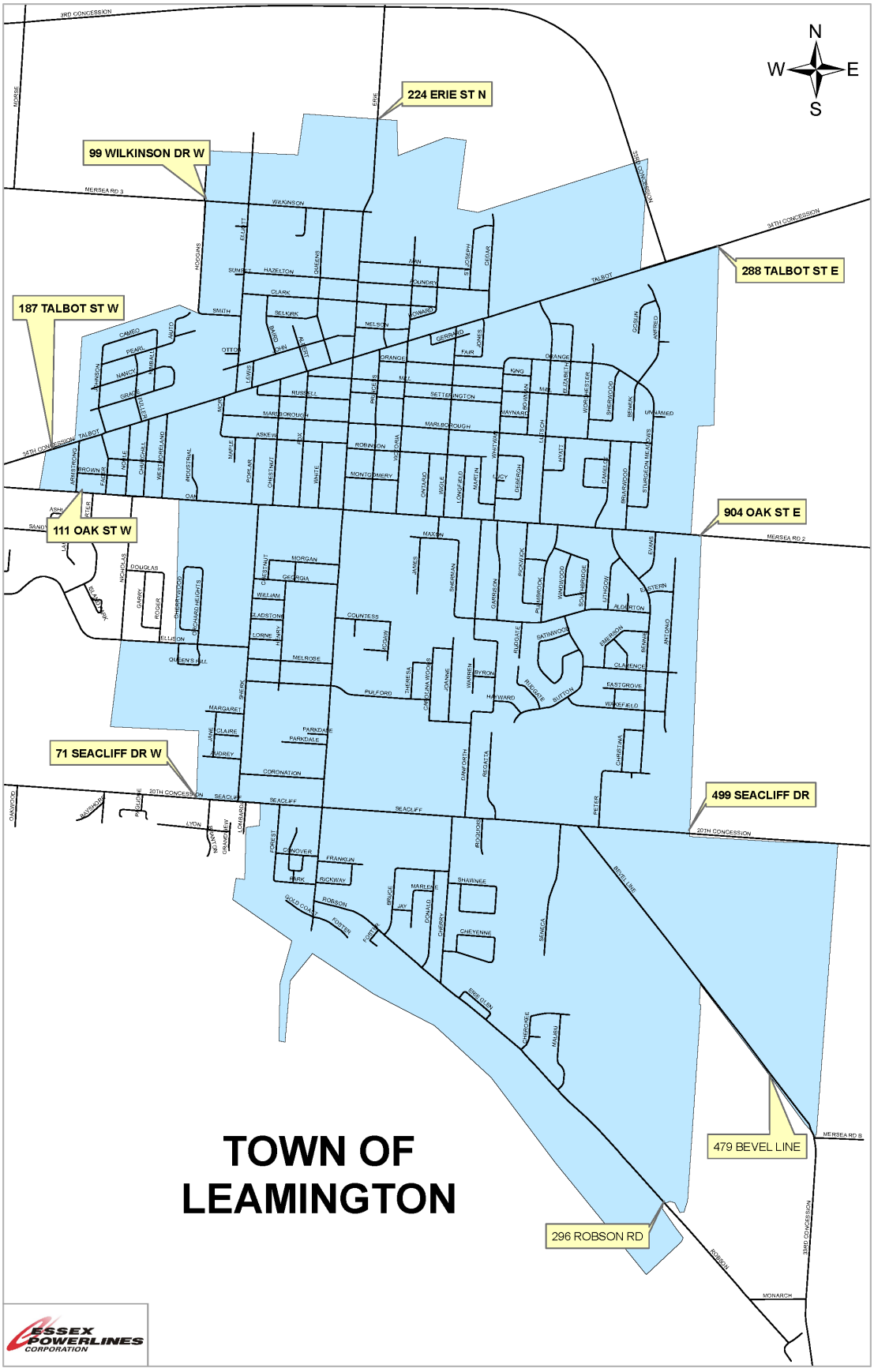
The Municipality of Leamington has a diverse economy, with a focus on agriculture and manufacturing. Approximately 60% of Ontario's greenhouses can be found in the Leamington area and accounts for a load that is expected to grow from 500 MW today to 2,100 MW by 2035 per the Windsor-Essex Integrated Regional Resource Plan, prepared by the IESO and released in February 2022.

The Project will be initially open only to DERs with a Connection Point to the EPLC distribution system and within the area shown in Figure 1 (the "**Project Area**").

There will be two zones in the Leamington service area for the 2023 Market Operation Period . The zones are defined by the area's division between the two transmission feeder stations. The DSO will inform Applicants which of the zones their assets are located in.

EPLC customers can verify whether a particular Connection Point associated with their account is located within the Project Area by confirming the Meter Number with EPLC.

Figure 1: Project Area



1.7 RESPONSIBILILTY FOR DER VIABILITY

Persons participating in the Market are solely responsible for ensuring the technical, regulatory, financial and economic and overall viability of their DERs. The DSO shall have no responsibility whatsoever to independently assess the viability of any DER, nor any liability whatsoever in the event a DER is not viable in any respect.

1.8 THE SOFTWARE PLATFORM & NOTICES

The DSO will use the Website **http://powershare.energy/** to coordinate registration of Market participants and DERs.

The DSO will use NODES' Market Platform (the "**Platform**") to contract, schedule and activate DERs, and carry out settlement (i.e. payment for services). The Platform is accessible via **https://portal.nodesmarket.com/home** to parties that have signed the Participant Contract and the NODES Membership Agreement or other web location that NODES may specify.

Notices sent by the DSO to Applicants and Registrants will be sent via email and/or other media as determined appropriate. The DSO will also use reasonable efforts to send a copy of any such Notice by email to the registered email of the Applicant/Registrant as provided in its Application or Registration.

Once a Participant Contract is entered into, Registrants are responsible for routinely checking the Website and Platform, reviewing and responding to, where required, all Notices. In particular, the Registrant/Participant shall be wholly responsible, and the DSO and its Partners shall not have any liability to the Registrant/Participant, in the event the Registrant /Participant fails to make any necessary actions during or following any Market Operation Period following and pursuant to any Notice that is provided using the Platform or sent by email.

Unless required to respond directly on the Website or otherwise noted in these Rules, Applicants, Registrants, and Participants should contact the DSO using the email listed in Appendix E – DSO Coordinates.

1.9 PROJECT OVERVIEW

The two feeders EPLC currently has access for servicing Leamington exceed optimal levels at least half of the time in a given year. This limits EPLC's ability to transfer load to the other feeder in the event of a failure and significantly impacts redundancy.

Existing measures to mitigate transmission load issues include installing two new 230 kV load supply stations in the Kingsville and Leamington areas. These projects are costly, lengthy and are the 'wires' solutions referred to in "Non-Wires Alternative" and therefore represent the parallel solution alongside this NWA project to addressing Leamington's forecasted demand.

DER owners/operators and prospective Aggregators that meet the eligibility criteria are invited to apply to register assets in the Project Market. Registration is administrated by the DSO and will determine which applicants are permitted to apply for Membership with NODES ("**Membership**") to offer their services to the market.

Registration will be done in two stages. Application involves the Applicant Operator's information and some preliminary exploration of their DERs. Registration pertains to finalizing technical requirements for the DERs, collecting detailed information, signing the Participant Eligibility Contract for all their DERs assets ("**DER/A**" collectively) and the NODES Membership Agreement, and testing market operability.

There are two categories of DERs: Direct DERs and DER Aggregations ("**DERA**"s). Direct DERs are singular assets for which Registrants have User Rights (a "**Direct DER**"). DER Aggregations are a technology or type of DER which may have multiple assets registered under it (a "**Contributor DER**" or "**CDER**").

Applicants that complete the Application stage may be issued a Registration Permission Notice (see section 3.1.2) in respect of one or more of their DER/As, that Applicant Operator will then be considered a "**Registrant**".

Registrants will complete the Registration with respect to their DERs. The DSO will assess the DERs against the eligibility criteria set out in these Rules. Registrants with DERs that have been approved by the DSO in the Registration will be issued a single NODES Membership Agreement ("**Membership Agreement**") and a Participant Contract ("**Participant Contract**"). After the Participant Contract and the Membership Agreement are executed, the Registrant will conduct Market Acceptance and Site Testing with the DSO and NODES to confirm platform performance, flexibility delivery, DER Capacity, and other elements as necessary.

Following a successful test, the Registrant may receive a notice from the DSO of the date that they will be eligible to begin trading on the market ("**Trading Eligibility Date**"). Upon the Trading Eligibility Date, the Registrant is also considered a "Participant" and will be required to meet ongoing eligibility and performance requirements related to the DER that is set out in the Participant Contract.

Participants that have access to the Platform may submit offers as near-term 'ShortFlex' or recurring periodic 'LongFlex' offers. Market rules and operation will be conducted under the NODES Market Rules, which contain further details on ShortFlex and LongFlex products and market functioning.

1.10 PROJECT MARKET PRODUCTS EXPLAINED

ShortFlex and LongFlex are best compared to the IESO's real-time energy market and capacity auction, respectively. The market uses the term 'flexibility' for 'capacity'.

ShortFlex is a flexibility market which matches buy and sell offers on the conditions of price, volume, and location of the capacity. It is a continuous market that opens 7 days ahead and closes approximately two hours ahead on the day of activation. An offer can be matched at any time within that period and may be partially activated. An order can be edited or removed at any time prior to matching but not after.

LongFlex is a service that procures capacity availability at prescribed times. A matched LongFlex offer means a participant is agreeing to be available at certain times on certain days within the contract period. Flexibility available through LongFlex is activated in the ShortFlex market. A participant will receive a payment to be available at the prescribed times and receive a payment if their flexibility offers are activated.

1.11 ACCOUNT NUMBERS

Direct DERs and Contributor DERs must be related to an active Essex Powerlines customer account (the "**Customer Account**", which account must be in good standing at the time of registration and throughout the Project) in order to participate in the Project Market. DERs without a related Customer Account may be considered by the DSO on a case-by-case basis and may be subject to conditions.

With respect to Direct DERs, it is possible that the asset will not have an active EPLC Customer Account if it is not operational at the time of Application. In the event the Direct DER does not have an active EPLC Customer Account but an Applicant wishes to register a DER, the Direct Participant must contact the DSO (information found in Appendix E – DSO Coordinates) prior to initiating the registration process to obtain a temporary account number (a "**Temporary Account Number**") for registration purposes, which request shall be accepted in the DSO's discretion. Registrants seeking a Temporary Account Number must meet the Registrant eligibility criteria set out in Section 2.1.

With respect to Contributor DERs, CDERs must have an active EPLC Customer Account at the time of registration and otherwise must request a Temporary Account Number.

1.12 AGGREGATORS

In general, Aggregators will be free to group and rearrange CDER assets on the platform respecting any geographic, grid, or other DSO-imposed limitations. An Aggregator may operate multiple DERAs, but a CDER may not appear in multiple DERAs.

More information on the Contributor List and how it can be changed is found in *Section 7 – Contributor List Changes to Contributor DERs* of these Rules.

2. Eligibility Requirements

Sections 2.1 applies to corporations that wish to participate in the Project Market. Section 2.2 applies to DER assets intended to participate as a Direct or as a Contributor DER.

2.1 REGISTRANT ELIGIBILITY

2.1.1 Registrant Eligibility Requirements

To be eligible to participate in the Project Market, the Registrant:

a) must provide any EPLC Customer Account numbers related to the Applicant Corporation;
b) must be a corporation (with or without share capital), co-operative, partnership, or limited partnership;
c) must be solvent and have sufficient financial capability to perform its obligations under the Participant Contract;
d) must be registered or otherwise qualified to carry on business in the Province of Ontario;
e) have a Registered Bank Account in the province of Ontario;
f) must have the requisite power to enter into a Contract and to perform its obligations under the Participant Contract;
g) may only register once, unless the prior Registration has been formally withdrawn and de-registered from the Project Market; and
h) must submit one or more DERs into the Project Market.

2.1.2 Registrant Ineligibility

To be eligible to participate in the Project Market, the Registrant:

a) must not be a natural person, sole proprietorship, trust, joint venture or other type of unincorporated association;
b) must have no bankruptcy, insolvency, reorganization, receivership, seizure, realization, arrangement or other similar proceedings pending against or being contemplated by the Registrant, or to the knowledge of the Registrant, threatened against the Registrant; or
c) must not be the IESO, EPLC, or NODES AS.

2.1.3 Considerations with no impact on eligibility

A Participant may be a *registered market participant* (as such term is defined in the IESO Market Rules) and also participate in the Project Market provided it does not have active obligations.

Participation in the Industrial Conservation Initiative or the IESO Energy Efficiency Auction Pilot will not impact eligibility to participate in the Project Market.

2.2 DER ELIGBILITY

2.2.1 DER Eligibility Requirements

An Operator may register multiple Direct or Contributor DERs during its Registration. To be eligible to participate in the Project Market each DER or Contributor DER must:

a) have User Rights that are held by the Participant;
b) be at least one of the following (collectively, a "**Permitted Resource**"):
    i. a Demand Response Resource,
    ii. a Generator Resource, (including but not limited to Natural Gas and Diesel but not including variable generation resources without a Storage Resource)
    iii. a Storage Resource;
c) have a nameplate DER Capacity of at least 1 kW
d) no later than one day prior to the Trading Eligibility Date:
    i. have achieved its In-Service Date;
    ii. have a valid Meter Number that is registered under the Customer Account;
    iii. connect directly to Essex Powerlines' Distribution System at a single Connection Point or at multiple Connection Points or any other Connection Point provided that the Registrant has obtained the written consent of the DSO acting in its discretion, prior to registering such DER; and
    iv. have revenue-quality metering connected to the Distribution System and approved and verified by Measurement Canada and the DSO as usable for billing purposes on an hourly or sub-hourly basis (an "**Approved Meter**").

2.2.2 DER Ineligibility

DERs and Contributor DERs are not eligible to participate in the Project Market if it is a DER that:

a) has not achieved its In-Service Date;
b) is not in compliance with all Laws;
c) is a registered facility in the IESO-Administered Markets ("**IAMs**"), which restriction shall apply only during active participation in IAMs;
d) uses coal as a fuel source;
e) is the subject of an existing contract relating to the generation or storage of Electricity, conservation or demand management of Electricity or other form of contract, including a net-metering contract, or unit sub-metering contract relating to Electricity or Related Products (an "**Existing Contract**"), unless otherwise consented to by the DSO in accordance with Section 10.4(a) of these Rules;
f) is the subject of a contract with a licensed electricity retailer with respect to its Electricity requirements in the Project Area, provided however that this criteria will be waived by the DSO upon the entering into of an agreement between the DSO and the electricity retailer, the form of which is attached hereto as Appendix B – Electricity Retailer Waiver and will be available on the Website; or
g) is the subject of rate regulation by the OEB pursuant to the Ontario Energy Board Act, 1998.

3. Registration Process and Requirements

3.1 REGISTRATION PROCESS

Applications and Registrations should be prepared having regard to these Rules, including the *Appendix A - Glossary of Terms*, and should meet all of the requirements set out in Section 2.

An Applicant Operator will complete the Application and it will be reviewed by the DSO for permissibility to Register. If an Applicant is permissible, they may receive a Registration Permission Notice and an invitation to complete Registration. Registration is more in-depth and involves the technical requirements of the electricity distribution system. When a Registrant signs the Participant Eligibility Contract and the NODES Membership Agreement, they will complete DER/A testing. Upon a successful test, the DER/A may be granted eligibility to trade in the Project Market.

Registration will not be considered complete unless all of the Registration materials, including any Additional Information requested by the DSO, have been submitted either via the Website or by email to the DSO, as determined by the DSO in its discretion.

3.1.1 Application

Application shall take place via the Website in accordance with these Rules and any instructions posted on the Website from time to time.

In the Application, an Applicant must complete and submit:

a) **Applicant Information** - information about the Applicant, including:
   i. all information needed to demonstrate Applicant eligibility and otherwise successfully participate in the Project Market;
   ii. preliminary information regarding the DERs/CDERs that the Applicant intends to have participate in the Project Market, including Future DERs;

b) **Authorized Contact Person** - details of authorized Delegate that has the legal authority to bind the Applicant in respect of the Project Market and will be the primary contact for the DSO during the Registration process;
   i. this will also be considered the Contact Person in respect to NODES and the Platform until overridden by Registration information.

c) **Warranties and Representation** - legally binding covenants, representations, and warranties that:
   i. each DER or Contributor DER in the Application is reasonably expected to satisfy the eligibility requirements set out in Section 2.2 of these Rules;
   ii. the Applicant Operator satisfies the eligibility requirements in Section 2.1.1 of these Rules and is not ineligible under Section 2.1.2; and
   iii. the Applicant has read and accepts these Rules,

d) **Information Sharing** – an authorization permitting the DSO to provide:
   i. to the IESO and Project Partners any and all information relating to the Applicant, the Registration, Contributor DERs, the DERs and any other information pertaining to this Project Market, including without limitation each DER Connection Point, meters,

metering and billing data and accounts as the Project Partners may require for the purposes of evaluating the Project; and

e) **Additional Information** - any Additional Information, as defined in Section 4.1(d) that may be requested by the DSO within the requested timeframes.

3.1.2 Registration Permission Notice

Following completeness and fitness assessments of the Application carried out in Section 4, the DSO may send notification (a "**Registration Permission Notice**") to an Applicant that confirms:

a) **DSO Permission to Register** - the Applicant Operator's permission to proceed to Registration, (whether the Operator can become a "**Registrant**"); and
b) **Permitted DERs** - Confirms which DERs, including Future DERs, are permitted to proceed to Registration, (a "**Permitted DER**").

The Registration Permission Notice is not a final determination of an Applicant or Registrant's eligibility to participate in the Project Market, and the DSO may decline to authorize a Registrant or one or more permitted DERs/CDERs to participate in the Project Market in its sole and unfettered discretion.

The Registration Permission Notice shall provide instruction on the next steps of registration. This may include links to forms, application documents, copies of Eligibility Contract and Market Rules, or other information as considered appropriate by the DSO.

3.1.3 Registration Information Collection

Registration shall begin following issuance of a Registration Permission Notice and will end for the Registrant on their Trading Eligibility Date.

During the Registration, a Registrant must complete and/or submit:

a) **Registrant Information** – advanced information about the Registrant, including:
    i. Company Legal Name
    ii. Company Registration Number
    iii. HST number of the Registrant;

b) **Representatives of the Registrant** – further information on specialized representative roles as accepted or required by the Platform.
    i. Name, email and telephone number of a trading responsible person, responsible for commercial activities on the Platform
    ii. Name, email and telephone number of a settlement responsible person, responsible for matters related to invoicing and payments for activities on the Platform

c) **Additional Information** - any Additional Information that may be requested by the DSO within the requested timeframes, as defined in section 4.1(d).

3.1.4 Participant Contract and Membership Agreement Issuance

Following submission and approval of Registration Information Collection, the DSO and NODES may issue a Participant Contract ("**Participant Contract**") and the NODES Membership Agreement ("**Agreement**") to confirm obligations prior to market acceptance testing and/or site testing.

An Agreement may be issued by NODES to each Operator registering assets in the Project Market. An Operator need only conclude the Agreement once to attain Membership and access to the Platform, regardless of the number of assets the Operator registers.

A Participant Contact may be issued to Registrants for each Permitted DER or all Permitted DER/As that are accepted by the DSO following completion of the Registration. The DSO will determine the arrangement of DER/As across any number of Participant Contracts in its sole and unfettered discretion. An Eligible DER/A subject to a Participant Contract is referred to in these Rules as a Contracted DER.

a) The Contract will be issued to Registrants by email, or other form as determined by the DSO.
b) Upon receipt of the Registrant-executed Contract the DSO may execute the Contract and notify the successful Registrants of the execution.
c) The template form of the Contract is attached hereto as *Appendix D – Participant Contract*. Changes to the form of Contract will be governed by the terms of the Contract.
d) For greater certainty, to the extent that there is any inconsistence between these Rules and the Contract, the Contract shall prevail.

3.1.5 Market Acceptance and Site Testing

Market Acceptance and Site Testing is the final step of Registration. Once the Contract and the Agreement are executed, the Registrant will conduct the testing with the DSO and NODES for at least one (1) DER/CDER per technology or asset type as identified by the DSO. See Section 6 of these Rules for more information on DER tests.

The DSO shall be given unencumbered access by the Registrant to each DER/A during site testing.

Following a successful test, the Registrant may receive a notice from the DSO of the date that they will be eligible to begin trading on the market ("**Trading Eligibility Date**").

Following a failed test, the DSO, NODES, and the Registrant may confer to resolve the failure. Two failed tests may result in termination of the Registration per Section 10.3.

4. Registration Administration by DSO

The Market Operation Periods will not have separate registration processes. A Registration submitted in any Period will be automatically carried over for subsequent Periods unless otherwise notified.

4.1 REGISTRATION REVIEW

a) Applications and Registrations will be reviewed by the DSO for completeness and subsequently assessed for fitness as outlined below:

i. Information submitted during the Application will be assessed by the DSO, at its sole discretion, to evaluate the Applicant against the eligibility requirements in Section 2.1. In the event the Application is not considered complete, or the Applicant is not considered eligible by the DSO in its discretion, the Application may be declined or otherwise subject to Termination in accordance with Section 10.3.
ii. In the event the DSO approves the Application, the DSO will send the Applicant a Registration Permission Notice that the Applicant may proceed with Registration by submitting all required information.
iii. Information submitted during the Registration will be reviewed for completeness and, if complete, the DSO will assess the Permitted DERs against the eligibility requirements in Section 2.2, as applicable.
iv. With respect to a DERA, the Contributor DERs accepted in Registration will be included on the Contributor List for the Registrant. Changes to the Contributor List may only be made in accordance with the Participant Contract and Section 7 of the Rules.
v. In the event the Registration is not considered complete, or all, but not less than all of the Permitted DERs submitted are deemed ineligible by the DSO in its discretion, the Registration may be subject to Termination by the DSO in accordance with Section 10.3.

b) The DSO will only review information submitted through the Website or as otherwise requested by the DSO. Information submitted through email or any other form may not be considered unless it constitutes Additional Information or is specifically requested to be sent via email by the DSO.
c) The clock of the DSO's computer systems, including the Website, whether accurate or not, will establish the time of submission or issuance of information or notices. The DSO will not be responsible for late deliveries.
d) The DSO may, at its discretion, request Additional Information from an Applicant or Registrant in order to assess a Registration. Additional Information must be submitted within the requested timeframes, failing which the Registration may be deemed incomplete and Terminated in accordance with Section 10.3.
e) The Application, Registration, and if any Additional Information, must be in English.
f) Registration must be completed having regard to these Rules, including *Appendix A - Glossary of Terms*, and must meet the requirements set out in these Rules.
g) All materials submitted during the Registration process are the property of the DSO and shall not be returned to an Applicant or Registrant for any reason.

The DSO may in its sole discretion allow an Applicant to re-submit an Application if a previous Application was denied or a Registration was terminated. The Registration may be in respect of the DER(s) that were included in the Terminated Registration or any other DER. Additional details pertaining to use of the Platform and the Registration process can be found in Section 3.1 above and the Website.

5. Project Market

Only Registrants with one or more eligible Contracted DERs/CDERs will be authorized to participate in the Project Market.

5.1 MARKET OPERATION PERIOD

The Project Market will initially consist of at least two phases, which will be the market operation periods beginning within 2023 and 2024, respectively.

Each Market Operation Period will begin on the Market Start Date and end on the Market End Date. The precise dates of operation will be specified in Market Determination Reports, though approximate time periods are outlined in *Appendix C – Mock Timeline*. During a Market Operation Period, Participants are subject to all requirements of the Rules, Contract, and Agreement. For illustration and without limiting other requirements, Participants are required to:

- Submit information regarding Outages, if required;
- Report any amalgamation, merger, or transfer of assets affecting ownership or operation of the Contracted DER/A;
- Report any bankruptcy, dissolution, or winding-up of the Operator;
- Report any changes to Participant Delegates or Delegate Information;
- Respond to activation instructions from the DSO and/or the Platform.

5.2 MARKET DETERMINATION REPORT

Prior to Market Operation, the DSO will publish a "**Market Determination Report**" on the Website and occasionally thereafter. For clarity, the most recent Market Determination Report will reflect the current state of the Market unless otherwise stated by the DSO. The Market Determination Report will include the following parameters for the Project Market:

a) Application Opening Date
    - The day which the DSO will begin reviewing Applications. Applications may be made prior to this date if the manner of application is made available by the DSO.
b) Market Operation Period(s)
    - The Market Start Date
        - The day which the Platform will be open to receive Offers for the current Market Operation Period ("**Market Start Date**").
    - The Market End Date
        - The day which the Platform will cease to be open to receive Offers for the current Market Operation Period ("**Market End Date**").
c) Aspirational Targets for total trade volumes, total availability, or otherwise, if applicable

In addition to the publication of the Market Determination Report, the DSO will send a Notice to all current Applicants and Registrants advising them that a Market Determination Report has been published. Further Registrant-specific details may be available for each Registrant via Website/Platform notice or email.

6. Test Activations

6.1 TEST ACTIVATIONS

Tests in respect of flexibility (a "**Test Activation**") will be performed at the DSO's discretion on Contracted DERs to verify that the Contracted DER can receive and respond to signals from the Platform, deliver flexibility, demonstrate simulated Wholesale interoperability, and other functions as applicable.

In general, Test Activations will be conducted on at least one (1) asset of each type or technology group of the Registrant. The DSO shall determine the number of Contracted DERs to test, types of assets, or technology groups of assets in its sole discretion.

For clarity, an Operator is responsible for the performance of all their Contracted DERS regardless of testing method or number of assets tested. Operators are incentivized to ensure it can meet its trading obligations. One such method is disproportionate reduction in payment for under-delivery as found in NODES Market Rules.

Test Activations will be scheduled to occur during regular Business Hours of a weekday or otherwise during the Trading Hours of the active Market Operation Period, if applicable. Tests will be scheduled by the DSO in consultation with the Contracted DER/A Operator and NODES.

A DER/A may be tested for up to eight consecutive half-hours (each half-hour a "**Test Interval**") and will be expected to follow their instructions for the entire duration of the test. The DSO will determine the duration of the test in its sole discretion.

a) For Demand Response Resources, Test Activations will be conducted to verify that a Contracted DER/A can respond to signals from the Platform and reduce its energy usage in an amount reasonably expected by the DSO, as applicable.
b) For Generator or Storage Resources, Test Activations will be conducted to verify that the Contracted DER can respond to signals from the Platform and deliver flexibility in an amount reasonably expected by the DSO, as applicable.

6.1.1 Market Acceptance Test Activations

Market Acceptance Tests will be conducted on Contracted DERs/DERAs during Registration. The tests will be conducted to simulate the regular operation of the market, and thus the Test Activation will be carried out by means of a simulated buy/sell order match in a test market environment on the platform.

The Operator will be considered to be notified of the Test Activation by consulting with the DSO on scheduling the Test Activation and will be responsible to ensure the buy/sell order match is completed at least 20 hours prior to the first Test Interval.

The duration of the Test Activation and the quantity activated in each Test Interval within the duration will be available on the platform in the form of a buy order placed by the DSO and will be considered the test instructions ("**Test Activation Instruction**"). A Test Activation Instruction may relate to any number of Test Intervals and may differ interval-to-interval as determined by the DSO with respect to technical limitations of the Contracted DER/A.

The Operator shall receive notices as they have configured them on the Platform, with timing and number of notices dependant on those configurations. The Operator will ensure that all required notices and instructions are received from the DSO and the platform.

Once the Test Activation has begun, the DSO may issue further Test Activation Instructions which will supersede the previous Test Activation Instructions for each Test Interval following the interval it was issued in. Supplementary Activation Instructions may be issued with less than two (2) hours notice and may be sent by means other than the Platform.

Supplementary Activation Instructions may be issued to test wholesale market scenarios. Failure to follow Supplementary Activation Instructions does not necessitate failure of the Test Activation if the test is otherwise satisfactory to the DSO.

A Test Activation is considered valid, unless:

- The Operator has provided an Outage Notice to the DSO of a Planned Outage or a Forced Outage with respect to the Contracted DER/A within the prescribed timeframes in accordance with the Contract;
- The DSO or NODES did not send notices in advance of the Test Activation as per the timelines specified above; or
- The DSO cancels the test prior to the start of the first Test Interval of the Test Activation.

If the Contracted DER is unable to comply with the Test Activation Instructions from the platform on the Test Activation Day, it is the responsibility of the Participant to manage its non-performance in accordance with the terms of the Contract, whether such non-performance is due to force majeure, an Outage, or falls under one of the described performance exemptions.

Failure of a Contracted DER/A to successfully complete a Test Activation may result in the Contracted DER/A undergoing a second Test Activation in the sole discretion of the DSO. Failure of a Contracted DER/A to successfully complete a subsequent Test Activation may be considered an event of default under the Contract and may result in the termination of the Registration or the Contract, as applicable.

6.1.2 Performance-Related Test Activations

Performance-Related Test Activations may be conducted at the sole discretion of the DSO if a Contracted DER/DERA is regularly unable to fulfill market contracts or obligations. Without limitation, this may include verifying the capacity of the Contracted DER/DERA.

The DSO may make the completion of the Performance-Related Test Activation a condition of continued market eligibility of a Contracted DER/DERA.

Performance-Related Test Activations shall be designed on a case-by-case basis but may generally follow the procedure of Market Acceptance Tests in 6.1.1.

6.1.3 Test Activation Performance Targets and Requirements

During a Test Activation, the quantity of energy delivered/reduced for the Contracted DER/A for each Test Interval should target within a ten percent (10%) dead-band of the quantity activated in the Test Activation Instructions. Failure to achieve the dead-band target may not result in failure of the Test Activation if the DSO is otherwise satisfied that the Test Activation demonstrated the tested functions.

Test Activations will also be evaluated against DER/A Performance Requirements as stated in the Contract and as otherwise deemed necessary by the DSO for testing wholesale market scenarios. The DSO shall determine whether the requirements were satisfied during the test in its sole discretion.

6.2 NO PAYMENTS FOR TEST ACTIVATION

Test Activations conducted under these Rules shall not be paid by the DSO and/or NODES to the Registrant or any other party. For clarity, Test Activations made under the Participant Contract or for Registration purposes are considered to have been conducted under these Rules.

This Section does not limit, prohibit, or otherwise affect payment determinations for Test Activations conducted under or considered by the NODES Market Rules.

7. Contributor Lists and Changes to Contributor DERs

7.1 CONTRIBUTOR LIST

Prior to the Trading Eligibility Date, the list of assets in Appendix B of the Participant Contract shall be the Participant's Contributor List.

Following the Trading Eligibility Date, the list of all assets (each DER and CDER) registered on the Platform shall be the Participant's Contributor List. Functionality of the Platform shall determine the acceptable management of assets and portfolios of assets, subject to the DSO's approval.

Each asset on the Contributor List must also be determined to be eligible and provided access by the DSO to the project market through the prescribed Platform functionalities.

7.2 ADDITION OF CONTRIBUTOR DERS

Prior to the Trading Eligibility Date, an Aggregator may request to amend its Contributor List by contacting the DSO.

Following the Trading Eligibility Date, an Aggregator may amend its Contributor List by adding one or more new CDERs (i.e. Contributor DERs that were not previously registered) on the Platform. Participants will follow all Platform requirements. Addition of a CDER on the Platform shall be considered a Change Request.

New Contributor DERs must meet the eligibility criteria in these Rules. Participants must provide the CDER information required by Appendix B and Appendix C of the Contract in addition to any required waivers to the DSO. Through the Participant Contract, Participants provide all requisite warranties and

representations relating to all CDER assets registered on the Platform to the DSO. The DSO may request Additional Information per section 4.1(d).

The DSO may require a Test Activation of the DERA or the Contributor DER to confirm changes of capacity in the Change Request.

7.3 REMOVAL OF CONTRIBUTOR DERS

Prior to the Trading Eligibility Date, an Aggregator that is an Aggregator may request to amend its Contributor List by contacting the DSO.

Following the Trading Eligibility Date, an Aggregator may remove a Contributor DER from the Contributor List by de-registering it using the Platform at any time following Registration without the consent of the DSO provided that, in doing so, the Participant shall continue to meet its obligations under the Rules.

7.4 APPROVAL OF CHANGE REQUESTS

Change Requests made to the DSO before the Trading Eligibility Date will be considered on a case-by-case basis. The Participant may resubmit previously rejected CDERs at the discretion of the DSO.

Change Requests made to the DSO following the Trading Eligibility Date will be assessed by the DSO to ensure the CDER(s) match the characteristics of the Participant's Contracted DERAs and that the additions are eligible for the market.

8. Project Review and Amendments

a) The DSO may from time-to-time review and Amend as necessary the Project, these Rules, and the form of Participant Contract (which, for greater certainty, shall not affect any previously executed Participant Contracts) (a "**Project Review**"). The DSO may make an Amendment outside of a Project Review in response to direction from the IESO, changes in Laws, significant changes in market conditions or other circumstances as determined by the DSO in its sole and unfettered discretion.

b) Notice of any Amendment as a result of a Project Review will be posted on the Website at least fourteen (14) days prior to the effective date of such Amendment. Notice of any Amendment that is not as a result of a Project Review will be posted by the DSO on the Website for such time period, if any, prior to the effective date of such Amendment, as circumstances may permit.

c) Amendments made by the DSO shall be without any liability whatsoever to Applicants or Registrants or any other Person.

9. Confidentiality

a) All information that is not otherwise publicly available that was provided to Participants or obtained from the DSO in any form in connection with the Project before or after the execution of a Participant Contract is the sole property of the DSO and must be treated as confidential, and:

i. is not to be used for any purpose other than participating in the Project Market and the performance by the Participant or its obligations under the Participant Contract;
ii. must not be disclosed without the prior written authorization of the DSO, other than to the OEB and the IESO and other than to the Applicant's, Registrant's or Participant's employees, counsel or contractors that have a need to know that information for the purpose of participating in the Project Market and the performance by the Participant of its obligations under the Participant Contract provided the Applicant, Registrant or Participant obtains similar confidentiality commitments from such third parties; and
iii. shall be returned to the DSO or destroyed by the Applicant, Registrant or Participant or third party (as applicable) DSO immediately upon request of the DSO.

b) All information contained in registration provided by or obtained from a Registrant in connection with the Project Market that is not otherwise publicly available (the "**Sensitive Information**") will be treated as confidential by the DSO, respecting that:
i. the DSO has the right to share Registration and Additional Information with NODES for the purpose of NODES fulfilling its role as market operator for the Project Market;
ii. it is not to be used for any purposes other than the Project Market or any of the Project objectives as set out in Section 1.5 more generally; and
iii. must not be disclosed without the prior written authorization of the Registrant or Participant as applicable, except as otherwise provided in this Section 9.

c) Information provided by a Person participating in the Project Market may be released in accordance with the provisions of the MFIPPA or FIPPA. Notwithstanding any confidentiality statement provided by the Project Market participant, the DSO or the IESO may be required to disclose information provided to it by a Project Market participant and is otherwise not protected from disclosure through an exemption in MFIPPA, FIPPA or any other applicable legislation, regulation or policy. Project Market participants should not assume that such an exemption is available.

d) Information provided by a Person participating in the Project Market in relation to a DER, including location, date, status within the Project Market and name of Project Market participant, may be disclosed by the DSO on the Website or otherwise, and such disclosure may be made on an individual basis, or on an aggregated basis with information provided by other Project Market participants.

e) Persons participating in the Project Market are advised that any information obtained by the DSO, whether directly or indirectly, including via the Website, Platform or other means, will, as necessary, be disclosed on a confidential basis to the IESO, Federal or Provincial Government entities, the DSO's counsel, consultants and any other advisers retained for the purpose of administration of the Project Market or the Project.

f) If the DSO or any other person specified in paragraph (e) above is requested or required (by oral question, interrogatories, requests for information or documents, court order, civil investigative demand, or similar process) to disclose any Sensitive Information in connection with litigation or any regulatory proceeding or investigation, or pursuant to any applicable Laws, the DSO will promptly notify the Registrant so that the Registrant may seek an appropriate protective order. If, in the absence of a protective order or the receipt of a waiver hereunder, the DSO or other person is compelled to disclose the Sensitive Information, the DSO or other person may disclose only such of the Sensitive Information to the person compelling disclosure as is required by Laws and only to such person or persons to which the DSO or other person is legally compelled to disclose and, in connection with such compelled disclosure, the DSO or other person shall provide

notice to each such recipient (in co-operation with legal counsel for the Registrant) that such Sensitive Information is confidential and subject to non-disclosure on terms and conditions as provided in these Rules.

10. Additional Rules

10.1 RESERVED RIGHTS

a) The DSO reserves the right to request clarification, additional information, documentation and statements from any Applicant, Registrant or Participant in relation to any Registration, DER, Bid or Offer, and other information relevant to this Project Market at any time ("**Additional Information**"). Any requested Additional Information must be submitted to the DSO by e-mail within five (5) Business Days of the date of such request, or by such other means and within such other time frame as may be requested by the DSO, failing which the Registration and Participant Contract, if applicable, may be Terminated. Except in response to the request for Additional Information, a Registrant may not supplement, amend, correct or modify its Registration in any respect once received by the DSO unless accepted by the DSO in its sole and unfettered discretion.

b) The DSO reserves the right to verify with an Applicant, Registrant or Participant, or with a third party, any of the information set out in a Registration, Additional Information, or Offer.

c) The DSO reserves the right to waive any informality or irregularity or defect, including any alteration, qualification, omission, inaccuracy or misstatement, noncompliance with these Rules, non-conformity (including in form, content and substance) or irregularity in a Registration or Offer which is not material, including by extending any deadline set out in these Rules.

d) The DSO reserves the right to at any time make changes to these Rules, the form of Participant Contract or the Project Market (including substantial changes or a suspension or cancellation of the Project Market) without any liability whatsoever to Applicants, Registrants or any other Person.

e) The DSO shall not be liable for any delays in delivering the Project Market, including but not limited to delays in processing, reviewing, accepting or Terminating a Registration, Bid or Offer, providing a Registration Permission Notice or any other Notice required by these Rules, conducting the Project Market or any step pertaining to conducting the Project Market, such as providing a Market Determination Report, release of information, or issuing a Participant Contract.

f) The DSO reserves the right to withdraw the eligibility status of a Registrant and/or a Contracted DER if the Registrant and/or Contracted DER, as applicable, ceases to satisfy any of the eligibility requirements or otherwise becomes ineligible pursuant to Section 2 of these Rules.

g) The DSO reserves the right to withdraw the issuance of a Participant Contract that is extended to a Registrant, for any reason and at any time, without penalty of any kind, before the Participant Contract is duly executed by the Parties. A decision by the DSO to Terminate any Registration, to withdraw the eligibility status of any Registrant and/or Permitted DER, or to withdraw the issuance of a Participant Contract with a Registrant, shall be final and binding and not subject to appeal or judicial review.

h) The DSO reserves the right to enrol any number of Participants to the Project Market and makes no guarantee to real market prices for flexibility services. For clarity, the DSO makes no representation to the profit expectations of Participants. Without limiting the foregoing and

without any liability or guarantee, the DSO believes a Participant has a reasonable expectation to not operate a deficit as a result of participation in the Project Market if the Participant is acting prudently and reasonably within an open market.

i) The DSO reserves the right to cancel all or any part of the Project Market, including one or more Trading Days and/or Market Operation Periods, at any time and for any reason or to suspend the Project Market in whole or in part for any reason for such period of time as the DSO shall determine in its discretion, in each case without any obligation or any reimbursement to a Applicant or Registrant, as applicable, except as provided in the Participant Contract.

10.2 ASSIGNMENT

An Applicant or Registrant shall not assign its Registration to another Person (including by way of amalgamation or by operation of law) without the consent of the DSO. If a Registrant violates this Section, the DSO shall be entitled to Terminate the Registration.

10.3 TERMINATION

Termination by the Applicant or Registrant:

a) An Applicant or Registrant may withdraw its Registration from the Project Market by contacting the DSO at its Coordinates (Appendix E) at any time prior to executing the Participant Contract. Upon confirmation by the DSO in writing of the withdrawal from the Project Market, the Registration shall be deemed Terminated and the Parties shall have no further liability to each other.

b) An Applicant or Registrant may not re-apply to the Project Market during the current Market Operation Period following the Termination of its Registration without the express consent of the DSO.

Termination by the DSO:

c) The DSO reserves the right to Terminate any incomplete Registration, any Registration that does not satisfy all of the eligibility requirements or is ineligible as set out in Section 2, and any Registration where there was a breach by the Applicant or Registrant, as applicable, of any of the covenants, representations, warranties or other requirements in these Rules. If a Registration is Terminated, the DSO will provide the Applicant or Registrant with notice of the reason(s) for Termination. Termination by the DSO of a Registration may take place by notice to the corresponding Applicant or Registrant at any time following the receipt of such Registration by the DSO.

d) Following the execution of the Contract, the DSO shall follow the termination procedures therein for the respective Contracted DER.

e) The DSO will not reimburse the Applicant or Registrant, as applicable, in any manner whatsoever, in the event of Termination of any or all Registrations for any reason, nor in the event of the revocation of the issuance of the Participant Contract.

10.4 GENERAL

A reference to "**Registrant**" in this section shall include "**Applicant**" unless otherwise indicated.

a) In the event the consent of the DSO is required to admit a DER that is the subject of an existing Contract to the Project Market, the Registrant shall submit a request for such consent in writing following completion of its Application via the Website and include in its request the rationale for allowing the DER with an existing Contract to participate in the Demonstration, details of the existing Contract and the general specifications of the DER including the category of Permitted Resource, DER Capacity, and Connection Point.

b) In the event the consent of the DSO is required for any reason under these Rules other than with respect to an existing Contract, the Registrant or Participant, as applicable, must submit a request for such consent in writing and include in its request sufficient detail to allow the DSO to make an informed decision.

c) Except for changes to the Registrant's coordinates or a change in the Delegate, which changes must be confirmed in writing to the DSO, the Registrant is not permitted to make any changes to its Application or Registration, except in accordance with these Rules.

d) The DSO shall not be obligated in any manner whatsoever, or have any liability, to any Person participating in the Project Market in any manner, unless and until a Participant Contract is executed with such Person, and then only in accordance with the terms of such Participant Contract.

e) The DSO shall not be liable to pay a Registrant's costs or expenses under any circumstances. By submitting a Registration, the Registrant irrevocably and unconditionally waives any Claims against the DSO relating to the Registrant's costs and expenses including costs incurred to satisfy the eligibility criteria described in Section 2, the Registration completeness criteria described in Section 3 or any costs associated with, if selected, entering into a Participant Contract.

f) Each Applicant, Registrant and Participant shall be solely responsible for its own costs and expenses relating to the preparation and submission of its Registration, the development, operation, maintenance, and connection to the DSO's Distribution System of its DERs, fuel charges, and participation in the Project Market, whether or not a Registration is accepted or Terminated or the Demonstration is cancelled, suspended, revoked, amended or revised.

g) The acceptance by the DSO of a Registration or the issuance of a Registration Permission Notice by the DSO to a Registrant shall not be construed as:
    i. evidence that the DSO has accepted the authenticity or sufficiency of the Registration and its supporting documentation; or
    ii. a waiver of or bar to any of the DSO's rights under these Rules or otherwise.

h) The rights reserved by the DSO in these Rules are in addition to any other express rights or any other rights which may be implied in the circumstances, and the DSO along with its Project Partners shall not be liable for any Claim, losses, damages, liabilities, penalties, obligations, payments, costs and expenses, losses or any direct or indirect damages incurred or suffered by any Registrant or any third party resulting from the DSO exercising any of its express or implied rights under the Project Market, including the right to exercise its discretion hereunder. In submitting a Registration and participating in the Market, each Registrant agrees that it waives any rights it may have to bring a Claim or otherwise as against the DSO for the conduct of the Project or the Project Market, such as failing to issue the Registrant a Registration Permission Notice, issuing a Registration Permission Notice to another Registrant, or declining to issue a Participant Contract, as applicable.

i) In submitting a Registration or participating in the Market, each Registrant respectively agrees that, in no circumstances shall it nor any third party be entitled to recover any damages as against the DSO or its Project Partners, whether such claim for damages arises in contract, warranty, equity, negligence, intended conduct, detrimental reliance or otherwise, including any action or claim arising from the acts or omissions, negligent or otherwise, of the DSO or its Partners, and including any claim by the Registrant that the DSO has failed to comply with these Rules.

j) By submitting a Registration, the Registrant authorizes the collection by the DSO of the information set out in the Registration and otherwise collected in accordance with the terms hereof, and the use of such information for the purposes set out in or incidental to these Rules and the Participant Contract, and for the purpose of offering, managing and directing the Project Market generally.

k) The DSO shall not be liable for any temporary suspension, interruption, unavailability or fault occurring in the provision of the Platform by its Partner(s) ; any loss or damage whatsoever and howsoever caused arising in connection with the use of information or services acquired by the Participants through use of the Platform howsoever; or any Force Majeure Event.

10.5 INTERPRETATION

a) **Consent**. Whenever a provision requires an approval or consent and the approval or consent is not delivered within the applicable time limit, then, unless otherwise specified, the Party whose consent or approval is required shall be conclusively deemed to have withheld its approval or consent.

b) **Currency**. Unless otherwise specified, all references to money amounts are to the lawful currency of Canada.

c) **Discretion**. Where the DSO may take an action or make a determination under these Rules, the decision to take such action or make such determination shall be at the DSO's sole and unfettered discretion. Any reference to the DSO's discretion in these Rules shall mean the DSO's sole and unfettered discretion.

d) **Extensions of Time.** The DSO may extend the time to meet the requirements of these Rules at its discretion. Any failure to meet the revised time requirement shall have the same consequences as if the original time requirement had not been met.

e) **Governing Law.** These Rules are made under and shall be governed by and construed in accordance with, the laws of the Province of Ontario and the federal laws of Canada applicable in the Province of Ontario.

f) **Headings**. Headings of sections are inserted for convenience of reference only and do not affect the construction or interpretation of these Rules. References to Sections means Sections of these Rules, unless otherwise specified.

g) **No Strict Construction**. Despite the fact that these Rules were drafted by the DSO's legal and other professional advisors, Applicants submitting Applications, Registrants completing Registration, and Participants acknowledge and agree that any doubt or ambiguity in the meaning, application or enforceability of any term or provision in these Rules shall not be construed against the DSO or in favour of the Registrant when interpreting such term or provision, by virtue of such fact.

h) **Notice**. No person may provide any notices or otherwise communicate with the DSO in respect of a Registration other than the primary contact provided in the Registration, provided that a duly

authorized signatory of the Registrant may enter into a Participant Contract that is the subject of a Registration Permission Notice, if any, in relation to such Registration.

i) **Number and Gender**. Unless the context otherwise requires, words importing the singular include the plural and vice versa and words importing gender include all genders.

j) **Severability**. If any provision of these Rules or its application to any Party or circumstance is restricted, prohibited or unenforceable, the provision shall be ineffective only to the extent of the restriction, prohibition or unenforceability without invalidating the remaining provisions of these Rules and without affecting its application to the other Party or circumstances.

k) **Statutory References.** A reference to a statute includes all regulations and rules made pursuant to the statute and, unless otherwise specified, the provisions of any statute, regulation or rule which amends, supplements or supersedes any such statute, regulation or rule.

l) **Time**. Time is of the essence in the performance of the Parties' respective obligations.

m) **Time Periods**. Unless otherwise specified, time periods within or following which any payment is to be made or act is to be done shall be calculated by excluding the day on which the period commences and including the day on which the period ends and by extending the period to the next Business Day following if the last day of the period is not a Business Day.

n) **References to Time**. Any reference to time in these Rules shall be in the 24-hour clock and be understood to be made in Eastern Standard Time (EST) (UTC-5) unless otherwise stated and shall be read to the millisecond. A time reading "HE [hour]" shall mean "hour ending".

11. Appendix A – Glossary of Terms

In these Rules the following terms shall, unless the context otherwise requires, have the meaning stated below:

Term	Definition
Access Rights	Either title or rights of access to the Site, such rights being sufficient to allow the Applicant, Registrant or Participant, as applicable, to meet the requirements of the Project, including allowing the DSO to access the Site.
Additional Information	Has the meaning given to it in Section 10.1(a) of the Rules.
Affiliate	Any Person that (i) Controls a Person; (ii) is Controlled by a Person; or (iii) is Controlled by the same Person that Controls that Person.
Aggregator	An Operator/Person who has or will have User Rights over more than one Contributor DER, and aggregates such Contributor DERs for the purposes of participating in the Project Market.
Agreement	The NODES Membership Agreement.
Amendment	A change, revision or addition to the Project, the Rules, an executed Contract, or the form of Contract. For greater certainty, a suspension of the Project, in whole or in part, shall constitute an Amendment. "Amend" has a corresponding meaning.
Applicant	A(n) Person/Operator who has completed an Application to participate in the Project Market and has not yet become a Registrant. An Applicant becomes a Registrant when they receive a Registration Permission Notice from the DSO.
Application	The initial input of information by an Operator, who upon submission is considered an Applicant.
Approved Meter	Revenue-quality metering connected to the Distribution System and approved and verified by Measurement Canada and the DSO as usable for billing purposes on an hourly or sub-hourly basis
Arbitrator	A single arbitrator pursuant to the Arbitration Act. Outlined in Section 11.2 of the Contract.
Asset	A unit or facility for the production, consumption or transmission of electricity, or several such units or facilities acting as a single unit, as registered in the Platform. An Aggregation is not an Asset.
BTM ("behind-the-meter")	A DER/A installed in a system that provides electricity to be used on-site without passing through a meter to or from the Distribution System. Generation Resources located behind-the-meter are considered to be Demand Response Resources under these Rules.
Business Day	Any day other than a Saturday, a Sunday or holiday in Ontario, being New Year's Day, Family Day, Good Friday, Easter Monday, Victoria Day, Canada Day, Labour Day, Thanksgiving Day, Remembrance Day, Christmas Day, Boxing Day, and as further defined in Section 88 of the Legislation Act, 2006, S.O., chap 26, Sched F.

Term	Definition
Business Hours	The usual operating hours of the DSO which will usually be 08:00-16:00 EST (UTC-5) on Monday through Friday except Holidays. This may be changed by the DSO from time to time and without notice.
CDER	Contributor DER.
Change Request	A request by an Operator to the DSO to add or exchange one or more Contributor DERs to/from its Contributor List.
Claim	A complaint, claim, demand, suit or cause of action in contract, in tort, equity, under a Law, or otherwise.
Connection Point	The electrical connection point between a DER and a Distribution System where the Electricity is withdrawn from, or injected into, the Distribution System, and is associated with the Meter Number.
Contract	A contract entered by the Registrant related to its participation in the Market. This primarily means the Participant Contract but where context requires it also includes the Membership Agreement, and any other contracts affecting the registrant in regards to energy, flexibility, or capacity.
Contracted DER	An Eligible DER that is subject to a Participant Contract. This includes Direct DERs, DER Aggregation Types/Technologies, and each Contributor DER.
Contributor DER	A DER owned or operated by a Contributor to a DER Aggregation. Grants User Rights to an Aggregator and appears on a Contributor List.
Contributor List	With respect to a Registrant or Participant prior to the Trading Eligibility Date, the list of all Contributor DERS that are proposed during Registration for each DERA or Contracted DERA. With respect to a Participant following the Trading Eligibility Date, the list of all Contributor DERs registered on the Platform.
Control	With respect to any Person at any time (i) holding, whether directly or indirectly, as owner or other beneficiary (other than solely as the beneficiary of an unrealized security interest) securities or ownership interests of that Person carrying votes or ownership interests sufficient to elect or appoint fifty percent (50%) or more of the individuals who are responsible for the supervision or management of that Person; or (ii) the exercise of de facto control of that Person, whether direct or indirect and whether through the ownership of securities or ownership interests or by contract, trust or otherwise; and Controlled by has a corresponding meaning.
Cost Recovery Fees	A fee outlined in Section 5.11 of the Participant Contract "Exceptional Payment Obligations" which is a fee payable to the DSO for any extraneous expense incurred during the Registration Process.
Customer Account	A customer account in good standing with Essex Powerlines Corporation.
Delegate	A natural person who shall be duly authorized to act on behalf of the Applicant, Registrant, or Participant and with whom the DSO may consult at all reasonable times, and whose instructions, requests, and decisions,

Term	Definition
	provided the same are in writing and made via email, shall be binding on the Applicant, Registrant or Participant, as applicable.
Demand Response Resource	A DER/A which offers flexibility by reducing Electricity demand and is inclusive of electricity generating resources located "behind-the-meter". Refers to a Demand Response Resource (C&I) and a Demand Response Resource (Residential), collectively.
DER (Distributed Energy Resource)	A facility capable of providing DER Capacity that is connected to the Distribution System as well as all equipment and property comprising the facility as described in the Registration.
DERA (DER Aggregation)	A technology or type of DERs controlled by an aggregative Registrant or Participant.
DER Capacity	The amount in kilowatts of electricity available to be provided to or the amount in kilowatts of electricity load (use of, demand for electricity) available to be reduced to the Distribution System. This can relate to Nameplate Capacity or Effective Capacity.
DER ID	The number assigned to each Direct DER and Contributor DER upon Registration, which number shall be used to identify the DER for the duration of its participation in the Market.
DER/A	A term that refers to DERs and DERAs collectively.
Direct DER	Has the meaning given to it in Section 1.9 of the Rules.
Direct Participant	A Participant that participates in the Demonstration directly and not through an Aggregator or other third party.
Distribution System	A system connected to the IESO-Controlled Grid for distributing Electricity at voltages of fifty (50) kilovolts or less and includes any structures, equipment or other things used for that purpose, provided that a Distribution System shall be deemed not to include any equipment controlled by the IESO pursuant to the Distribution System Code
Distribution System Code	The code approved by the OEB and in effect from time to time, which, among other things, establishes the obligations of an LDC with respect to the services and terms of service to be offered to customers and retailers and provides minimum technical operating standards of Distribution Systems.
DSO (Distribution System Operator)	A system operator that manages the low-voltage distribution system and represents a potential new type of entity or function that is distinct from, but has many parallels with a transmission system operator and for the purposes of the Project, Essex Powerlines Corporation shall be the DSO.
DSO Coordinates	The contact information provided for the DSO as set out in the Rules Appendix E – DSO Coordinates.
DSO Default	Failure by the DSO to fulfill an obligation outlines in the Contract in Article 6 - Events of Default and any other provision relating to DSO Defaults.
EEC	Essex Energy Corporation.
Effective Capacity	The maximum demonstrated capacity of a DER/A that has been validated or confirmed by the DSO by testing or other means.

Term	Definition
Electrical Safety Code	The code issued by the Canadian Standards Association as amended by the Electrical Safety Authority pursuant to O.Reg. 164/99 of the Electricity Act, 1998.
Electricity or Energy	Electric energy, measured in kWh unless expressly stated otherwise.
Eligibility	The designation by the DSO of a Participant and separately each of its Contracted DERs to be approved to be registered in the Platform and offer flexibility services to the DSO. This approval is made without liability and subject to the limitations in the Contract.
EPLC	Essex Powerlines Corporation, the DSO.
Existing Contract	A contract which the Applicant/Registrant/Participant is party to relating to the generation or storage of Electricity, conservation or demand management of Electricity or other form of contract, including a net-metering contract, or unit sub-metering contract relating to Electricity or Related Products.
FIPPA	Freedom of Information and Protection of Privacy Act, R.S.O. 1990, c. F 31
Flexibility	A modification of generation or consumption patterns provided by individual or aggregated assets as a service to the DSO, in order to alleviate congestion on the distribution or transmission networks.
Force Majeure	Any act, event, cause or condition that prevents a Party from performing its obligations. Outlined in the Participant Contract Article 7 - Force Majeure.
Forced Outage	Governed by the Participant Contract, an Outage which was not planned or by circumstance of severity or urgency of events prevents the Participant from managing Platform activity per the Participant Contract.
Future DERs	A DER that has not achieved its In-Service Date.
Generator Resource	A DER capable of generating and injecting Electricity at a controlled rate, all in accordance with all Laws, directly to the Distribution System. Variable Generation Resources such as wind and solar generation are not considered generator resources under these Rules. Resources which generate Electricity but are not capable of injecting directly to the Distribution System or are otherwise "behind-the-meter" assets are considered Demand Response Resources under these Rules.
Governmental Authority	The Crown, any federal, provincial, or municipal government, parliament or legislature, or any regulatory authority, agency, tribunal, commission, board or department of any such government, parliament or legislature, or any court or other law, regulation or rule-making entity, having jurisdiction in the relevant circumstances, including the IESO, the OEB, the Electrical Safety Authority, and any Person acting under the authority of any Governmental Authority.
Grid Performance Requirements (GPRs)	Characteristics or measures of energy-related performance which must be met by all Contracted DERs at all times, detailed in an exhibit to the Contract.
IESO	The Independent Electricity System Operator of Ontario established under Part II of the Electricity Act, 1998 or its successor.

Term	Definition
IESO Energy Efficiency Auction Pilot	A pilot auction mechanism to procure peak demand reductions from energy efficiency and load-shifting resources administered by the IESO.
IESO Market Rules	The rules made under Section 32 of the Electricity Act, 1998, together with all market manuals, policies, and guidelines issued by the IESO, as may be amended from time to time.
IESO-Administered Markets	The Electricity markets administered by the IESO, as further defined in the IESO Market Rules.
Indemnifiable Loss	Any and all Claims, demands, suits, losses, damages, liabilities, penalties, obligations, payments, costs and expenses and accrued interest thereon (including reasonable legal fees in connection therewith) which the Participant indemnifies the DSO, the IESO, the OEB, and other partners. Outlined in detail in Article 10 of the Contract.
Indemnitees	Defined by Section 10.1 of the Contract.
Industrial Conservation Initiative	An IESO initiative which allows Class A electricity consumers to pay Global Adjustment based on their top five peaks.
In-Service	The state that a DER or Contributor DER is considered to be in when it is fully installed and competed with regard to all required regulations on safety, cetification, licensing, and all other applicable requirements. Additionally, the DER or Contributor DER can be reasonably expected to deliver flexibility services.
In-Service Date	The date upon which a DER or Contributor DER is considered to be in-service.
Invalid Provision	A provision of the Contract or the disappearance or inability to calculate or determine any index, price or other quantum referred to in this Contract in dispute related to alleged invalidity, inapplicability, or unenforceability.
kW	Kilowatts.
Laws	(i) applicable Canadian federal, provincial or municipal laws, ordersin-council, by-laws, codes, rules, policies, regulations and statutes; (ii) applicable orders, decisions, codes, judgments, injunctions, decrees, awards and writs of any court, tribunal, arbitrator, Governmental Authority or other Person having jurisdiction; (iii) applicable rulings and conditions of any licence, permit, certificate, registration, authorization, consent and approval issued by a Governmental Authority; (iv) any requirements under or prescribed by applicable common law; (v) the Retail Settlement Code, the Distribution System Code, and any other codes issued by the OEB from time to time that are binding on the Applicant, Registrant or Participant, the DSO or the IESO.
LDC	Local Distribution Company. The owner or operator of a Distribution System that is licensed by the OEB as an “electricity distributor”.
Market Determination Report	A report issued by the DSO that reflects the ongoing state of the Market, which will set important characteristics such as Application Dates, Trading Start Dates, Market Operation Periods, among others outlined in Section 5.2 of these Rules.
Market End Date	The day which the Platform will be closed to receive offers for the respective Market Operation Period.

Term	Definition
Market Operation Period	The time between Market Start Dates and Market End Dates in which trading will be active on the platform.
Market Start Date	The day which the Platform will be open to receive offers for the respective Market Operation Period.
Membership	The status achieved by a Registrant when it executes a membership agreement with NODES AS.
Meter Number	The identifying number of the customer's electricity meter(s) connected to the Distribution System.
MFIPPA	The Municipal Freedom of Information and Protection of Privacy Act, RSO 1990, c. M.56.
MW	Megawatts.
MWh	Megawatt-hours.
Nameplate Capacity	The theoretical intended maximum capacity of a DER or Contributor DER on installation.
NODES	NODES AS.
Non-Wires Alternatives or NWAs	Resources, including certain DERs, that are capable of providing Services as alternatives to transmission and distribution solutions, such as a new stations or lines.
Notice	A written communication provided by one Party to the other Party concerning any matter directly or indirectly related to the Rules or the Contract, as applicable, and includes Activation Notices and Standby Notices.
Notice of Arbitration	Written notice of arbitration to the other Party containing a concise description of a matter submitted for arbitration. Detailed in Article 11 of the Contract.
OEB	The Ontario Energy Board, or its successor.
Operator	The corporation which registers and then operates and/or conducts trading for a DER or a DER Aggregation. An Operator is not necessarily the owner of a DER/A. An Operator is the party to each Participation Eligibility Contract and the NODES Membership Agreement.
Outage	The removal of equipment from service, unavailability for connection of equipment or restriction of use or reduction in performance of the Contracted DER for any reason, including to permit the performance of inspections, tests, repairs or maintenance on the facility, which results in a partial or total interruption in the ability of the Contracted DER to meet market obligations and deliver flexibility, as applicable.
Outage Notice	Governed by the Participant Contract, a notice provided by the Operator of a DER/A of an Outage respecting a Contracted DER/A.
Participant	The Operator-party to a Participant Contract, which for clarity does not include the DSO, who has one or more Contracted DER/As which has achieved its Trading Eligibility Date. A Participant is always also considered a Registrant unless the context requires otherwise.
Participant Class	A group of Participants required to participate in multi-party arbitration on the issues set out in a Notice of Arbitration. Detailed in Article 11 of the Contract.

Term	Definition
Participant Contract	The contract respecting an Operator's eligibility to act as a Participant in the Market, concluded by the Operator and the DSO. The contract is a condition of continued eligibility in the Market.
Participant Default	Failure by the Participant to fulfill an obligation outlined in the Contract in **Article 6 - Events of Default** and any other provision relating to Participant Defaults.
Party	(i) with respect to the Contract, any one of the Participant and the DSO, and the DSO and the Participant are collectively referred to as the Parties; and (ii) with respect to the Demonstration Rules, any one of the Applicant or the Registrant and the DSO, and the DSO and the Applicant or the Registrant are collectively referred to as the Parties.
Permitted DER	Means a DER or DERA, including a Future DER, that was submitted in an application and has been permitted to proceed to Registration in a Registration Permission Notice and has not had its eligibility terminated.
Permitted Resource	With respect to a DER meaning that the DER or Contributor DER is one of a class of allowed resources, types, or technologies.
Person	A natural person, First Nation that is a “band” as defined in the Indian Act, RSC 1985, c. I-5, co-operative, firm, trust, partnership, limited partnership, company or corporation (with or without share capital), joint venture, sole proprietorship, Governmental Authority or other entity of any kind.
Planned Outage	Governed by the Participant Contract, an Outage which was scheduled with reasonable notice that a Participant is able to modify Market trading behaviour appropriately, such as for routine maintenance.
Platform	The computer facilities, services and/or software applications made available by NODES to Members for the purpose of Trading and associated activities.
Platform Rules	The rules governing access and use of the Platform, as set by NODES from time to time.
Privacy Legislation Records	All recorded information in any form or medium that is provided by the DSO, NODES, the IESO, the OEB or its respective Representatives to the Participant, or provided by the Participant to the DSO or its Representatives for the purposes of this Contract, or created by the Participant in the performance of this Contract, and that is in the custody or control of the DSO which may require the disclosure of such the Privacy Legislation Records to third parties.
Project	PowerShare or the "DSO Pilot Project".
Project Area	The part of the DSO's service area as defined in Section 1.6 of the Rules.
Project Market	The Market as operated by NODES for the trading of flexibility services.
Project Partners	The corporations named in the Grid Innovation Fund Contribution Agreement that are proponents of the Project which are not EPLC.
Project Review	A change, amendment, suspension, or other modification to the Administration or Operation of the Project which can be made by EPLC at any time. Considered in Section 8 of the Rules.

Term	Definition
Registered Bank Account	A bank account registered in Ontario, which may be in the name of the Participant one of its Affiliates, and which bank account must be capable of sending and receiving of funds by electronic funds transfer.
Registrant	An Operator which has received Registration Permission Notice.
Registration	The second stage of the registration process for the Project Market, except where context requires it to mean the Application and the Registration together.
Registration Permission Notice	Notice given by the DSO to Applicants following completeness and fitness assessments of their application as set out in Section 4. The notice states whether the Applicant is permitted to become a Registrant, and whether the DERs/DERAs are permitted to proceed to registration.
Replacement Provisions	The alternative language or amendments agreed to by both parties of the Contract in case a provision is considered invalid or unenforceable per Section 1.8 of the Contract.
Reservation Price	The price or price formula published by the DSO for calculation of payments made to secure flexibility availability on prescribed hours, usually done through LongFlex contracts via the platform.
Rules	The rules governing the Project and Project Market as may be Amended in accordance with its terms, from time to time.
Senior Conference	A meeting convened during the informal dispute resolution process in which a senior executive of the Participant shall meet with a manager of the DSO, either in person or by telephone. Outlined in Section 11.1 of the Contract.
Sensitive Information	Has the meaning given to it in Article 9(b) of the Rules.
Site	In respect of a DER, is the real property on, over, in or under which the DER is situated, as such real property is identified in the Registration and in the Contract.
Site-Specific Losses	Electricity losses due to line resistance, the operation of transformers and switches, and other associated losses of Electricity incurred by the DER that may occur as a result of the difference between the location of the meter and the Connection Point, as determined pursuant to loss factors applied in accordance with the Retail Settlement Code and other Laws.
Storage Resource	A DER capable of withdrawing Electricity at a controlled rate, storing such Electricity for a controlled period of time and then injecting only the stored Electricity, minus losses arising from roundtrip efficiency, at a controlled rate, all in accordance with all Laws, to the Distribution System.
Temporary Account Number	A provisional identifying number which an applicant with a Future DER may apply to the DSO for in order to complete an application or registration, as found in Section 1.11 of the Rules.
Term	The period between the Contract Date and the expiry or termination of the Contract.
Terminate	With respect to a Registration, means the termination, rejection, discharge and release of the Registration and all rights of the Applicant or Registrant (if any), and all obligations of the DSO (if any) to the Applicant or Registrant, in respect of or arising out of the Project and Project Market.

Term	Definition
Test Activation	A process which confirms aspects of market operability, DER/A characteristics, or otherwise as required by the DSO as described in Section 6.1 of the Rules.
Test Activation Day	A business day which the DSO has elected as the day a Test Activation will occur.
Test Activation Instruction	A set of data sent by or on behalf of the DSO which details the quantity of flexibility activated in each Test Interval of a Test Activation. May be received on the Platform via a test market order or otherwise.
Test Interval	Each a half-hour period within a Test Activation.
Trading Eligibility Date	The date which a Registrant will be eligible to begin trading in the market on the platform, also the date the Registrant is also considered a Participant.
Trading Hours	The hours on each day which participants may be activated, as defined in the NODES Rules. For clarity, these hours do not restrict the submission, acceptance, or formation of buy or sell orders.
Transmission System	A system for conveying electricity at voltages of more than fifty (50) kilovolts and includes any structures, equipment or other things used for that purpose.
TS	Transformer station
TSO	Transmission system operator, which in Ontario is the IESO, responsible for managing the operations of high-voltage transmission systems and administers a wholesale energy market.
UC	Utilismart Corporation.
User Rights	With respect to a DER that is registered in the Project Market (being a Direct DER, Contributor DER and, following the entering into of a Contract, a Contracted DER), ownership and operational control, or in absence of ownership and operational control, a contractual right broad enough to permit the Applicant, Registrant or Participant, as applicable, to use the DER in such a manner to meet the requirements of the Rules and, if applicable, the Contract, which rights shall include but are not limited to, Access Rights, the right to use the DER to participate in the Project Market and the right to allow the DSO to use and share the metering data from the DER.
Website	The web-portal operated by the DSO to procure, contract, schedule, dispatch, measure and verify DERs and otherwise run the Demonstration
Wholesale Markets	The collective term for IESO-Administered Markets, as referred to in Section 1.1 of the Rules.

12. Appendix B – Electricity Retailer Waiver

CONSENT, ACKNOWLEDGEMENT AND WAIVER AGREEMENT

Date	
Legal name of electricity retailer (the "**Retailer**")	
Legal name of customer (the "**Customer**")	
Address of Customer	
EPLC Account Number	
EPLC Meter/Premise Number	

TO: Essex Powerlines Corporation ("**EPLC**")

RECITALS:

1. **WHEREAS** the Customer is a party to an electricity retail agreement (the "**ERA**") with the Retailer.
2. **AND WHEREAS** the ERA may contain provisions that limit the Customer either generally or explicitly from entering into any other contract or agreement relating directly or indirectly to the supply of electricity or any other electricity program.
3. **AND WHEREAS** the Customer would like to participate in the Essex Powerlines Corporation DSO Project ("**Project**") PowerShare, which is being administered by Essex Powerlines Corporation as delivery agent and distribution system operator ("**DSO**").
4. **AND WHEREAS** the Retailer is prepared to provide this consent, acknowledgment and waiver (referred to collectively as the "**Waiver**") to the addressees of this Waiver.

NOW THEREFORE for good and valuable consideration between the Customer and the Retailer, receipt of which is acknowledged by the signatories hereto, the parties agree as follows:

1. The Retailer acknowledges being advised that the Customer intends to participate in the Demonstration and that it has reviewed a copy of the rules (the "Rules") governing the Demonstration, which are publicly available DSO Website or on request.
2. The Retailer hereby consents to the Customer participating in the Demonstration either as a Participant or a Contributor DER (as such terms are defined in the Rules).
3. The Retailer acknowledges and agrees that the Customer and the DSO, or the Customer and an Aggregator, as applicable, may enter into contracts relating directly or indirectly to the supply or

reduction in use of electricity, capacity and/or energy, including reserve, pursuant to the Demonstration.

4. The Retailer acknowledges and agrees it shall have no entitlement to or receive any benefit from the Customer, the Aggregator or the DSO relating to the Demonstration.
5. The Retailer acknowledges and agrees that EPLC is not in violation of any of its obligations under applicable law by acting in its role as the delivery agent and DSO for the Demonstration.
6. The Retailer acknowledges and agrees that this Waiver shall not give rise to any event of default by the Customer or provide any remedy or right by it as against the Customer or any third party.
7. The Customer acknowledges and agrees that this Waiver shall not give rise to any event of default by the Retailer or provide any remedy or right by it as against the Retailer or any third party.
8. This executed Waiver is being provided pursuant to the Rules to the parties described therein for the express purposes of ensuring that the Customer is not ineligible per criteria described in Section 2.2.2(f) of the Rules.
9. Delivery of an executed copy of this Waiver by electronic transmission will be as effective as personal delivery of an originally executed copy.
10. This Waiver may not be assigned by either Party without the prior written consent of the DSO.

Date:

Signed the first day above written.

RETAILER

[Retailer Name]

Per:_____
Name:
Title:
I have the authority to bind the retailer

CUSTOMER (LEGAL ENTITY)

[Customer Name]

Per:_____
Name:
Title:
I have the authority to bind the customer

CUSTOMER (INDIVIDUAL)

Per:_____
Name:

13. Appendix C – Mock Project Market Timeline

The dates below are to demonstrate by way of example the sequence of events relative to one another during the Project Market and approximate timeframes. Final dates will be confirmed by the DSO in the Market Determination Report. Persons participating in the Project market should rely exclusively on the dates published in the Market Determination Report.

2023 Market Operation Period	
Registration Open	May 2023 - *ongoing*
Market Start Date	June 1, 2023
Market End Date	April 30, 2024
2024 Market Operation Period	
Market Start Date	June 1, 2024
Market End Date	June 30, 2025

14. Appendix D – Participant Contract

Available separately, contact DSO.

15. Appendix E – DSO Coordinates

The following should be used to contact the DSO for purposes under the Rules and the Participant Contract:

Address: 200-2199 Blackacre Dr., Oldcastle, ON, N0R 1L0

Telephone: 519-737-6640 (Customer Care)

Email: dso@powershare.energy

Essex Powerlines Corporation DSO Project - PowerShare

Contract for Participant Eligibility to Project Market

THIS CONTRACT is entered into between Essex Powerlines Corporation and _____, the "**Participant"**.

WHEREAS on March 21st, 2022, Essex Powerlines Corporation ("EPLC") entered into a contribution agreement with the Independent Electricity System Operator (the "IESO") for funding of a project under the IESO's Grid Innovation Fund to enable EPLC to perform as a Distribution System Operator ("DSO") within a project market designed to activate Distributed Energy Resource ("DER") flexibility and allow DER owners to monetize their investments while simultaneously adding resiliency to the grid as a non-wires alternative;

AND WHEREAS the Participant has User Rights to the Contracted DER(s), which Contracted DER's registration has been accepted in accordance with the Rules and is capable, or in the case of Future DERs, will be capable of providing: (i) flexibility services to meet local or province-wide electricity needs by participating in the project market, and (ii) if applicable, availability services to provide guaranteed flexibility to meet local energy needs;

AND WHEREAS the Participant and the DSO wish to execute this Contract in order to formalize the contractual arrangements for the Participant to be eligible to operate the Contracted DER in the project market during the Market Operation Period on the terms and conditions set out herein;

NOW THEREFORE, in consideration of the mutual agreements set forth herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and intending to be legally bound, the Parties agree as follows:

[Remainder of the page left intentionally blank.]

Contents

Terms and Conditions

ARTICLE 1 - INTERPRETATION

1.1 Definitions

Capitalized terms shall have the meaning ascribed to them in Exhibit A – Glossary of Terms or the NODES Market Rules, *Schedule 1 - Definitions and Interpretation* unless otherwise noted.

1.2 Headings and Table of Contents

The inclusion of headings and a table of contents in this Contract are for convenience of reference only and shall not affect the construction or interpretation of this Contract.

1.3 Number

In this Contract, unless the context otherwise requires, words importing the singular include the plural and vice versa.

1.4 Currency

Except where otherwise expressly provided, all amounts in this Contract are stated, and shall be paid, in the lawful currency of Canada.

1.5 Time

a) Unless otherwise specified, time periods within or following which any payment is to be made or act is to be done shall be calculated by including the day on which the period commences and including the day on which the period ends and by extending the period to the next Business Day following if the last day of the period is not a Business Day.

b) Any reference to time in this Contract is a reference to the 24-hour clock and with reference to the Platform, shall be read to the millisecond (HH:MM:SS:mm).

c) Daylights savings will not be observed for the purposes of this Contract and references to time are in Eastern Standard Time (EST) (UTC-5).

1.6 Laws and Regulations

Unless otherwise expressly stipulated, any reference in this Contract to a statute or to a regulation, code or rule promulgated under a statute or to any provision of a statute, regulation, code or rule or to any other Laws shall be a reference to the statute, regulation, code, rule, provision or Laws as amended, re-enacted or replaced from time to time.

1.7 Extended Meaning

Unless otherwise stated, any reference to the DSO's discretion in this Contract shall mean the DSO's sole and unfettered discretion.

1.8 Invalidity, unenforceability or inapplicability of provisions

a) If a provision is considered to be invalid or unenforceable, then the Party considering such provision to be invalid or unenforceable may propose, by notice in writing to the other Party, a replacement provision and the DSO and the Participant and, at the DSO's sole discretion, those Other Participants that are required by the DSO to participate, shall engage in good faith negotiations to replace such provision with a valid and enforceable provision, the economic effect of which substantially reflects that of the invalid or unenforceable provision which it replaces.

b) If a Party does not believe that a provision is invalid or unenforceable or if the negotiations set out in Section 1.8(a) are not successful and the Parties are unable to agree on all such issues and any amendments required to this Contract (the "**Replacement Provision**(s)") within thirty (30) days after either the giving of the notice under Section 1.8(a) or the occurrence of the event in Section 1.9(b), then the Replacement Provision(s) shall be determined in accordance with Section 11.7 (Class Arbitration).

c) The terms of this Contract shall be amended either:
   i. by the agreement of the Parties, where no award of an Arbitrator has been made pursuant to Section 11; or
   ii. by the Arbitrator in accordance with Section 11.7 (Class Arbitration).

1.9 Exhibits and Appendices

The following Exhibits and Appendices are attached to and form part of this Contract, which may be :

a) Exhibit A – Glossary of Terms
b) Exhibit B – Grid Performance Requirements
c) Appendix A – Participant Information
d) Appendix B – Contracted DER/As
e) Appendix C – Additional Terms (if applicable in the sole discretion of the DSO).

ARTICLE 2 – ELIGIBILITY TO PROJECT MARKET

2.1 Eligibility to Project Market

Eligibility to the Project Market is a designation by the DSO of a Participant and separately each of its Contracted DERs to be approved to be registered in the Platform and offer flexibility services to the DSO. This approval is made without liability and subject to the limitations within this contract.

For clarity, a Contracted DER may be ineligible for the Project Market subject to this Contract.

2.2 DSO Payment of Platform Fees for Eligible Participants and Contracted DERs

The Participant will pay such Platform membership fees and Platform transaction fees as are reasonably necessary to facilitate participation in the Project. Payment of Platform fees by the DSO shall not constitute a promise of payment or obligation of payment to a Participant.

2.3 DSO Management of Eligibility to Project Market

The DSO retains full and exclusive authority for the management and provision of eligibility to the Project Market. The DSO shall determine eligibility for the Project Market by each Operator, Contracted DER, including each Contributor DER, or any other asset or person at its sole and unfettered prerogative including, but not limited to, approving eligibility, declining eligibility, withdrawing eligibility, proclaiming conditions for attaining or retaining eligibility for the Participant or Participants as a class, proclaiming conditions for attaining or retaining eligibility for a Contracted DER or DERs as a class, or directing its partners to undertake any or all of the foregoing actions.

2.4 Each DER on Platform must be Eligible

Participant agrees that each DER and Contributor DER registered to it on the Platform must be designated as eligible by the DSO and that the Participant has an obligation to not conduct transactions related to DERs which are not designated as eligible by the DSO.

2.5 Each DER on Platform must be Contracted

Participant agrees that each DER and Contributor DER registered to it on the Platform must be a Contracted DER and that the Participant has an obligation not to conduct transactions on the Platform related to DERs which are not Contracted DERs.

ARTICLE 3 – REPRESENTATIONS

3.1 Representations and Warranties of the Participant

The Participant represents and warrants to the DSO as follows, which representations and warranties are given as of the Contract Date and shall continue to be true at all times during the Term:

a) To the best of its knowledge and belief, having made all due inquiry into the applicable requirements the Participant satisfies the eligibility requirements set out in Section 2.1.1 of the Rules and the Participant is not ineligible under Section 2.1.2 of the Rules (where reference to the Registrant shall be deemed to be a reference to the Participant for the purposes of this Section 3.1(a)).

b) This Contract has been duly authorized, executed and delivered by the Participant and is a valid and binding obligation of the Participant enforceable in accordance with its terms, except as such enforcement may be limited by bankruptcy, insolvency and other Laws affecting the rights of

creditors generally and except that equitable remedies may only be granted in the discretion of a court of competent jurisdiction.

c) The execution and delivery of this Contract by the Participant and the consummation of the transactions contemplated by this Contract will not result in the breach or violation of any of the provisions of, or constitute a default under, or conflict with or cause the termination, cancellation or acceleration of any material obligation of the Participant under:
   i. any contract or obligation to which the Participant is a party or by which it or its assets may be bound, except for such defaults or conflicts as to which requisite waivers or consents have been obtained and forwarded to the DSO;
   ii. the articles, by-laws or other constating documents or resolutions of the directors or shareholders of the Participant;
   iii. any judgment, decree, order or award of any Governmental Authority or arbitrator;
   iv. any licence, permit, approval, consent or authorization held by the Participant; or
   v. any Laws

   that could have a Material Adverse Effect on the Participant.

d) There are no actions, suits, proceedings, judgments, rulings or orders by or before any Governmental Authority or arbitrator, or, to the knowledge of the Participant, threatened against the Participant, that could have a Material Adverse Effect on the Participant.

e) All requirements for the Participant to make any filing, declaration or registration with, give any notice to or obtain any licence, permit, certificate, registration, authorization, consent or approval of, any Governmental Authority as a condition to entering into this Contract have been satisfied.

f) The Participant is in compliance with all Laws, other than acts of noncompliance which, individually or in the aggregate, would not have a Material Adverse Effect on the Participant.

g) The Participant is not a non-resident of Canada for the purposes of the Income Tax Act (ITA).

h) The Participant, or any third party engaged by the Participant for the purposes of fulfilling the Participant's obligations under this Contract, has all of the requisite resources, skill, experience, and qualifications to participate effectively and perform its obligations under this Contract in a professional and workmanlike manner, in accordance with generally recognized industry standards for similar services.

i) The Participant has not directly or indirectly engaged or attempted to engage in conduct (alone or with another person whose conduct the Participant is or reasonably ought to be aware of) which:
   i. exploits any element of the Project Market including by, without limitation, exploiting any gap or defect in the Rules or Contract;
   ii. circumvents any of the Rules or the Contract;
   iii. manipulates any functions or transactions of the Project Market; or
   iv. undermines through any means the ability of the DSO, NODES, or the IESO to carry out its powers, duties or functions under Laws or the Rules.

3.2 Representations and Warranties of the Participant regarding the Contracted DER(s)

The Participant represents and warrants to the DSO as follows, which representations and warranties shall be effective as of the Contract Date, and which representations and warranties, once effective, shall be true and correct for the Term for each Contracted DER, which necessarily includes each Contributor DER registered by the Participant in the Platform:

a) The information contained in Appendices A and B are true and correct.

b) It has User Rights for each Contracted DER.

c) To the best of its knowledge, having made all due inquiry into the applicable requirements that each Contracted DER (which for clarity includes each Contributor DER to a DERA) satisfies the eligibility requirements set out in Section 2.2.1 of the Rules and each Contracted DER is not ineligible under Section 2.2.2 of the Rules.

d) Each Contracted DER has been designed and built using good engineering & operating practices and meets all relevant requirements of the Distribution System Code, the Connection Contract (if applicable) and all other Laws, and further, that each Contracted DER has been designed, engineered and constructed such that it can operate in accordance with the requirements of this Contract.

e) It has made all reasonable inquiries into requirements to obtain any applicable approvals, including environmental assessments, required for each Contracted DER pursuant to all Laws.

f) All statements, specifications, data, confirmations, and information that have been set out in the Registration are complete and accurate in all material respects and are hereby restated and reaffirmed by the Participant as representations made to the DSO hereunder and there is no material information omitted from the Registration which makes the information in the Registration misleading or inaccurate.

g) Each Contracted DER is capable of operating and will operate within the applicable Grid Performance Requirements ("**GPR**"s) outlined in Exhibit B for all market-related activity.

h) It understands that in the event of under-delivery or contravention of GPRs, that it may be required by the DSO in its sole discretion to conduct Performance-Related Test Activations per the Rules and that eligibility of the Contracted DERs in testing may be suspended pending completion of the testing.

3.3 Covenants of the Participant

The Participant covenants as follows:

a) The Participant hereby agrees to be bound by and to comply with all of the provisions of the Rules, including but not limited to limitations of liability and grounds of termination therein, as

amended by the DSO from time-to-time and shall notify the DSO as soon as reasonably practicable should the Participant become aware of their contravention of any of the Rules.

b) The Participant shall at no time following the submission of the Registration, modify, vary, or amend in any material respect any of the features or specifications of any Contracted DER, or any aspect of a Contracted DER such that the information provided in the Registration or Appendix B is no longer correct or complete or would be contrary to any Warranties or Representations in this Contract, without obtaining the prior written consent of the DSO, which consent may be withheld by the DSO in its sole discretion.

c) In the event the Participant or the Owner of a Contributor DER has entered into an agreement with an electricity retailer with respect to the Contracted DER, the Participant shall have obtained from the electricity retailer a duly executed Electricity Retailer Waiver (as set out in the Market Eligibility Rules) in respect of the Contracted DER and shall have delivered a copy of such waiver to the DSO.

d) During the Term, the Participant is responsible for monitoring, reading and, where required, responding to all Notices sent by the DSO in accordance with Section 5.8 (Notices) hereunder and the Participant agrees that it shall access the Website and Platform as reasonably required in order to meet such obligation and under no circumstances will the DSO be responsible for a failure by the Participant to monitor, read and respond to Notices successfully sent by the DSO in accordance with Section 5.8 (Notices).

e) The Participant shall obtain and maintain or ensure a third party maintains insurance for each Contracted DER during the Term covering such risks and in such amount as a prudent owner or operator of a facility the same as or similar to the Contracted DER would maintain; and to provide evidence thereof to the DSO upon request; and to indemnify, defend and hold the DSO harmless in respect of any failure by it to do so.

f) The Participant shall assume all risk, liability and obligation and indemnify, defend and hold harmless the Indemnitees (as defined in section 10.1) in respect of all actions, causes of action, suits, proceedings, claims, demands, losses, damages, penalties, fines, costs, obligations and liabilities arising out of a discharge of any contaminant into the natural environment at or related to any Contracted DER and any fines or orders of any kind that may be levied or made in connection therewith pursuant to the Environmental Protection Act (Ontario), the Water Resources Act (Ontario), or the Dangerous Goods Transportation Act (Ontario), or other similar legislation whether federal or provincial except to the degree that such discharge shall have been due to the negligence of the Indemnitees.

g) The Participant shall comply, in all material respects, with all Laws required to perform or comply with its obligations under this Contract.

h) During the Project and until the termination of this Contract, it will promptly notify the DSO in writing of any material adverse change in the business or financial affairs of the Registrant or the existence of any circumstance that would make any representation or warranty of the Registrant untrue in any respect or constitute a breach of any covenant of the Registrant.

i) The Participant shall undertake payment of Cost Recovery Fees and Required Fees as set by the DSO under the Rules. Pursuant to section 5.11 of this Contract, Cost Recovery Fees and Required Fees are subject to dispute via Article 11 – Dispute Resolution. Unless disputed, payment of Cost Recovery Fees and Required Fees shall be made in an expeditious manner and the Participant shall send receipts or other proof of payment to the DSO.

j) The Participant shall provide to the DSO upon request by the DSO any written clarification, additional information, documentation, statements, or records relating to any Registration, DER, facility, Bid, or Offer, and other information relevant to the Project Market at any time ("Additional Information") within ten (10) business days.

3.4 Representations of the DSO

a) The DSO represents to the Participant and acknowledges that the Participant is relying on such representations in entering into this Contract, that this Contract has been duly authorized, executed and delivered by the DSO and is a valid legal and binding obligation of the DSO enforceable in accordance with its terms, except as such enforcement may be limited by bankruptcy, insolvency and other laws affecting the rights of creditors generally and except that equitable remedies may only be granted in the discretion of a court of competent jurisdiction.

b) The DSO makes no representations whatsoever as to the number or extent of any market activity that may be contracted or transacted with respect to the Contracted DER(s) within a Market Operation Period.

ARTICLE 4 – OUTAGE MANAGEMENT

4.1 Planned Outages

A Planned Outage is an Outage which is scheduled by a Contracted DER with sufficient lead time for the Participant to modify Market trading behaviour appropriately.

The Participant may choose and is encouraged to notify the DSO of any Planned Outages by submitting an Outage Notice by email unless the DSO has prescribed a function on the Website for Outage Notice.

Unless the NODES Market Rules, which for clarity will take precedence over the requirements (a) and (b) in this Section 4.1 require otherwise, the Participant must manage its activity on the Platform for the duration of the Planned Outage by:

a) In the case of ShortFlex orders, the Participant refraining from placing sell orders to the ShortFlex market and remove any existing unmatched offers within the duration of the Planned Outage.

b) In the case of LongFlex orders, the Participant communicating the duration of the Planned Outage in the comment field of a LongFlex response.

4.2 Forced Outages

A Forced Outage is an Outage which was not planned or which, by circumstance of severity or urgency of events, prevents the Participant from managing it as a Planned Outage. Any Outage affecting matched ShortFlex or LongFlex contracts concluded on the Platform is considered a Forced Outage.

a) The Participant shall notify the DSO of a Forced Outage by submitting an Outage Notice by email, unless the DSO has prescribed a function on the Website for Outage Notice, not less than forty-eight (48) hours prior to the start of the Forced Outage, and in the event the severity or urgency of the events leading to the Forced Outage prevents the Participant from submitting an Outage Notice prior to the start of the Forced Outage, the Participant shall submit an Outage Notice as soon as possible thereafter, and no later than twenty-four (24) hours following the start of the Forced Outage.

b) Following the conclusion of the Forced Outage, the Participant must immediately, and no later than twenty-four (24) hours following the conclusion of the Forced Outage, inform the DSO by email confirming the time that the Forced Outage concluded.

c) In addition to the Outage Notice submitted per Section 4.2(a) or the conclusion of a Forced Outage notice submitted per Section 4.2(b), the Participant must if requested by the DSO submit Additional Information regarding the events leading to or concluding the Forced Outage by email to the DSO within ten (10) Business Days of such request.

d) The DSO may request that the market access of a Participant's affected assets be suspended until it is satisfied that the conditions leading to the Forced Outage have been managed.

4.3 Failure to Provide Notice

Failure by the Participant to provide notice of Outages in accordance with Section 4.2 shall be a Participant Default and in addition to the rights and remedies of the DSO herein, the DSO may, in its sole discretion, terminate the eligibility of the Participant or its Affiliate(s).

ARTICLE 5 – CONTRACT OPERATION AND ADMINISTRATION

5.1 Amendments to Appendices

The Parties may, without formal amendment to these Terms and Conditions, amend the Appendices from time to time by written agreement between them. An updated Appendix becomes effective when it is dated and signed by all parties.

5.2 Participant Representatives

The Participant shall appoint two delegates (each a "**Delegate**") during the Registration process, each of whom shall be duly authorized to act on behalf of the Participant, and with whom the DSO may consult when necessary, and whose instructions, requests, and decisions, provided the same are in writing and

sent from the Registered Email by the Delegate or submitted via the Website or Platform, shall be binding on the Participant as to all matters pertaining to the administration of this Contract. The Participant shall notify the DSO in writing of any change in the identity of a Delegate or a Delegate's contact information within one (1) Business Day of such change.

5.3 Confirming Eligibility of Additional Contracted DERs

For each Contracted DER or Contributor DER for which the Registration was not completed prior to execution of this Contract, such as in the case of Future DERs or DER/Contributor DER additions the participant must provide the information required in Sections 3 and 7 of the Rules.

In the case of an additional Direct DER, the DSO may determine that Appendix B must be updated as a condition for eligibility of the Direct DER.

In the case of a Contributor DER addition, the Participant shall follow Section 7 of the Rules. The DSO may determine that Appendix B must be updated as a condition for eligibility of any or all of the Contributor DER additions.

5.4 Record Retention

The Participant and the DSO shall both keep complete and accurate records and all other data required by either of them for the purpose of proper administration of this Contract. All such records shall be maintained as required by applicable Laws but for no less than for seven (7) years after the creation of the record or data.

5.5 Audit Rights

The DSO reserves the right for it, or any of its Representatives, to verify and audit all technical, financial, and operational data and systems of any Contracted DER which relate to its participation in the Project, the Participant and any other Person as required by the DSO in connection with such verification and audit. Such verification and audit methodologies will be determined by the DSO or its Representatives and may include the verification and audit of real-time, and baseline measurements for Demand Response Resources as well as visits or inspections to the Site, as required by the DSO in connection with such verification and audit.

5.6 Inspection of the DER

The DSO and its Representatives shall, at all times upon two (2) Business Days prior notice, at any time after the Contract Date, have access to the Contracted DER and every part thereof, and all relevant records during regular business hours and the Participant shall cause all personnel operating and managing the Contracted DER to furnish the DSO or its Representatives with all reasonable assistance in inspecting the Contracted DER (including the right to be provided with copies of any and all written records and downloads of any and all electronic records as reasonably required) for the purpose of ascertaining compliance with this Contract; provided that such access and assistance shall be carried out in accordance with and subject to the reasonable safety and security requirements of the Participant and all personnel operating and managing the Contracted DER, as applicable, and shall minimize any interference with the operation of the Contracted DER. The Participant shall ensure that any confidentiality agreements or arrangements between it and any third party (including any subcontractor, supplier or other supplier of

goods or services to the Participant) shall not have the effect of preventing, impairing or delaying any disclosure or access to or by the DSO or any of its Representatives as contemplated in this Section 5.6.

5.7 Inspection not waiver

Failure by the DSO to inspect the Contracted DER or any part thereof under Section 5.6 (Inspection of DER), or to exercise its audit rights under Section 5.5 (Audit Rights), shall not constitute a waiver of any of the rights of the DSO hereunder. An inspection or audit not followed by a notice of a Participant Default shall not constitute or be deemed to constitute a waiver of any Participant Default, nor shall it constitute or be deemed to constitute an acknowledgement that there has been or will be compliance by the Participant with this Contract. In no event will any inspection, audit, or determination of eligibility by the DSO hereunder be a representation that there has been compliance with Laws.

5.8 Notices

a) All required Notices shall be sent to the Participant using the contact information that is maintained in Appendix A, and the Participant acknowledges and agrees that it is wholly responsible for keeping its contact information up to date with the DSO and on the Platform and monitoring and responding to Notices, and the DSO shall not be liable to the Participant in the event the Participant fails to update its contact information, fails to take any necessary action, or fails to respond to a Notice delivered by the DSO hereunder.

b) All Notices shall be sent to the DSO using the DSO Coordinates unless otherwise instructed by the DSO.

c) The Parties acknowledge and agree that the sending and receipt of electronic Notices will be deemed to be simultaneous absent any disruption in telecommunication services.

d) Notwithstanding the foregoing:
   i. the Participant may endeavour to provide Notices pertaining to a Forced Outage first by telephone and followed up with a written Notice by email; and

   ii. Notices pertaining to a DSO Default or a Participant Default shall be provided to the defaulting Party by the non-defaulting Party by email, and if then requested by the other party, by registered mail.

5.9 Meter Access, Data Collection, and Data Sharing

a) The Participant consents to the DSO accessing the Meter of each Contracted DER remotely or having one of its Representatives attend the Site to access the Meter during the Market Operation Period.

b) The Participant consents to the DSO sharing Metering and other data identified in this Section 5.9 with parties as deemed necessary in the DSO's discretion for the purposes of settlement and verification of any project-related activity or undertaking.

c) The Participant consents to the DSO collecting and utilizing all data the DSO considers necessary in its sole and unfettered discretion from each Contracted DER for the purposes of operational visibility, performance validation, or project-related undertakings. This information shall not be considered confidential. This information includes but is not limited to, as available:

   i. Aggregated telemetry or measurements from each DERA,
   ii. Device-level telemetry or measurements for each Contracted DER,
   iii. All smart meter data associated with each Contracted DER, site, or facility,
   iv. IESO revenue-grade meter data (where existing),
   v. Baseline information including participant-submitted baselines and related calculations,
   vi. Historical demand at each Contracted DER site or facility,
   vii. Forecasted demand at each Contracted DER site or facility, and
   viii. Information related to the Grid Performance Requirements.

d) Where information deemed necessary by the DSO per this Section 5.9 is not available in the DSO's metering or other systems, the Participant shall furnish the DSO with access to the information in the frequency and format specified by the DSO.

5.10 No Payment for DER Services Under Contract

The Participant shall have no entitlement under this Contract to receive compensation for, including but not limited to, flexibility, energy, or availability services provided under contracts concluded on the Platform.

5.11 Exceptional Payment Obligations

The DSO may in its sole discretion request cost recovery fees ("**Cost Recovery Fees**") from a Participant payable to the DSO for procedures or outlays outside of the expected costs of administrating the Registration process.

The DSO may in its sole discretion nominate payments required to third parties as a required fee ("**Required Fee**") under this section. This nomination may be made whether or not the DSO is an intermediary or party to the payment or service. Without limiting the foregoing, this nomination specifically applies to technical analysis such as a Connection Impact Assessment.

The DSO will take commercially reasonable steps to achieve mutual written agreement between the Participant and the DSO on Cost Recovery Fees and Required Fees.

If the DSO is confident that the Cost Recovery Fee or Required Fee is reasonable but cannot achieve mutual agreement, the DSO may request or nominate the Cost Recovery Fee or Required Fee. The Participant may dispute Cost Recovery Fees or Required Fees via Article 11 – Dispute Resolution.

Nothing in this section prevents the DSO from waiving or otherwise cancelling a previously requested Cost Recovery Fee or Required Fee. The DSO shall return any payments made toward the waived or cancelled Cost Recovery Fee or Required Fee.

ARTICLE 6 – EVENTS OF DEFAULT

6.1 Participant Events of Default

Each of the following will constitute an event of default by the Participant (each, a "**Participant Default**"):

a) The Participant fails to follow or adhere to any part of the Rules, as amended by the DSO from time-to-time, if such failure is not remedied within five (5) days after written notice of such failure from the DSO.

b) The Participant fails to perform any covenant or obligation set forth in this Contract (except to the extent constituting a separate Participant Default) if such failure is not remedied within fifteen (15) days after written notice of such failure from the DSO.

c) The Participant fails to complete the Registration for itself or any of its DER on the platform if such failure is not remedied within fifteen (15) days after written notice of such failure from the DSO.

d) The Participant fails two (2) successive Test Activations per the Rules.

e) The Participant fails to conduct Performance-Related Test Activations per the Rules, as required by the DSO.

f) A Contracted DER fails to operate within applicable Grid Performance Requirements.

g) The Participant or the Contracted DER fails to achieve, or ceases to maintain, membership on the Platform.

h) The Participant or the Contracted DER fails to satisfy, or ceases to satisfy, the eligibility and other requirements set out in Section 2.1.1 and Section 2.2.1 of the Rules, or the Participant or the Contracted DER are ineligible under Section 2.1.2 and 2.2.2 of the Rules, and such failure or cessation is not remedied within fifteen (15) days after written notice of such failure from the DSO.

i) Subject to the completion of any fee dispute resolution process under this Contract, the Participant fails to pay such required fees as required under this Contract or the Rules within the lesser of: sixty (60) days of the notice or three (3) business days prior to the final payment date of a third party invoice in the case of a required Fee.

j) The Participant assigns this Contract to another Person without the consent of the DSO pursuant to Section 12.5 (Assignment).

k) The Participant fails or ceases to hold a valid licence, permit, certificate, registration, authorization, consent or approval issued by a Governmental Authority where such failure or cessation results in a Material Adverse Effect on the Participant is not remedied within fifteen (15) days after such event.

l) The Participant commits any act of fraud in relation to its Registration, the DSO, this Contract, or the Contracted DER.

m) Any representation made by the Participant in this Contract is not true or correct in any material respect when made, or any continuing representation is not true or correct, and in either case, if capable of cure, is not made true or correct in all material respects within fifteen (15) days after receipt by the Participant of written notice of such fact from the DSO.

n) An effective resolution is passed or documents are filed in an office of public record in respect of, or a judgment or order is issued by a court of competent jurisdiction ordering, the dissolution, termination of existence, liquidation or winding up of the Participant, unless such filed documents are immediately revoked or otherwise rendered inapplicable.

o) The Participant amalgamates with, or merges with or into, or transfers all or substantially all of its assets to, another Person.

p) By decree, judgment or order of a Governmental Authority, the Participant is adjudicated bankrupt or insolvent or any substantial part of the Participant's property is sequestered, and such decree continues undischarged and un-stayed for a period of thirty (30) Business Days after the entry thereof. A petition, proceeding or filing is made against the Participant seeking to have the Participant declared bankrupt or insolvent, or seeking adjustment or composition of any of their respective debts pursuant to the provisions of any Insolvency Legislation, and such petition, proceeding or filing is not dismissed or withdrawn within thirty (30) Business Days.

q) The Participant dissolves, winds up or liquidates, or makes an assignment for the benefit of its creditors generally under any Insolvency Legislation or consents to the appointment of a receiver, manager, receiver-manager, monitor, trustee in bankruptcy, or liquidator for all or part of its property or files a petition or proposal to declare bankruptcy or to reorganize pursuant to the provision of any Insolvency Legislation.

r) The Participant has made an amendment to the Contracted DER that has not first been consented to by the DSO in accordance with Section 3.3(b).

s) The Participant informs the DSO in writing of its intention to cease Participation in the Project Market and Terminate this contract.

t) The Participant fails to provide the DSO Additional Information within ten (10) business days of a request per 3.3.(j).

u) The Participant fails to provide the DSO information in the format or frequency as requested per 5.9.(d),or otherwise provide notice to the DSO that the requested information is unavailable given limitations on the Participant’s rights of access, within fifteen (15) business days after written notice of such failure by the DSO.

6.2 Remedies of the DSO

In addition to all other rights and remedies it may have under this Contract, and all other rights and remedies it may have at law and/or in equity, if any Participant Default occurs and is continuing, then upon written notice to the Participant, the DSO may, but shall not be obliged to:

a) Suspend, or request its Partners suspend, any or all payments owing to the Participant until such Participant Default has been remedied to the satisfaction of the DSO, in its sole discretion, and/or

b) Suspend, or request its Partners suspend any or all of the Participant's Contracted DERs from activity on the platform, and/or

c) following the expiry of any cure period, terminate this Contract, and in the event the DSO does not pursue either such remedy, Section 5.7 (Inspection not waiver) shall apply.

6.3 Immediate Termination

Notwithstanding Section 6.2 (Remedies of the DSO):

a) upon the occurrence of a Participant Default referred to in Section 6.1 (h), (k), (l), (m), (n), (o), or (p), this Contract shall automatically terminate without notice, act or formality, effective immediately before the occurrence of such Participant Default;

b) upon the occurrence of a Participant Default referred to in Section 6.1 (a), (b), (c), (d), (e), (f), (g), (i), (j), (q), (r), (s), (t), or (u), the DSO may, in its sole and unfettered discretion, terminate this Contract without notice, act or formality, effective immediately.

6.4 DSO Events of Default

If the DSO fails to perform its duties required per the Rules or this Contract and such failure is not remedied within thirty (30) days after written notice of such failure from the Participant, then such failure shall constitute an event of default by the DSO (a "**DSO Default**").

6.5 Remedies of the Participant

If any DSO Default occurs and is continuing, then, upon written notice to the DSO, the Participant may terminate this Contract effective as of the date such written notice is given. Notwithstanding the foregoing, the DSO shall be responsible for payment of amounts accruing under this Contract, if any, only up to and including the date such written notice under Section 6.4 (DSO Events of Default) is received by the DSO.

6.6 Remedies Non-exclusive

The termination of this Contract by either Party and the payment of all amounts then due and owing to the other Party as expressly provided in this Contract shall not limit, waive or extinguish in any way the recourse of either Party to any remedies available to it in relation to such termination at law, in equity or

otherwise, nor shall such termination affect any rights that the Indemnitees may have pursuant to any indemnity given under this Contract.

ARTICLE 7 – FORCE MAJEURE

7.1 Force Majeure event

Subject to the exclusions described in Sections 7.2 (Exclusions) and 7.3 (COVID-19 pandemic), "**Force Majeure**" means any act, event, cause or condition that prevents a Party from performing its obligations (other than payment obligations) hereunder, but only if and to the extent such event or circumstance could not reasonably have been anticipated as at the Contract Date and is beyond the affected Party's reasonable control, and shall include:

a) acts of God, including extreme wind, ice, lightning or other storms, earthquakes, tornadoes, hurricanes, cyclones, landslides, drought, floods and washouts;
b) fires or explosions;
c) local, regional or national states of emergency;
d) strikes and other labour disputes (other than legal strikes or labour disputes by employees of such Party, or a third party contractor of such Party, unless, in either such case such strikes or other labour disputes are the result or part of a general industry strike or labour dispute);
e) delays or disruptions in fuel supply resulting from a Force Majeure event (whether such event is in respect of a Party or a third party);
f) civil disobedience or disturbances, war (whether declared or not), acts of sabotage, blockades, insurrections, terrorism, revolution, riots, pandemics or epidemics;
g) an order, judgment, legislation, ruling or direction by Governmental Authorities restraining a Party, provided that, in the event such order, judgment or ruling pertains to the affected Party and is not of general application, the affected Party has not applied for or assisted in the application for and has used commercially reasonable efforts to oppose said order, judgment, legislation, ruling or direction;
h) a planned or unplanned Outage affecting all or part of the DSO's Distribution System; and
i) a Forced Outage affecting the Contracted DER that results directly from, or is scheduled or planned directly as a consequence of, an event of Force Majeure.

7.2 Exclusions

No act, event, cause or condition shall be considered to be an event of Force Majeure:

a) a Planned Outage or a Forced Outage, but excluding a Forced Outage described in Section 7.1(i);
b) if and to the extent the Party seeking to invoke Force Majeure has caused or contributed to the applicable act, event, cause or condition by its fault or negligence or has failed to use commercially reasonable efforts to prevent or remedy such act, event, cause or condition (which commercially reasonable efforts shall, with respect to COVID-19, include implementing the recommended health and safety guidelines to prevent the spread of the COVID-19 among its Representatives while at the Site or at the Participant's place of business), and, so far as possible and within a reasonable time period, remove it (except in the case of strikes, lockouts and other labour disturbances, the settlement of which shall be wholly within the discretion of the Party involved);

c) if the act, event, cause or condition is the result of a breach, by the Party seeking to invoke Force Majeure, of a permit or approval issued by a Governmental Authority or of any applicable Laws;
d) if the act, event, cause or condition was caused by a lack of funds or other financial cause; or
e) if the act, event, cause or condition is the result of a breach or alleged breach of contract or other obligation between the Party seeking to invoke Force Majeure and any Person (other than the other Party), regardless of whether such breach or alleged breach was caused by the Party seeking to invoke Force Majeure or was caused by such other Person.

7.3 COVID-19 Pandemic

Notwithstanding Section 7.1(f) (Force Majeure event), the Parties agree that the COVID-19 pandemic does not constitute Force Majeure for the purposes of this Contract, provided however that an order, judgment, legislation, ruling or direction by a Governmental Authority directly related to COVID-19, which effect is to restrain a Party, including but not limited to the operation of the Contracted DER, constitutes Force Majeure for the purposes of this Contract.

7.4 Invoking Force Majeure

a) A Party shall be deemed to have invoked Force Majeure with effect from the commencement of the event or circumstances constituting Force Majeure when that Party gives to the other Party prompt Notice in accordance with Section 5.8 (Notices), provided that such Notice shall be given within five (5) Business Days of the later of (i) the commencement of the event or circumstances constituting Force Majeure or (ii) the date that the Party invoking Force Majeure knew or ought to have known that the event or circumstances constituting Force Majeure could have a Material Adverse Effect on the development or operation of the Contracted DER. If the effect of the Force Majeure and full particulars of the cause thereof cannot be reasonably determined within such five (5) Business Day period, the Party invoking Force Majeure shall be allowed a further ten (10) Business Days (or such longer period as the Parties may agree in writing) to provide such full particulars in substantially the prescribed form to the other Party.

b) The Party invoking Force Majeure shall use commercially reasonable efforts to remedy the situation and remove, so far as possible and with reasonable dispatch, the Force Majeure, but settlement of strikes, lockouts and other labour disturbances shall be wholly within the discretion of the Party involved. Upon the request of the DSO, the Participant shall: (i) provide to the DSO information and documentation confirming to the satisfaction of the DSO, acting reasonably, that such commercially reasonable efforts were used, and (ii) represent and warrant that such information and documentation are true, complete and accurate in all material respects and that no material information is omitted that would make such information or documentation misleading or inaccurate.

c) The Party invoking Force Majeure shall give prompt written notice of the termination of the event of Force Majeure, provided that such notice shall be given within three (3) Business Days of the termination of the event or circumstances constituting Force Majeure.

d) The Participant is required to update the Bids/Offers for the Contracted DER to reflect an event of Force Majeure as soon as possible after the start of the Force Majeure event and no later than twenty-four (24) hours following the start of the Force Majeure event.

   i. The Participant is also required to follow any requirements of the Platform or NODES Rules in regard to managing performance or actions in the Market in the case of Force Majeure.

7.5 Effect of invoking Force Majeure

a) If either Party is unable to satisfy any of its obligations hereunder due to Force Majeure, provided that the Party makes commercially reasonable efforts to avoid, or if unavoidable, to correct the reason for such delay or failure and gives the other Party prompt notice of such delay or failure, then such Party shall be excused and relieved from its obligation to satisfy such obligation and its failure to do so will not constitute an event of default, provided however that a Party shall not be relieved from its obligation to make a payment of any amounts that were due and owing before the occurrence of the Force Majeure or that otherwise may become due and payable during any period of Force Majeure.

b) Notwithstanding any other provision of this Contract, an event of Force Majeure shall not serve to extend the Contract or any Market Operation Period.

ARTICLE 8 – TERM AND TERMINATION

8.1 Term

This Contract shall become effective upon the date hereof and shall continue for the duration of all Market Operation Periods following the effective date. If the Market is not extended past the duration of the Project, this contract shall expire at 23:59 hours (EDT) on March 31, 2026.

The period between and including the Contract Date and the expiry date being the "**Term**", subject to earlier termination in accordance with the terms of this Contract.

8.2 Project Termination

Subject to Section 10.3(c), in addition to the termination rights of the Parties for a Participant Default or DSO Default, this Contract may be terminated by the DSO in its sole discretion if it determines that the Project has been cancelled by the IESO and/or OEB, or, for reasons that are beyond the control of the DSO, the Platform ceases to operate in a manner such that the Project Market can be executed fairly and accurately, and in each such circumstance, the DSO and the Participant shall each be relieved of their respective obligations hereunder.

ARTICLE 9 – CONFIDENTIALITY

9.1 Disclosure of Confidential Information

From the date of this Contract and following the expiry of the Term, and in respect of the Confidentiality provisions in the Rules, each of the Parties shall keep confidential and secure and shall not disclose Confidential Information except as follows:

a) The Receiving Party may disclose Confidential Information to its Representatives who need to know Confidential Information for the purpose of assisting the Receiving Party in complying with its obligations under this Contract. The Receiving Party shall inform its Representatives of the confidentiality of Confidential Information and shall be responsible for any breach of this Article 9 (Confidentiality) by any of its Representatives.

b) Where the Participant is the Receiving Party, the Participant may disclose Confidential Information to any lender, prospective lender or investor and its advisors, to the extent necessary, for securing financing for the Contracted DER, provided that any such lender, prospective lender or investor has been informed of the Participant's confidentiality obligations hereunder and such lender, prospective lender or investor has covenanted in favour of the DSO to hold such Confidential Information confidential on terms substantially similar to this Article 9 (Confidentiality).

c) Any information obtained by the DSO, whether directly or indirectly, including via the Website, Platform, or other means, will as necessary be disclosed on a confidential basis to the IESO, OEB, Federal or Provincial Government entities, the DSO's counsel, consultants and any other advisers retained for the purpose of administration of the Project Market or the Project. This Section 9.1 shall not limit the DSO's granted rights and abilities within this Contract, the Eligibility Rules, or otherwise, to share information with IESO and/or OEB and Project Partners as necessary.

d) Information provided by a Participant in relation to a DER including location, exact or approximate statistics of trading activity on the Platform, status within the Project Market, and name of Participant, may be disclosed by the DSO on the Website or otherwise, and such disclosure may be made on an individual basis, or on an aggregated basis with information provided by other participants notwithstanding any assertion of confidentiality.

9.2 Privacy Legislation

The Participant and the DSO acknowledge and agree that the DSO, the IESO and the OEB, as sponsors of the Project, and their respective Representatives are subject to the privacy legislation including FIPPA/MFIPPA, and that the privacy legislation applies to and governs all recorded information in any form or medium that is provided by the DSO, the IESO, the OEB or its respective Representatives to the Participant, or provided by the Participant to the DSO or its Representatives for the purposes of this Contract, or created by the Participant in the performance of this Contract, and that is in the custody or control of the DSO (the "**Privacy Legislation Records**"), and may require the disclosure of such Privacy Legislation Records to third parties upon formal request. To the extent that the DSO, the IESO, or other

Project Partners must comply with disclosure obligations under the privacy legislation, the Participant agrees:

a) to keep the Privacy Legislation Records in its possession secure;
b) to provide the Privacy Legislation Records to the DSO within seven (7) calendar days of being directed to do so by the DSO for any reason under the Privacy Legislation, including an access request or privacy issue; and
c) to implement other specific security measures that in the reasonable opinion of the DSO would improve the adequacy and effectiveness of the Participant's measures to ensure, for the purposes of the Privacy Legislation, the security and integrity of the Privacy Legislation Records held in the Participant's possession.

ARTICLE 10 - INDEMNIFICATION AND LIABILITY

10.1 Indemnification

The Participant shall indemnify and recognize the following parties as Indemnitees for purpose of this contract: Essex Powerlines Corporation and all entities in its group of companies -namely Essex Power Corporation, Utilismart Corporation, Essex Energy Corporation and all others as appropriate-, NODES AS, IESO, and the OEB (the "**Indemnities**").

In addition to the indemnities provided by the Participant in Section 3.3(e) and Section 3.3(f), the Participant shall indemnify, defend and hold the Indemnitees harmless from and against any and all Claims, demands, suits, losses, damages, liabilities, penalties, obligations, payments, costs and expenses and accrued interest thereon (including reasonable legal fees in connection therewith) (each, an "**Indemnifiable Loss**") asserted against or suffered by the Indemnitees or any of them relating to, in connection with, resulting from, or arising out of (i) any occurrence or event relating to the Contracted DER, howsoever occurring, and including any occurrence or event arising in connection with the operation of the Contracted DER, and (ii) any breach by the Participant of any representations, warranties or covenants contained in this Contract.

EPLC will defend and hold harmless and fully indemnify the Participant from and against all losses incurred by the Participant to the extent arising from or out of the following: (i) any claim for any injury to or death of any person or loss or damage to property to the extent arising out of the negligence or willful misconduct of EPLC or any of its representatives; (ii) EPLC's violation of applicable Laws; (iii) EPLC's breach of any terms of this Contract. EPLC will not be obligated to indemnify Participant for any losses to the extent that such losses were caused by the negligence or wilful misconduct of Participant or any of its representatives.

10.2 Defence of Claims

a) Promptly after receipt by the Indemnitees of any third party Claim or notice of the commencement of any action, administrative or legal proceeding, or investigation as to which the indemnity provided for in this Contract may apply, including without limitation Sections 3.3(e) and Section 3.3(f) and Article 10 , the DSO shall notify the Participant in writing of such fact. The Participant shall assume the defence thereof with counsel designated by the Participant and

satisfactory to the affected Indemnitees, acting reasonably; provided, however, that, if the defendants in any such action include both the Indemnitees and the Participant and the Indemnitees shall have reasonably concluded that there may be legal defences available to them which are different from or additional to, or inconsistent with, those available to the Participant, the Indemnitees shall have the right to select separate counsel satisfactory to the Participant acting reasonably (at no additional cost to the Indemnitees) to participate in the defence of such action on behalf of the Indemnitees. The Participant shall promptly confirm that it is assuming the defence of the Indemnitees by providing written notice to the DSO. Such notice shall be provided no later than five (5) Business Days prior to the deadline for responding to any Claim relating to any Indemnifiable Loss.

b) Should any of the Indemnitees be entitled to indemnification under Section 10.1 as a result of a Claim by a third party, and the Participant fails to assume the defence of such Claim (which failure shall be assumed if the Participant fails to provide the notice prescribed by Section 13.2(a)), the Indemnitees shall, at the expense of the Participant, contest (or, with the prior written consent of the Participant, settle) such Claim, provided that no such contest need be made and settlement or full payment of any such Claim may be made without consent of the Participant (with the Participant remaining obligated to indemnify and defend the Indemnitees under Section 10.1), if, in the written opinion of an independent third party counsel chosen by the DSO, such Claim is meritorious.

10.3 Limitations of liability

Notwithstanding anything contained herein to the contrary:

a) Neither Party will be liable under this Contract or under any cause of action relating to the subject matter of this Contract for any special, indirect, incidental, punitive, exemplary or consequential damages, including loss of profits, loss of use of any property or Claims of customers or contractors of the Parties for any such damages;

b) Subject to Section 8.2 (Termination), the DSO shall not be liable under this Contract or under any cause of action relating to the complete or partial shutdown of the Platform for any reason during the Term; and

c) The DSO shall not be liable under this Contract or under any cause of action relating to a failure to meet its obligations under this Contract due to the discontinuance of funding by the Sponsors of the Project.

10.4 IESO Not Liable

In addition to other waivers of liability, the Participant agrees that the IESO shall not be liable for any Claims, demands, suits, losses, damages, liabilities, penalties, obligations, payments, costs and expenses and accrued interest thereon (including reasonable legal fees in connection therewith) relating to, in connection with, resulting from, or arising out of this Contract, including without limitation: (i) any

occurrence or event relating to the Contracted DER, howsoever occurring, and including any occurrence or event arising in connection with the operation of the Contracted DER, (ii) any breach by the Participant or the DSO of any representations, warranties or covenants contained in this Contract, (iii) participation by the Participant in the Project Market in any manner including Registration, (iv) any activity related to the Project.

ARTICLE 11 – DISPUTE RESOLUTION

11.1 Informal Dispute Resolution

If either Party considers that any dispute has arisen under or in connection with this Contract that the Parties cannot resolve, then such Party may deliver a notice to the other Party describing the nature and the particulars of such dispute. Within twenty (20) Business Days following delivery of such notice to the other Party, a senior executive of the Participant shall meet with a manager of the DSO, either in person or by telephone (the "**Senior Conference**"), to attempt to resolve the dispute. Each Party shall be prepared to propose a solution to the dispute. If following the Senior Conference the dispute is not resolved and the Contract remains in force, the dispute shall be settled by arbitration pursuant to this Article 11.

11.2 Arbitration

Subject to Laws and in accordance with the provisions of this Article, any and all differences, disputes, claims or controversies arising out of or in any way connected with this Contract, whether arising before or after the expiration or termination of this Contract, (including any dispute as to whether an issue is arbitrable) shall be resolved by arbitration before a single arbitrator (the "**Arbitrator**") pursuant to the Arbitration Act and otherwise in accordance with the laws of the Province of Ontario.

11.3 Appointment and Powers of Arbitrator

A Party desiring arbitration hereunder shall give written notice of arbitration to the other Party containing a concise description of the matter submitted for arbitration ("**Notice of Arbitration**"). If the Parties fail to jointly appoint an Arbitrator within twenty (20) days thereafter, an Arbitrator shall be designated by a judge of the Ontario Superior Court of Justice upon application by either Party. The Arbitrator may determine all questions of law, fact and jurisdiction with respect to the dispute or the arbitration (including questions as to whether a dispute is arbitrable) and all matters of procedure relating to the arbitration. The Arbitrator may grant legal and equitable relief (including injunctive relief), award costs (including legal fees and the costs of the arbitration), and award interest.

11.4 Arbitration Procedure

The arbitration shall be conducted in English in the City of Windsor or other city as the Arbitrator may decide reasonable at such place therein and time as the Arbitrator may fix and, failing agreement thereto by the Parties, in accordance with such procedures as the Arbitrator shall determine, in accordance with the principles of natural justice. The arbitration and all matters arising directly or indirectly therefrom shall be kept strictly confidential by the Parties and shall not be disclosed to any third party except as may be compelled by law.

11.5 Arbitrator's Decision and Appeal

The Arbitrator's written decision shall be delivered to each of the Parties within sixty (60) days following the conclusion of the arbitration hearing. The costs of any arbitration hereunder shall be borne by the Parties in the manner specified by the Arbitrator in his or her decision. The decision of the Arbitrator shall be final and binding upon the Parties in respect of all mailers relating to the arbitration, the conduct of the Parties during the proceedings and the final determination of the issues in the arbitration. There shall be no appeal from the decision of the Arbitrator to any court, except on the grounds that the conduct of the Arbitrator, or the decision itself, violated the provisions of the Arbitration Act, or solely on a question of law as provided for in the Arbitration Act. Judgment upon any award rendered by the Arbitrator may be entered in any court having jurisdiction thereof.

11.6 Preclusion of Actions

Submission to arbitration under this Section is intended by the Parties to preclude any action in matters which may be arbitrated hereunder, save and except for enforcement of any arbitral award hereunder.

11.7 Class Arbitration

Notwithstanding anything contained in Section 11.2 to, and including, Section 11.6, if in the sole discretion of the DSO, a matter which has been or is to be referred to arbitration under the Arbitration Act under this Contract then the DSO may, by issuing a Notice of Arbitration to the Participant and the other participants (referred to collectively as the "**Participant Class**"), require that the Participant Class participate by way mandatory multi-party arbitration in the issues set out in the said Notice of Arbitration before one Arbitrator in one arbitral hearing whose decision(s) will bind the DSO and the Participant Class served with such notice, whether or not they participated in such arbitration, subject to the following:

a. This mandatory multiparty arbitration between DSO and the Participant Class shall be conducted in accordance with this Article 11 subject only to such changes as may be necessary to deal with the fact this is to be a multi-party arbitration or as may be directed by the Arbitrator then appointed.
b. If the matter in dispute relates to the alleged invalidity, inapplicability or unenforceability of any provision of this Contract or the disappearance or inability to calculate or determine any index, price or other quantum referred to in this Contract (each, an "**Invalid Provision**"), then the DSO shall, acting in good faith, propose Replacement Provision(s) to the Arbitrator, which the Arbitrator may choose to accept as a valid, applicable and enforceable replacement for the Invalid Provision(s) in question, or reject the proposed Replacement Provisions, in which case the Arbitrator shall provide the Replacement Provisions, the economic effect of which comes as close as possible to that of the Invalid Provision.
c. The terms of this Contract shall be deemed to be amended by the award of the Arbitrator from and after such date as may be determined by the Arbitrator.

ARTICLE 12 – MISCELLANEOUS

12.1 Applicability of Rules

In the event of any conflict or inconsistency with the Rules and the terms of this Contract, this Contract shall govern to the extent of such conflict or inconsistency. The Participant acknowledges and agrees that the Rules may be amended by the DSO from time to time in accordance with the Rules.

12.2 Entire Eligibility Agreement

The Rules, the Terms and Conditions, each Appendix, and all Exhibits entered into from time to time during the Term, all as may be amended from time to time, together constitute the entire agreement between the Parties pertaining to the Participant's eligibility to the Project. There are no covenants, promises, warranties, representations, conditions, understandings or other agreements, oral or written, express, implied or collateral between the Parties in connection with the subject matter of this Contract except as specifically set forth in this Contract and any documents required to be delivered pursuant to this Contract.

12.3 Survival

The provisions of Article 9 (Confidentiality), Article 10 (Indemnification and Liability), Article 11 (Dispute Resolution) and 5.4 (Record Retention), 5.5 (Audit Rights), 5.6 (Inspection of DER), 6.6 (Remedies non-exclusive), and 12.9 (Governing Law) shall survive the expiration of the Term or earlier termination of this Contract. The expiration of the Term or termination of this Contract shall not affect or prejudice any rights or obligations that have accrued or arisen under this Contract prior to the time of expiration or termination and such rights and obligations shall survive the expiration of the Term or the termination of this Contract for a period of time equal to the applicable statute of limitations.

12.4 Amendment, Waiver

Except as expressly provided in this Contract, no amendment or waiver of any provision of this Contract shall be binding unless executed in writing by the Party to be bound thereby. No waiver of any provision of this Contract shall constitute a waiver of any other provision nor shall it constitute a continuing waiver or operate as a waiver of, or estoppel with respect to, any subsequent failure to comply, unless otherwise expressly provided.

12.5 Assignment

a. The Participant may not assign this Contract nor any of the rights, interests or obligations assigned to it under this Contract to another party without the consent of the DSO in writing, acting in its sole discretion and any new party shall enter into an assumption agreement, acceptable to the DSO.
b. The DSO may assign this Contract without consent to any Person, provided that prior written notice of such assignment and the identity and contact information of the assignee have been provided to the Participant. Upon any such assignment, the DSO shall remain liable for any obligations of the assignee under this Contract in the event of default by such assignee under this Contract, provided that notice of such default by the assignee has been delivered to the DSO by

the Participant and the DSO has been given a reasonable opportunity to cure such default following the receipt of such notice, if curable.

12.6 Successors and assigns

All of the covenants and agreements in this Contract shall be binding upon the Parties and their respective successors and permitted assigns and shall inure to the benefit of and be enforceable by the Parties and their respective successors and permitted assigns.

12.7 Further assurances

Each of the Parties shall from time to time hereafter and upon any reasonable request of the other, execute and deliver, make or cause to be made all such further acts, deeds, assurances and things as may be required or necessary to more effectually implement and carry out the true intent and meaning of this Contract.

12.8 Severability

If any term or provision of this Contract is found to be invalid, illegal or unenforceable in accordance with Article 11 (Dispute Resolution), such invalidity, illegality or unenforceability shall not affect any other term or provision of this Contract, or invalidate or render unenforceable such term or provision. Upon a determination that any term or provision is invalid, illegal or unenforceable pursuant to a decision rendered in accordance with Section 11.7 (Class Arbitration), such decision shall govern.

12.9 Governing Law

This Contract shall be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada applicable therein.

12.10 Third party beneficiaries

The Parties do not confer any legal, equitable or other rights or remedies of any nature whatsoever under or by reason of this Contract upon any Person other than the Parties and their respective successors and permitted assigns, the IESO and the OEB.

12.11 Time of the essence

Time is of the essence in the performance of the Parties' respective obligations under this Contract.

12.12 Preparation of agreement

The Parties expressly agree that any doubt or ambiguity in the meaning, application, or enforceability of any term or provision of this Contract shall not be construed or interpreted against the DSO or in favour of the Participant when interpreting such term or provision by virtue of the fact that this Contract was prepared by the DSO.

12.13 Counterparts and electronic signatures

This Contract may be executed in two or more counterparts, and all such counterparts shall together constitute one and the same Contract, and it shall not be necessary in making proof of the contents of this Contract to produce or account for more than one such counterpart.

[Remainder of the page left intentionally blank.]

DATED as of the (day number) of (month) this year of (year)

[PARTICIPANT], the "Participant"

_____

Name:
Title:
I have the authority to bind the Participant.

_____

Name:
Title:
I have the authority to bind the Participant.

ESSEX POWERLINES CORPORATION, the "DSO"

_____

Name:
Title:
I have the authority to bind the Corporation.

_____

Name:
Title:
I have the authority to bind the Corporation.

Exhibit A – Glossary of Terms

In these Rules the following terms shall, unless the context otherwise requires, have the meaning stated below:

Term	Definition
Access Rights	Either title or rights of access to the Site, such rights being sufficient to allow the Applicant, Registrant or Participant, as applicable, to meet the requirements of the Project, including allowing the DSO to access the Site.
Additional Information	Has the meaning given to it in Section 10.1(a) of the Rules.
Affiliate	Any Person that (i) Controls a Person; (ii) is Controlled by a Person; or (iii) is Controlled by the same Person that Controls that Person.
Aggregator	An Operator/Person who has or will have User Rights over more than one Contributor DER, and aggregates such Contributor DERs for the purposes of participating in the Project Market.
Agreement	The NODES Membership Agreement.
Amendment	A change, revision or addition to the Project, the Rules, an executed Contract, or the form of Contract. For greater certainty, a suspension of the Project, in whole or in part, shall constitute an Amendment. "Amend" has a corresponding meaning.
Applicant	A(n) Person/Operator who has completed an Application to participate in the Project Market and has not yet become a Registrant. An Applicant becomes a Registrant when they receive an Registration Permission Notice from the DSO.
Application	The initial input of information by an Operator, who upon submission is considered an Applicant.
Approved Meter	Revenue-quality metering connected to the Distribution System and approved and verified by Measurement Canada and the DSO as usable for billing purposes on an hourly or sub-hourly basis
Arbitrator	A single arbitrator pursuant to the Arbitration Act. Outlined in Section 11.2 of the Contract.
Asset	A unit or facility for the production, consumption or transmission of electricity, or several such units or facilities acting as a single unit, as registered in the Platform. An Aggregation is not an Asset.
BTM ("behind-the-meter")	A DER/A installed in a system that provides electricity to be used on-site without passing through a meter to or from the Distribution System. Generation Resources located behind-the-meter are considered to be Demand Response Resources under these Rules.
Business Day	Any day other than a Saturday, a Sunday or holiday in Ontario, being New Year's Day, Family Day, Good Friday, Easter Monday, Victoria Day, Canada Day, Labour Day, Thanksgiving Day, Remembrance Day, Christmas Day, Boxing Day, and as further defined in Section 88 of the Legislation Act, 2006, S.O., chap 26, Sched F.
Business Hours	The usual operating hours of the DSO which will usually be 08:00-16:00 EST (UTC-5) on Monday through Friday except Holidays. This may be changed by the DSO from time to time and without notice.
CDER	Contributor DER.

Term	Definition
Change Request	A request by an Operator to the DSO to add or exchange one or more Contributor DERs to/from its Contributor List.
Claim	A complaint, claim, demand, suit or cause of action in contract, in tort, equity, under a Law, or otherwise.
Confidential Information	Information disclosed by the one party to the other, including, but not limited to, trade secrets, know-how, software, financial, business, sales or technical information, terms of agreements, negotiations or proposals, all data, and such other information disclosed (a) in written or other tangible form and marked "Confidential" or with words of similar import, or is designated as such by the disclosing party within a reasonable time after disclosure; (b) orally or visually and identified as confidential or proprietary information at the time of disclosure; or (c) under circumstances by which receiving party should reasonably understand such information is to be treated as confidential, whether or not marked as "Confidential" or otherwise. Confidential Information will not include information which: (a) is previously known to or lawfully in the possession of the receiving party prior to the date of disclosure as evidenced by the receiving party's written record; (b) is independently known to or discovered by the receiving party, without any reference to the Confidential Information; (c) is obtained by the receiving party from an arm's length third party having a bona fide right to disclose same and who was not otherwise under an obligation of confidence to the disclosing party or its representatives; and (d) is or becomes publicly available through no act or omission of, or breach of this Contract by, the receiving party or its representatives.
Connection Point	The electrical connection point between a DER and a Distribution System where the Electricity is withdrawn from, or injected into, the Distribution System, and is associated with the Meter Number.
Contract	A contract entered by the Registrant related to its participation in the Market. This primarily means the Participant Contract but where context requires it also includes the Membership Agreement, and any other contracts affecting the registrant in regards to energy, flexibility, or capacity.
Contract Date	The date set out on the signature page of this Contract.
Contracted DER	An Eligible DER that is subject to a Participant Contract. This includes Direct DERs, DER Aggregation Types/Technologies, and each Contributor DER.
Contributor DER	A DER owned or operated by a Contributor to a DER Aggregation. Grants User Rights to an Aggregator and appears on a Contributor List.

Term	Definition
Contributor List	With respect to a Registrant or Participant prior to the Trading Eligibility Date, the list of all Contributor DERS that are proposed during Registration for each DERA or Contracted DERA. With respect to a Participant following the Trading Eligibility Date, the list of all Contributor DERs registered on the Platform.
Control	With respect to any Person at any time (i) holding, whether directly or indirectly, as owner or other beneficiary (other than solely as the beneficiary of an unrealized security interest) securities or ownership interests of that Person carrying votes or ownership interests sufficient to elect or appoint fifty percent (50%) or more of the individuals who are responsible for the supervision or management of that Person; or (ii) the exercise of de facto control of that Person, whether direct or indirect and whether through the ownership of securities or ownership interests or by contract, trust or otherwise; and Controlled by has a corresponding meaning.
Cost Recovery Fees	A fee outlined in Section 5.11 of the Participant Contract "Exceptional Payment Obligations" which is a fee payable to the DSO for any extraneous expense incurred during the Registration Process.
Customer Account	A customer account in good standing with Essex Powerlines Corporation.
Delegate	A natural person who shall be duly authorized to act on behalf of the Applicant, Registrant, or Participant and with whom the DSO may consult at all reasonable times, and whose instructions, requests, and decisions, provided the same are in writing and made via email, shall be binding on the Applicant, Registrant or Participant, as applicable.
Demand Response Resource	A DER/A which offers flexibility by reducing Electricity demand and is inclusive of electricity generating resources located "behind-the-meter". Refers to a Demand Response Resource (C&I) and a Demand Response Resource (Residential), collectively.
DER (Distributed Energy Resource)	A facility capable of providing DER Capacity that is connected to the Distribution System as well as all equipment and property comprising the facility as described in the Registration.
DERA (DER Aggregation)	A technology or type of DERs controlled by an aggregative Registrant or Participant.
DER Capacity	The amount in kilowatts of electricity available to be provided to or the amount in kilowatts of electricity load (use of, demand for electricity) available to be reduced to the Distribution System. This can relate to Nameplate Capacity or Effective Capacity.
DER ID	The number assigned to each Direct DER and Contributor DER upon Registration, which number shall be used to identify the DER for the duration of its participation in the Market.
DER/A	A term that refers to DERs and DERAs collectively.
Direct DER	Has the meaning given to it in Section 1.9 of the Rules.
Direct Participant	A Participant that participates in the Demonstration directly and not through an Aggregator or other third party.

Term	Definition
Distribution System	A system connected to the IESO-Controlled Grid for distributing Electricity at voltages of fifty (50) kilovolts or less and includes any structures, equipment or other things used for that purpose, provided that a Distribution System shall be deemed not to include any equipment controlled by the IESO pursuant to the Distribution System Code
Distribution System Code	The code approved by the OEB and in effect from time to time, which, among other things, establishes the obligations of an LDC with respect to the services and terms of service to be offered to customers and retailers and provides minimum technical operating standards of Distribution Systems.
DSO (Distribution System Operator)	A system operator that manages the low-voltage distribution system and represents a potential new type of entity or function that is distinct from, but has many parallels with a transmission system operator and for the purposes of the Project, Essex Powerlines Corporation shall be the DSO.
DSO Coordinates	The contact information provided for the DSO as set out in the Rules Appendix E – DSO Coordinates.
DSO Default	Failure by the DSO to fulfill an obligation outlines in the Contract in Article 6 - Events of Default and any other provision relating to DSO Defaults.
EEC	Essex Energy Corporation.
Effective Capacity	The maximum demonstrated capacity of a DER/A that has been validated or confirmed by the DSO by testing or other means.
Electrical Safety Code	The code issued by the Canadian Standards Association as amended by the Electrical Safety Authority pursuant to O.Reg. 164/99 of the Electricity Act, 1998.
Electricity or Energy	Electric energy, measured in kWh unless expressly stated otherwise.
Eligibility	The designation by the DSO of a Participant and separately each of its Contracted DERs to be approved to be registered in the Platform and offer flexibility services to the DSO. This approval is made without liability and subject to the limitations in the Contract.
EPLC	Essex Powerlines Corporation, the DSO.
Existing Contract	A contract which the Applicant/Registrant/Participant is party to relating to the generation or storage of Electricity, conservation or demand management of Electricity or other form of contract, including a net-metering contract, or unit sub-metering contract relating to Electricity or Related Products.
FIPPA	Freedom of Information and Protection of Privacy Act, R.S.O. 1990, c. F 31
Flexibility	A modification of generation or consumption patterns provided by individual or aggregated assets as a service to the DSO, in order to alleviate congestion on the distribution or transmission networks.
Force Majeure	Any act, event, cause or condition that prevents a Party from performing its obligations. Outlined in the Participant Contract Article 7 - Force Majeure.

Term	Definition
Forced Outage	Governed by the Participant Contract, an Outage which was not planned or by circumstance of severity or urgency of events prevents the Participant from managing Platform activity per the Participant Contract.
Future DERs	A DER that has not achieved its In-Service Date.
Generator Resource	A DER capable of generating and injecting Electricity at a controlled rate, all in accordance with all Laws, directly to the Distribution System. Variable Generation Resources such as wind and solar generation are not considered generator resources under these Rules. Resources which generate Electricity but are not capable of injecting directly to the Distribution System or are otherwise "behind-the-meter" assets are considered Demand Response Resources under these Rules.
Governmental Authority	The Crown, any federal, provincial, or municipal government, parliament or legislature, or any regulatory authority, agency, tribunal, commission, board or department of any such government, parliament or legislature, or any court or other law, regulation or rule-making entity, having jurisdiction in the relevant circumstances, including the IESO, the OEB, the Electrical Safety Authority, and any Person acting under the authority of any Governmental Authority.
Grid Performance Requirements (GPRs)	Characteristics or measures of energy-related performance which must be met by all Contracted DERs at all times, detailed in an exhibit to the Contract.
IESO	The Independent Electricity System Operator of Ontario established under Part II of the Electricity Act, 1998 or its successor.
IESO Energy Efficiency Auction Pilot	A pilot auction mechanism to procure peak demand reductions from energy efficiency and load-shifting resources administered by the IESO.
IESO Market Rules	The rules made under Section 32 of the Electricity Act, 1998, together with all market manuals, policies, and guidelines issued by the IESO, as may be amended from time to time.
IESO-Administered Markets	The Electricity markets administered by the IESO, as further defined in the IESO Market Rules.
Indemnifiable Loss	Any and all Claims, demands, suits, losses, damages, liabilities, penalties, obligations, payments, costs and expenses and accrued interest thereon (including reasonable legal fees in connection therewith) which the Participant indemnifies the DSO, the IESO, the OEB, and other partners. Outlined in detail in Article 10 of the Contract.
Indemnitees	Defined by Section 10.1 of the Contract.
Industrial Conservation Initiative	An IESO initiative which allows Class A electricity consumers to pay Global Adjustment based on their top five peaks.
In-Service	The state that a DER or Contributor DER is considered to be in when it is fully installed and competed with regard to all required regulations on safety, certification, licensing, and all other applicable requirements. Additionally, the DER or Contributor DER can be reasonably expected to deliver flexibility services.

Term	Definition
In-Service Date	The date upon which a DER or Contributor DER is considered to be in-service.
Invalid Provision	A provision of the Contract or the disappearance or inability to calculate or determine any index, price or other quantum referred to in this Contract in dispute related to alleged invalidity, inapplicability, or unenforceability.
kW	Kilowatts.
Laws	(i) applicable Canadian federal, provincial or municipal laws, orders in-council, by-laws, codes, rules, policies, regulations and statutes; (ii) applicable orders, decisions, codes, judgments, injunctions, decrees, awards and writs of any court, tribunal, arbitrator, Governmental Authority or other Person having jurisdiction; (iii) applicable rulings and conditions of any licence, permit, certificate, registration, authorization, consent and approval issued by a Governmental Authority; (iv) any requirements under or prescribed by applicable common law; (v) the Retail Settlement Code, the Distribution System Code, and any other codes issued by the OEB from time to time that are binding on the Applicant, Registrant or Participant, the DSO or the IESO.
LDC	Local Distribution Company. The owner or operator of a Distribution System that is licensed by the OEB as an “electricity distributor”.
Market Determination Report	A report issued by the DSO that reflects the ongoing state of the Market, which will set important characteristics such as Application Dates, Trading Start Dates, Market Operation Periods, among others outlined in Section 5.2 of these Rules.
Market End Date	The day which the Platform will be closed to receive offers for the respective Market Operation Period.
Market Operation Period	The time between Market Start Dates and Market End Dates in which trading will be active on the platform.
Market Start Date	The day which the Platform will be open to receive offers for the respective Market Operation Period.
Membership	The status achieved by a Registrant when it executes a membership agreement with NODES AS.
Meter Number	The identifying number of the customer's electricity meter(s) connected to the Distribution System.
MFIPPA	The Municipal Freedom of Information and Protection of Privacy Act, RSO 1990, c. M.56.
MW	Megawatts.
MWh	Megawatt-hours.
Nameplate Capacity	The theoretical intended maximum capacity of a DER or Contributor DER on installation.
NODES	NODES AS.
Non-Wires Alternatives or NWAs	Resources, including certain DERs, that are capable of providing Services as alternatives to transmission and distribution solutions, such as a new stations or lines.

Term	Definition
Notice	A written communication provided by one Party to the other Party concerning any matter directly or indirectly related to the Rules or the Contract, as applicable, and includes Activation Notices and Standby Notices.
Notice of Arbitration	Written notice of arbitration to the other Party containing a concise description of a matter submitted for arbitration. Detailed in Article 11 of the Contract.
OEB	The Ontario Energy Board, or its successor.
Operator	The corporation which registers and then operates and/or conducts trading for a DER or a DER Aggregation. An Operator is not necessarily the owner of a DER/A. An Operator is the party to each Participation Eligibility Contract and the NODES Membership Agreement.
Outage	The removal of equipment from service, unavailability for connection of equipment or restriction of use or reduction in performance of the Contracted DER for any reason, including to permit the performance of inspections, tests, repairs or maintenance on the facility, which results in a partial or total interruption in the ability of the Contracted DER to meet market obligations and deliver flexibility, as applicable.
Outage Notice	Governed by the Participant Contract, a notice provided by the Operator of a DER/A of an Outage respecting a Contracted DER/A.
Participant	The Operator-party to a Participant Contract, which for clarity does not include the DSO, who has one or more Contracted DER/As which has achieved its Trading Eligibility Date. A Participant is always also considered a Registrant unless the context requires otherwise.
Participant Class	A group of Participants required to participate in multi-party arbitration on the issues set out in a Notice of Arbitration. Detailed in Article 11 of the Contract.
Participant Contract	The contract respecting an Operator's eligibility to act as a Participant in the Market, concluded by the Operator and the DSO. The contract is a condition of continued eligibility in the Market.
Participant Default	Failure by the Participant to fulfill an obligation outlined in the Contract in **Article 6 - Events of Default** and any other provision relating to Participant Defaults.
Party	(i) with respect to the Contract, any one of the Participant and the DSO, and the DSO and the Participant are collectively referred to as the Parties; and (ii) with respect to the Demonstration Rules, any one of the Applicant or the Registrant and the DSO, and the DSO and the Applicant or the Registrant are collectively referred to as the Parties.
Permitted DER	Means a DER or DERA, including a Future DER, that was submitted in an application and has been permitted to proceed to Registration in a Registration Permission Notice and has not had its eligibility terminated.
Permitted Resource	With respect to a DER meaning that the DER or Contributor DER is one of a class of allowed resources, types, or technologies.

Term	Definition
Person	A natural person, First Nation that is a “band” as defined in the Indian Act, RSC 1985, c. I-5, co-operative, firm, trust, partnership, limited partnership, company or corporation (with or without share capital), joint venture, sole proprietorship, Governmental Authority or other entity of any kind.
Planned Outage	Governed by the Participant Contract, an Outage which is scheduled by a Contracted DER with sufficient lead time for the Participant to modify Market trading behaviour appropriately.
Platform	The computer facilities, services and/or software applications made available by NODES to Members for the purpose of Trading and associated activities.
Platform Rules	The rules governing access and use of the Platform, as set by NODES from time to time.
Privacy Legislation Records	All recorded information in any form or medium that is provided by the DSO, NODES, the IESO, the OEB or its respective Representatives to the Participant, or provided by the Participant to the DSO or its Representatives for the purposes of this Contract, or created by the Participant in the performance of this Contract, and that is in the custody or control of the DSO which may require the disclosure of such the Privacy Legislation Records to third parties.
Project	PowerShare or the "DSO Pilot Project".
Project Area	The part of the DSO's service area as defined in Section 1.6 of the Rules.
Project Market	The Market as operated by NODES for the trading of flexibility services.
Project Partners	The corporations named in the Grid Innovation Fund Contribution Agreement that are proponents of the Project which are not EPLC.
Project Review	A change, amendment, suspension, or other modification to the Administration or Operation of the Project which can be made by EPLC at any time. Considered in Section 8 of the Rules.
Registered Bank Account	A bank account registered in Ontario, which may be in the name of the Participant one of its Affiliates, and which bank account must be capable of sending and receiving of funds by electronic funds transfer.
Registrant	An Operator which has received Registration Permission Notice.
Registration	The second stage of the registration process for the Project Market, except where context requires it to mean the Application and the Registration together.
Registration Permission Notice	Notice given by the DSO to Applicants following completeness and fitness assessments of their application as set out in Section 4. The notice states whether the Applicant is permitted to become a Registrant, and whether the DERs/DERAs are permitted to proceed to registration.
Replacement Provisions	The alternative language or amendments agreed to by both parties of the Contract in case a provision is considered invalid or unenforceable per Section 1.8 of the Contract.
Reservation Price	The price or price formula published by the DSO for calculation of payments made to secure flexibility availability on prescribed hours, usually done through LongFlex contracts via the platform.

Term	Definition
Rules	The rules governing the Project and Project Market as may be Amended in accordance with its terms, from time to time.
Senior Conference	A meeting convened during the informal dispute resolution process in which a senior executive of the Participant shall meet with a manager of the DSO, either in person or by telephone. Outlined in Section 11.1 of the Contract.
Sensitive Information	Has the meaning given to it in Article 9(b) of the Rules.
Site	In respect of a DER, is the real property on, over, in or under which the DER is situated, as such real property is identified in the Registration and in the Contract.
Site-Specific Losses	Electricity losses due to line resistance, the operation of transformers and switches, and other associated losses of Electricity incurred by the DER that may occur as a result of the difference between the location of the meter and the Connection Point, as determined pursuant to loss factors applied in accordance with the Retail Settlement Code and other Laws.
Storage Resource	A DER capable of withdrawing Electricity at a controlled rate, storing such Electricity for a controlled period of time and then injecting only the stored Electricity, minus losses arising from roundtrip efficiency, at a controlled rate, all in accordance with all Laws, to the Distribution System.
Temporary Account Number	A provisional identifying number which an applicant with a Future DER may apply to the DSO for in order to complete an application or registration, as found in Section 1.11 of the Rules.
Term	The period between the Contract Date and the expiry or termination of the Contract.
Terminate	With respect to a Registration, means the termination, rejection, discharge and release of the Registration and all rights of the Applicant or Registrant (if any), and all obligations of the DSO (if any) to the Applicant or Registrant, in respect of or arising out of the Project and Project Market.
Test Activation	A process which confirms aspects of market operability, DER/A characteristics, or otherwise as required by the DSO as described in Section 6.1 of the Rules.
Test Activation Day	A business day which the DSO has elected as the day a Test Activation will occur.
Test Activation Instruction	A set of data sent by or on behalf of the DSO which details the quantity of flexibility activated in each Test Interval of a Test Activation. May be received on the Platform via a test market order or otherwise.
Test Interval	Each a half-hour period within a Test Activation.
Trading Eligibility Date	The date which a Registrant will be eligible to begin trading in the market on the platform, also the date the Registrant is also considered a Participant.
Trading Hours	The hours on each day which participants may be activated, as defined in the NODES Rules. For clarity, these hours do not restrict the submission, acceptance, or formation of buy or sell orders.

Term	Definition
Transmission System	A system for conveying electricity at voltages of more than fifty (50) kilovolts and includes any structures, equipment or other things used for that purpose.
TS	Transformer station
TSO	Transmission system operator, which in Ontario is the IESO, responsible for managing the operations of high-voltage transmission systems and administers a wholesale energy market.
UC	Utilismart Corporation.
User Rights	With respect to a DER that is registered in the Project Market (being a Direct DER, Contributor DER and, following the entering into of a Contract, a Contracted DER), ownership and operational control, or in absence of ownership and operational control, a contractual right broad enough to permit the Applicant, Registrant or Participant, as applicable, to use or cause to be used the DER in such a manner to meet the requirements of the Rules and, if applicable, the Contract, which rights shall include but are not limited to, Access Rights, the right to use the DER to participate in the Project Market and the right to allow the DSO to use and share the metering data from the DER.
Website	The web-portal operated by the DSO to procure, contract, schedule, dispatch, measure and verify DERs and otherwise run the Demonstration
Wholesale Markets	The collective term for IESO-Administered Markets, as referred to in Section 1.1 of the Rules.
Access Rights	Either title or rights of access to the Site, such rights being sufficient to allow the Applicant, Registrant or Participant, as applicable, to meet the requirements of the Project, including allowing the DSO to access the Site.
Additional Information	Has the meaning given to it in Section 10.1(a) of the Rules.
Affiliate	Any Person that (i) Controls a Person; (ii) is Controlled by a Person; or (iii) is Controlled by the same Person that Controls that Person.

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Exhibit B – Grid Performance Requirements

Participants are required to operate in a manner that does not adversely affect the distribution or transmission systems they are connected to. These Grid Performance Requirements ("**GPR**"s) are modelled after the IESO's Grid Connection Requirements found in *Market Rules Chapter 4 Grid Connection Requirements – Appendices*, particularly *Appendix 4.1 – IESO-Controlled Grid Performance Standards, Appendix 4.2 – Requirements for Generation and Electricity Storage Facilities Connected to the IESO-Controlled Grid,* and *Appendix 4.3 – Requirements for Connected Wholesale Customers and Distributors Connected to the IESO-Controlled Grid*.

It is the responsibility of the Participant to ensure they do not contravene any rules or requirements of the IESO for the operation of their equipment. This contract does not supersede or replace any regulatory requirements on a DER. This contract does not constitute a waiver against any regulatory requirements nor does it constitute a warranty by the DSO that a DER does not contravene any regulatory or statutory requirements.

ID	**Category**	*All participants shall ensure:*
A	Frequency variations	All equipment shall be capable of continuously operating in the range between 59.5 Hz and 60.5 Hz.
B	Voltage variations	Under normal conditions, voltages are maintained within the applicable range below. Exporting DERs >10 kW: Voltage thresholds or tolerances are determined by the project-specific Connection Impact Assessment (CIA) and/or System Impact Assessment (SIA) study. Exporting DERs <10 kW: Voltage thresholds or tolerances are assessed and designated by Essex Powerlines in the project application and approval process. Non-Exporting DERs: Voltage thresholds or tolerances are indicated in a DER Operation Plan approved by the site/facility owner, and provided to Essex Powerlines by the participant. The DER Operation Plan shall provide for DER operation at the site/facility voltage level and must comply with CSA CAN3-C235 Preferred Voltage Levels for AC Systems 0-50,000 volts, Good Engineering & Operating Practices, and all relevant electric safety regulation.
	Category	*Generation facilities or electricity storage facilities directly connected to the grid shall have the capability to:*
1	Off-Nominal Frequency Operation	Operate continuously between 59.4 Hz and 60.6 Hz and for a limited period of time in the region bounded by straight lines on a log-linear scale defined by the points (0.0 s, 57.0 Hz), (3.3 s, 57.0 Hz), and (300 s, 59.0 Hz) and the straight lines on a log-linear scale defined by the points (0.0 s, 61.8 Hz), (8 s, 61.8 Hz), and (600 s, 60.6 Hz).

2	Speed/Frequency Regulation	Regulate speed/frequency with an average droop based on maximum active power adjustable between 3% and 7% and set at 4% unless otherwise specified by the IESO. Regulation deadband shall not be wider than ±0.06%. Speed/frequency shall be controlled in a stable fashion in both interconnected and island operation. A sustained 9% change of applicable rated active power as defined in category 4 after 10 s in response to a step change of speed of 0.5% during interconnected operation shall be achievable. Due consideration will be given to inherent limitations such as mill points and gate limits when evaluating active power changes. Control systems that inhibit primary frequency response shall not be enabled without IESO approval.
3	Voltage Ride-Through	Ride through routine switching events and design criteria contingencies assuming standard fault detection, auxiliary relaying, communication, and rated breaker interrupting times unless disconnected by configuration. For Inverter-based units, momentary current cessation or reduction of output current during system disturbances is not permitted without IESO approval.
4	Active Power	Continuously supply all levels of active power output within a +/- 5% range of its rated terminal voltage. Rated active power is the smaller output at either rated ambient conditions (e.g. temperature, head, wind speed, solar radiation) or 90% of rated apparent power. For electricity storage facilities, rated active power values shall be separately specified for both injection and withdrawal operations. To satisfy steady-state reactive power requirements, active power reductions to rated active power are permitted.
5	Reactive Power	Continuously (i.e., dynamically) inject or withdraw reactive power at the high-voltage terminal of the main output transformer up to 33% of the applicable rated active power at all levels of active power, and at the typical transmission system voltage, except where a lesser continually available capability is permitted with the IESO's approval. A conventional synchronous unit with a power factor range of 0.90 lagging and 0.95 leading at rated active power connected via a main output transformer impedance not greater than 13% based on generation unit rated apparent power is acceptable. Reactive power losses or charging between the high-voltage terminal of the main output transformer and the connection point shall be addressed in a manner permitted by IESO approval.
6	Automatic Voltage Regulator (AVR)	Regulate voltage automatically within ±0.5% of any setpoint within ±5% of rated voltage at the low voltage terminal of the main output transformer if the transformer impedance is not more than 13% based on the rated apparent power of the generation facility or electricity storage facility or at a point approved by the IESO. Reactive power-voltage droop or AVR reference load current compensation shall not be enabled without IESO approval. The equivalent time constants shall not be longer than 20 ms for voltage sensing and 10 ms for the forward path to the exciter output.
7	Excitation System for Synchronous Machines Greater than 20 MVA or any Synchronous Machines within Facilities Greater than 75 MVA	Provide (a) Positive and negative ceilings not less than 200% and 140% of rated field voltage, respectively, while supplying the field winding of the generation unit or electricity storage unit operating at nominal voltage under open circuit conditions; (b) An excitation transformer impedance not greater than 10% on excitation system base; (c) A voltage response time to either ceiling not more

		than 50 ms for a 5% step change from rated voltage under open-circuit conditions; and (d) A linear response between ceilings.
8	Power System Stabilizer (PSS) for Synchronous Machines within Facilities Greater than 75 MVA	Provide (a) A change of power and speed input configuration; (b) Positive and negative output limits not less than ±5% of rated AVR voltage; (c) Phase compensation adjustable to limit angle error to within 30° between 0.2 Hz and 2.0 Hz under conditions specified by the IESO, and (d) Gain adjustable up to an amount that either increases damping ratio above 0.1 or elicits poorly damped exciter modes of oscillation at maximum active output unless otherwise specified by the IESO. Due consideration will be given to inherent limitations. For electricity storage units, Power System Stabilizer shall be disabled while withdrawing
9	Phase Unbalance	Provide an open circuit phase voltage unbalance not more than 1% and operate continuously with a phase voltage unbalance as high as 2% at the high-voltage terminal of its main output transformer
10	Armature and Field Limiters	Provide short-time capabilities specified in IEEE/ANSI 50.13 and continuous capability determined by either maximum field current, maximum stator current, core-end heating, or minimum field current. More restrictive limiting functions, such as steady state stability limiters, shall not be enabled without IESO approval.
11	Technical Characteristics	Exhibit, at the high-voltage terminal of its main output transformer, performance comparable to an equivalent synchronous generation unit with characteristic parameters within typical ranges. Inertia, unsaturated transient impedance, transient time constants, and saturation coefficients shall be within typical ranges (e.g. H > 1.2 Aero-derivative, H > 1.2 Hydroelectric units less than 20 MVA, H > 2.0 Hydroelectric units 20 MVA or larger, H > 4.0 Other synchronous units, X'd < 0.5, T'd0 > 2.0, and S1.2 < 0.5) except where permitted by IESO approval.
12	Reactive Power Response to Voltage Changes of Inverter-Based Units	For a constant voltage at the high-voltage terminal of the main output transformer, achieve a sustained reactive power change of 30% of generation facility or electricity storage facility rated apparent power at the low-voltage terminal of the main output transformer within 3s following a step change no larger than 4% to the AVR voltage reference. AVR response to the voltage error signal must be consistent over the entire operating range.
	Category	*Equipment or facilities connected to the distribution system shall follow these requirements:*
13	Power Factor	Connected wholesale customers and distributors connected to the IESO-controlled grid shall operate at a power factor within the range of 0.9 lagging to 0.9 leading as measured at the defined meter point.
14	Under Frequency Load Shedding	Connected wholesale customers and distributors connected to the IESO-controlled grid may be required to participate in under frequency load shedding
15	Remedial Action Schemes	Connected wholesale customers and distributors connected to the IESO-controlled grid may be required to participate in remedial action schemes.
16	Voltage Reduction	Participants and operators of DERs connected to the IESO-controlled grid or the Distribution system with directly connected load facilities of aggregated rating above 20 MVA and with the capability to regulate distribution voltages under

		load, shall install and maintain facilities and equipment to provide voltage reduction capability.
17	Testing and Compliance Monitoring	Participants and operators of DERs connected to the IESO-controlled grid or the Distribution system shall test and maintain their equipment in accordance with all applicable reliability standards.
18	Metering	Where the Rules or the DSO do not determine or provide allowances otherwise, Participants and operators of DERs connected to the IESO-controlled grid or the Distribution system shall comply with metering codes and standards set by the IESO.
19	Voltage Ride-Through	Equipment connected within a connected wholesale customer's or a distributor's facility or distribution system that is connected to the IESO-controlled grid or the Distribution system shall ride through routine switching events and design criteria contingencies on the transmission system assuming standard fault detection, auxiliary relaying, communication, and rated breaker interrupting times unless either disconnected by configuration or a failure to do so has been assessed and confirmed by the IESO as having no material adverse effect on the operation of the IESO-controlled grid or the Distribution system.
20	Generation Units and Electricity Storage Units	Any generation unit or electricity storage unit connected within a connected wholesale customer's or a distributor's facility or distribution system that is connected to the IESO-controlled grid or the Distribution system shall meet, at a minimum, the performance requirements for Off-Nominal Frequency Operation (category 1), Speed/Frequency Regulation (category 2), and Voltage Ride-Through (category 3) specified in Appendix 4.2. If a connected wholesale customer injects active power into the IESO-controlled grid, all performance requirements specified in Appendix 4.2 are applicable to the generation units and electricity storage units installed within their facility. Note: These performance requirements shall apply to electricity storage units and generation units at all times while connected within a connected wholesale customer's or distributor's facilities or distribution system that is connected to the IESO-controlled grid, unless the IESO identifies specific performance requirements that are not applicable to an electricity storage unit or generation unit for those with a connection assessment finalized after January 18, 2021. Due consideration will be given to inherent limitations.

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Appendix A – Participant Information

1. Project Registration Number:

2. Participant Details:
   a) Company Legal Name
   b) Company Registration Number
   c) Registered Address
   d) HST Number

3. Delegate Details (primary):
   a) Name
   b) Registered email
   c) Mobile phone
      (registered for purposes of the Contract)
   d) Title

4. Delegate Details (secondary):
   a) Name
   b) Registered Email
   c) Mobile phone
      (registered for purposes of the Contract)
   d) Title

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Appendix B – Contracted DER/As

Contracted Direct DER #1		
A	DER Reference Title	
B	DSO Customer Account Number	
C	Permitted Resource Category	
D	DER Nameplate Capacity	
E	Meter Number(s)	
F	Connection Point(s)	
G	In-Service Date	
H	Municipal Address of Site	
I	Notes or Conditions	

[add or remove Direct DER information tables as necessary]

Contracted DER Aggregation #1		
A	DERA Reference Title	
B	Type or Technology	
C	Permitted Resource Category	
D	Number of Contributors at Registration	
E	Meter Number(s) of Contributors at Registration	
F	Municipal Address(es) of Contributors at Registration	
G	Notes or Conditions	

[add or remove DER Aggregation information tables as necessary]

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Appendix C – Additional Terms

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Transmission-Distribution Coordination Methodologies

Contents

1. Introduction

This document summarises the methods that will be used to trial Transmission-Distribution Coordination (T-D Coordination) within PowerShare. The document will be updated as details are developed and agreed with the IESO. **It does not form part of the Rules and will not be shared publicly.**

PowerShare will trial three T-D Coordination areas:

	T-D Coordination concept	Details in this document	PowerShare trial phase
1	Sharing information on Essex Powerlines' purchases with the IESO (the IESO Information Service)	Section 2	Market demonstration phase 1 and 2
2	Passing unmatched sell orders to the IESO's (simulated) Real-time Energy Market after Local Gate Closure (Simulated IESO Energy Market Service)	Section 3	Market demonstration phase 1
3	Having Essex Powerlines and the IESO (simulated) purchase flexibility at the same time on NODES (Integrated Coordination)	Section 4	Market demonstration phase 2

All simulated IESO purchases will be performed by Essex Powerlines, unless otherwise agreed by the IESO, Essex Powerlines and NODES.

Further information has been included in the different Appendixes at the end of the document:

- Appendix A: Rationale – in particular, links to other IESO documents on T-D coordination and on existing markets
- Appendix B: Scenarios for simulated IESO purchases
- Appendix C: Glossary

2. The IESO Information Service

2.1. Description

Trade data (volume, half hour, grid node) from the DSO market will be available to the IESO upon trade execution.

The IESO Information Service will be available during both market demonstration periods.

2.2. Methodology:

The IESO will be registered as the recipient of trade data (the Balance Responsible Party role[1] on NODES) for all assets/DERs that are part of PowerShare.

Transmission of data to the IESO:

- The IESO will get a log-in to NODES and can monitor the information via NODES graphical user interface as the trial unfolds.
- NODES will also share summary data with the IESO at the end of the relevant Milestone or at the IESO's request.
- Essex Powerlines and NODES may prepare demonstrations at request of the IESO
- (Data can also be accessed by the IESO via an API[2], but this is currently not planned as part of PowerShare.)

2.3. Public Trade Visibility

Public Trades is an additional functionality that provides an overview of matched order quantities at given locations and periods between market participants. In relation to T-D coordination, PowerShare sets out to make it clear on information shared for the system operator on distribution level (EPLC) and transmission level (simulated IESO).

- Public trades – information shared on a distribution level
    - All matched orders at a given location and all its associated sub grid levels (default)
- Public trades – information shared on a transmission level (two alternatives)
    - All matched orders at a given location and all its associated sub grid levels (same as for the distribution level)
    - Only qualified matched orders

[1] In European terminology, the Balancing Responsible Party is the one in charge of "imbalances" of a market player after all market operations and physical injection/withdrawals are counted. The market player can be its own BRP or outsource this to a contracted party.
This is a predefined role in NODES platform, which allows for receiving all the trades of an FSP. No economic responsibilities are associated with this role within the platform.

[2] NODES to provide information on NODESmarket API access to IESO Staff.

3. Simulated IESO Energy Market Service

3.1. Description

Essex Powerlines will purchase flexibility until Local Gate Closure. After this point, NODES will simulate that orders are passed to the IESO's Real-time Energy Market, where they are matched by the simulated IESO. Despite IESO activities being simulated, assets will be dispatched and settlement of transactions will be carried out.

The Simulated IESO Energy Market Service will be available during the first market demonstration period.

3.2. Methodology:

Essex Powerlines will purchase flexibility on NODES until Local Gate Closure (2 hours and 5 minutes prior to the delivery period), via long term reservation agreements (LongFlex Contracts) and the near term activation market (ShortFlex).

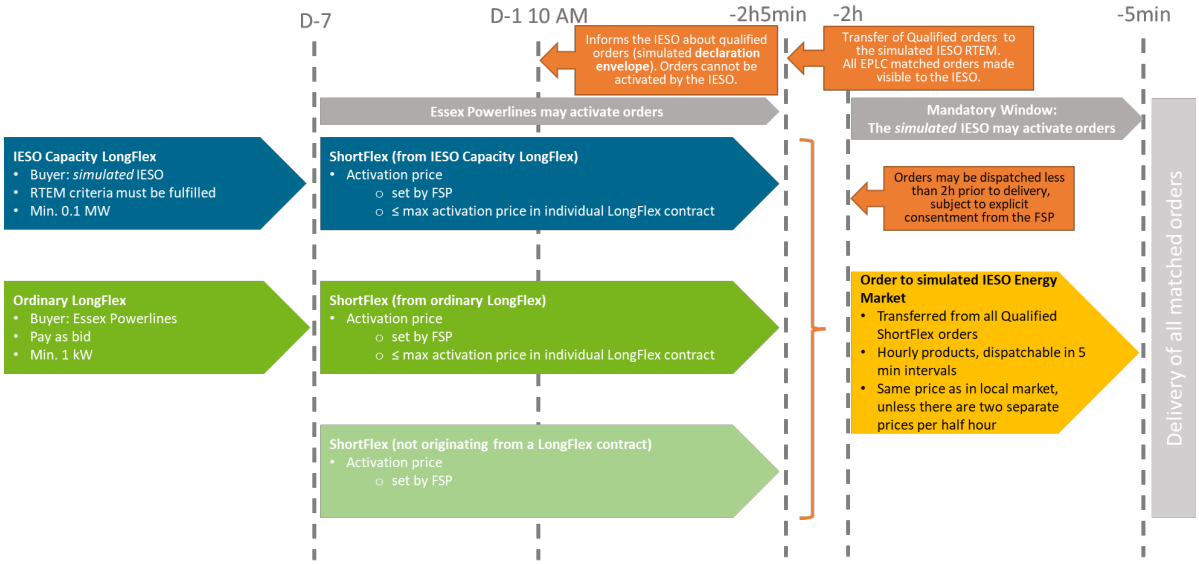

Figure 1: Different products and dispatch data submissions in the Local Market and in the Simulated IESO Energy Market under the Simulated IESO Energy Market Service

Several days before dispatch, when deemed relevant by the project:

The simulated IESO purchases LongFlex contracts in the Local Market, as described in Appendix B: Scenarios for the simulated IESO purchases. Essex Powerlines may buy the ShortFlex orders issued from these contracts in the Local Market, until Local Gate Closure. The ShortFlex orders issued from these LongFlex contracts are treated like any other ShortFlex order, as described below.

At 10.00 am the day prior to dispatch:

NODES will *simulate* submission of Qualified dispatch data by each Portfolio to the IESO. This is considered the *Availability Declaration* for the assets. The submission will include:

- dispatch data for LDC-directed / "must operate" Qualified quantities (i.e. matched orders) at the floor price

- remaining available Qualified DER(A) capacity in price/quantity ($/MWh, MW/h) pairs (i.e. unmatched orders). [3]

  The *simulated* submission will take the form of an automated extraction of relevant data every day by 10:00:00.

125 minutes prior to dispatch:

NODES will transfer final Qualified dispatch data by each Portfolio to the *simulated* IESO's Real-time Energy Market.

- dispatch data for LDC-directed / "must operate" Qualified quantities (i.e. matched orders) will be made visible for the IESO, but cannot be matched.
- remaining available Qualified DER(A) capacity in price/quantity ($/MWh, MW/h) pairs (i.e. unmatched orders) will be available for matching as described below. *5-120 minutes prior to dispatch – i.e.* in the Mandatory window

Mandatory window - the simulated IESO may activate orders forwarded from the local market:

- Offers will be analysed by 5-minute intervals. If 5-minute readings are not available, greater intervals may be averaged to achieve an estimate of each 5-minute interval.[4] As a starting point, dispatches could be simulated to take place in intervals one and seven (HH:00 and HH:30). Other intervals of consecutive 5min periods may be activated if negotiated with the FSP.
- Dispatch Notification Time:
  - Default dispatch time shall be 2 hours' notice. The FSP may chose, for each offer, their minimum dispatch notification time.
  - Special Short Notice Dispatch Criteria can be developed and tested but shall not form a minimum requirement for market participation in Sequential Coordination.
- Flexibility Service Providers (FSPs) with matched orders can choose to receive a dispatch/trade notification as set within the Platform per their preference. Portfolios are to be dispatched by the FSPs.

After dispatch, at regular intervals:

- NODES will validate delivery and settle transactions per NODES Market Rules
- As an analytical exercise, the project will calculate what FSPs would have received had we used the IESO's settlement rules for the Real-time Energy Market.
  - HOEP and Shadow Prices will be used to contrast against ShortFlex payments and Capacity Auction Availability Price will be used to contrast against LongFlex reservation payments.

[3] Conditions further explained in "Dispatch Data Qualification" Rationale but are summarized as: a pair of half-hourly orders starting on the hour comprising a whole hour, and each bundled offer are at least 100 kW to be included as a price-quantity pair.
See also "Treatment of Offers Submitted After ADE" rationale.
[4] Explored further in "Metering Granularity" Rationale

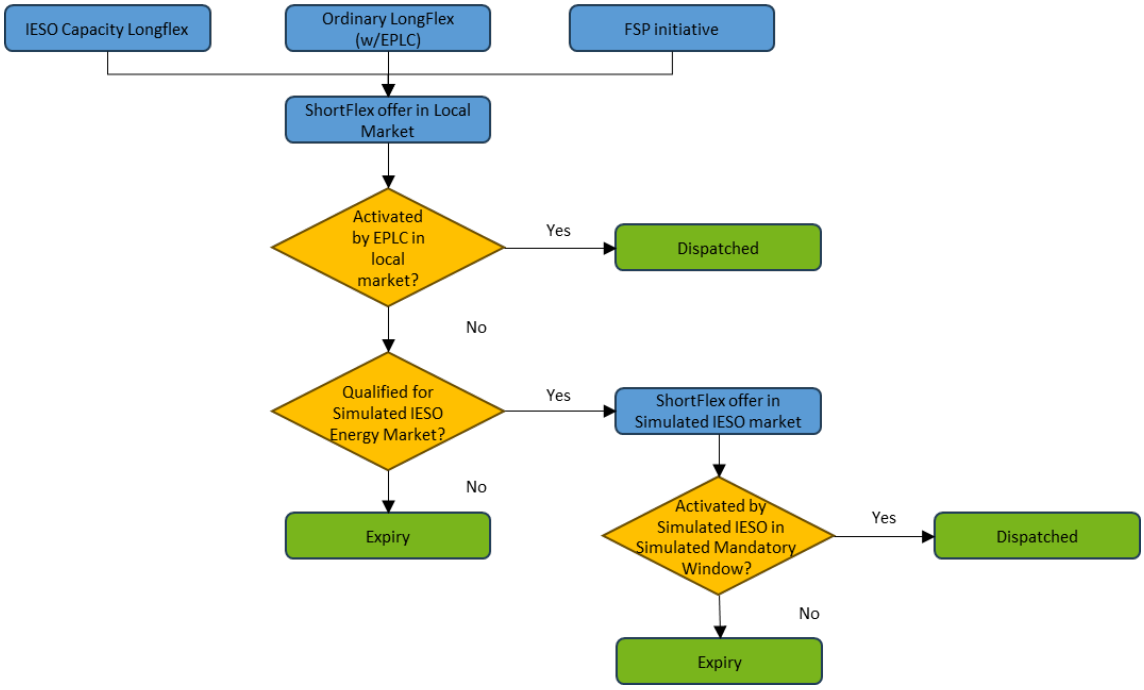

Figure 2: Flow chart of the Simulated IESO Energy Market Service

3.3. Dispatch Data Qualifications

To qualify for dispatch data submission as a price-quantity pair, offers must:

- Be preceded or followed by another offer, so that the offers together form one hour that start on the hour. Offers will be transmitted as a consecutive half hour pair ("horizontal bundling").
- Be issued for the same portfolio.
- Qualified offers from the same portfolio and the same half hours are included in the same price-quantity pair ("vertical bundling").
- Be issued from a portfolio tagged as dispatchable by 5min granularity (in platform: "TSO Enabled Portfolio"), and may be activated 120min or less prior to delivery.
- Be at least 100 kW or any value above (after vertical bundling where applicable). If one of the half hours belonging to a pair is for a lower volume than the other half hour, then the volume used for the lower shall apply to the whole hour. The price of the bundled offer should be equal to highest price of the two half-hours.
    - If the offer pairs have different volumes, the higher volume offer must have a Minimum Order Capacity lower or equal to the volume of the lower offer.
- Prequalification of the relevant resource through the formal IESO prequalification process is not a requirement for forwarding the orders to the simulated Real-time Energy Market.

The offers are issued by the FSP prior to 10:00:00 the day before delivery.

Similar conditions could be added to simulate forwarding of orders to the IESO Operating Reserve (OR) market (e.g., minimum four consecutive blocks of 30min, etc.) pending IESO guidance.

4. Integrated Coordination Service

4.1. Description:

NODES will simulate that the IESO purchases flexibility directly in the Local Market at the same time as Essex Powerlines.

The Integrated Coordination Service will be available during the second market demonstration period.

4.2. Methodology:

The *simulated* IESO purchases flexibility in the Local Market, alongside Essex Powerlines.

This will include LongFlex products, in line with that the IESO tends to purchase products that cover certain hours over an obligation period.

Given that the simulated IESO is simply another buyer on NODES, the products and market rules will be the same for both the IESO and Essex Powerlines, as set out in the market rulebook.

We will develop rules – such as the deadline - around the ability for Essex Powerlines to de-link grid nodes to prevent the IESO from accessing sell orders in certain areas.

Appendix A: Rationale

Dispatch Data Submission

Dispatch data submission will be undertaken to simulate a Dual Participation market model in which DER(A)s are participants in the local/DSO market and the IESO market. Data includes LDC-directed "must operate" quantities (i.e. matched orders) and eligible price-quantity pairs.

In a live dual participation market, dispatch data would be submitted by the DER(A) operators or forwarded on their behalf by the DSO or the DSO market platform to the IESO.[5] To simulate this, NODES will generate dispatch data for each asset prior to 10 am day-ahead and prior to 2 hours pre-dispatch if there are changes to dispatch data. See 'Short Notice Dispatch Data Change' rationale for interaction with IESO Short Notice Change Criteria.

The data is to simulate compliance with the DACP but could be adapted to comply with Day-Ahead Market procedures pending IESO guidance. Project proponents are interested in exploring how to demonstrate day-ahead commitments for DER(A)s. For illustration, page 11 of the Draft T-D Coordination Protocol stated DAM schedules being posted 13:30 day-ahead. Could be that the simulated IESO has a "first pass" over available capacity for DAM according to certain criteria, and expanded criteria for day-of activation.

The value of this exercise is to evaluate the Dual-Participation model outlined in the Draft T-D Coordination document, providing total quantities of LDC-directed flexibility and remaining qualified quantities available for dispatch.

Short Notice Dispatch Data Change

Per the 'Dispatch Instructions in Real Time Market' PDF shared by the IESO on March 1, 2023, short change notices (i.e. updates of offers by the FSP) "will not apply to Essex and therefore, Essex must submit their buy orders 2 hours before the dispatch hour".

It is understood that Short Notice Dispatch Data Changes are made for greater than 10 MW changes.

FSPs may set ShortFlex expiry times where unmatched offers are no longer available to either DSO or the simulated IESO, and these will be allowed to expire during the Project without additional notice to the Simulated IESO.

DSO and NODES are Not IESO Market Participants

The DSO and the platform provider do not intend to take on the responsibilities of an IESO market participant or aggregator for considerations including OEB licensing restrictions.

In simulation – dispatch data submissions of '*simulated wholesale market participants*' are not asset aggregations, it is a time/order bundle. Only single Portfolios of an FSP will follow Bundling logic as set out in Schedule 5. Aggregating across portfolios or of multiple FSPs will not be done. Information about flexibility will be available in IESO reporting.

[5] Note 'DSO and NODES Not IESO Market Participants' rationale.

Post-project – non-activated assets could be aggregated by a 4th party (Not IESO, EPLC, or NODES) offering to IESO.

If agreed between the project members, this could be studied for the second market period, potentially with OEB.

Metering Granularity

The project will have a maximum metering granularity of 15 minutes.

The sampling rate of FSP meters will be increased to 5 minutes, subject to EPL's metering infrastructure capabilities and constraints.

In cases where an FSP cannot have a 5-minute sample rate, the 15-minute sample rate will be averaged over the three 5-minute intervals. Reference to 5-minute metering granularity shall include the three 5-minute interval average metric (35IA, 15/3, other notation).

5-Minute dispatchability compatibility

PowerShare has structured to allow 5-minute intervals in metering and activations but will retain a 30-minute product duration for capacity-building in the market.

The 5-minute interval structure will allow IAM-like activations for FSPs with advanced capabilities, which may be tested or dispatched with short notice or beginning in intervals other than intervals 1 and 7.

Deadband for Compliance with Dispatch

Reference to the 'Dispatch Instructions in Real Time Market' PDF shared by the IESO on March 1, 2023, facilities in this pilot are less than 30 MW the IESO expects facilities to operate as close as possible to the dispatch instruction. Project proponents agree with IESO that findings from this project will help inform what a reasonable deadband for DER facilities would be, noting the IESO's interest in a +/-2% deadband.

Operation as close as possible to the dispatch instruction will be supported and incentivized by the stepwise reduction of payment by % delivery.

Ongoing changes to T-D Coordination Method

Reference to DACP and DAM, living document as IESO wants to change any information/reporting/simulations

Appendix B: Scenarios for the simulated IESO purchases

The following list is a suggestion of scenarios for the *simulated* IESO purchases of ShortFlex and LongFlex contracts (under both Simulated IESO Energy Market Service and integrated coordination) and when Essex Powerlines delinks grid nodes (under integrated coordination).

IESO purchases ShortFlex contracts

In the sequential coordination model, the simulated IESO will only purchase ShortFlex contracts in the simulated RTEM, as described in section 4.

Price trigger

IESO simulated purchases are triggered when the wholesale energy market price exceeds a threshold. Preferences in the scenarios can incentivize shorter ShortFlex expiry times.

Alternatives for the threshold:

- Could set the threshold close to the $2000 cap, so IESO purchases are triggered when the threshold is reached.
- Could set the threshold at the price observed in the local flexibility market, so that IESO purchases are triggered whenever the price in the local flexibility market is lower than the wholesale energy market price.
- Could set the threshold at a lower level, to ensure that we can simulate a sufficient number of IESO purchases to be able to properly test the arrangements.

Price series:

- The PowerShare team suggests using the Leamington Shadow Energy Price.
    - In addition, prices can be added at grid nodes above Leamington.
- As an alternative, the Market Clearing Price (MCP) could be used. To do so, it would be a need to translate 5-minute spot prices to a two hour outlook.

Final Proposals for Implementation

- Leamington Shadow Price Purchases (Variable Trigger)
    - Price trigger determined by the Predispatch Shadow Prices Report for node “LEAMINGTON-LT_GENSET”, where quotes are references to fields on the report.
    - The simulated IESO will purchase:
        - At T-2 hours, any available QSO with $/MW < “Energy” at T
- Market Clearing Price Purchases (Variable Trigger)
    - Price trigger determined by the Realtime Market Clearing Price Report, where quotes are references to fields on the report.
    - The simulated IESO will purchase:
        - At T-0.5 hours, any available QSO with $/MW < “Dollars per MW for Interval” at T-0.5 hours AND beginning in interval no later than T

Short notice activations

Activations of offers meant specifically for testing short notice activations. This also relates to the LongFlex scenario “Real time energy market alignment simulations” below.

The simulated IESO will publish ShortFlex orders specifying short expiry times of 5, 10, or 30 minutes with an arbitrary $/MW determined by EPLC for purposes of market discovery

IESO purchases in the LongFlex market

Simulated outages, such as planned outages of large contracted generators

For IESO Consideration: placed on an ad-hoc schedule or as requested by IESO to test.

Capacity auction and Real time energy market alignment simulations

Capacity Auctions simulated through LongFlex contracts with short notice activation period to demonstrate/test DER alignment with Real time energy market and Capacity Auction requirements.

PowerShare will trial that the IESO (simulated) enters into LongFlex Contracts through the following steps:

a. For the part of each *obligation period*[6] that overlaps with a Market Operation Period (excluding, where relevant, an initial time window allowing FSPs to submit their offers) register a new LongFlex request for up-regulation for the *availability window*[7] of the concerned *obligation period*.
    i. Volume is set to the maximum capacity that PowerShare wants to purchase
    ii. Maximum Activation Price per MW is set to the project's calculated maximum activation price.
    iii. Availability Price per MW is set to the lowest of the *auction clearing price* for the real IESO auction of the relevant *obligation period*, and the project's calculated maximum reserve price.
    iv. Schedule is set to the period overlapping with the *obligation period* as described above, Monday-Friday and the relevant *availability window.*
    v. Grid node is set to a parent GridNode that covers all Project area, given that the area is included in one price zone.
b. Simultaneously, the auction is announced in a market message, if necessary including but not limited to:
    i. The time window for FSPs to submit offers (bid submission window)
    ii. The time window accepting and/or refusing contracts
    iii. If relevant, maximum capacity per FSP
    iv. The matching criteria / rule for competition (availability price competition, activation price competition, other)
c. Selection of orders: NODES chooses the orders that correspond to the rules set up in the market message. Orders are selected manually after closure of the bid submission window.
d. Clearing and settlement: all selected orders will be paid according to the Rules.

[6] As defined in IESO Market Manual 12: April-October (Summer) and November-March (Winter)
[7] As defined in IESO Market Manual 12: business days 12.00-21.00 EST (Summer), business days 16.00-21.00 EST (Winter).

Override Scenarios

EPLC delinking scenarios will be manually applied during the simulated IESO purchasing, and will eventually be automatically applied or routed through override processes for any automated/threshold purchasing. Manual overrides of activations will be noted.

Planned outages

Planned disturbance to a congestion zone, such as scheduled maintenance. Scheduled delink of affected Grid Nodes, prevents purchasing by simulated IESO.

Emergency override

A procedure to support the DSO's ability to manage the distribution system in case of emergency which may include cancelling all active offers to mitigate potential damage to the system.

Emergency overrides may include delinking of Grid Nodes, preventing purchasing by simulated IESO.

Pre-activity Dx feasibility override

Analysis of system needs and DERs scheduled X days/hours ahead of activation to allow opportunity for EPLC to check feasibility (i.e., impact to the distribution grid) of allowing simulated IESO purchases in a period. May lead to Grid Node delink.

Instances of simulated IESO ShortFlex activations overridden by Dx pre-activity feasibility will be noted.

Post-activity feasibility

Evaluate after delivery if the IESO had orders that EPLC would have had to override (i.e. due to exceeding the 50% comfort threshold)[8].

[8] 50% comfort threshold is a distribution reliability and redundancy standard. Where the Distributor has two, or more, feeders, the feeder capacity is MW*0.5 so the load may be transferred in a contingency or emergency event. The two Leamington feeders (M24 and M27) regularly experience >50% loading during normal operation and peak at a significantly higher level thus posing a risk to reliability.

Appendix C: Glossary

Asset	An individual facility or unit which is registered on the Platform. Similar to a DER.
Contributor List	"Contributor List" after an FSP is given a Trading Eligibility Date is the list of all assets registered to it on the Platform. This includes Direct DERs and CDERs.
DER(A)	Distributed Energy Resource (Aggregated). Similar to an asset.
Local Gate Closure	Local Gate Closure is when it is no longer possible to buy orders in the Local Market. Local Gate Closure is set to 125 minutes prior to dispatch.
Local Market	The market used by Essex Powerlines for it purchases, and also by the *simulated* IESO in the second phase of the project. In the Local Market, one may visualise and purchase orders for some or all grid nodes.
LongFlex	LongFlex orders are capacity orders. Once contracted, ShortFlex orders are issued for activation of the contracted capacity. The issued ShortFlex orders must obey to activation price as defined in the LongFlex contract. The buyer of the contract may chose to activate the ShortFlex order or not.
Mandatory Window	The time window (5-120 minutes prior to dispatch) during which the Simulated IESO's Real-time Energy Market is open for the simulated IESO to activate orders in the Simulated IESO Energy Market Service.
Qualified	Qualified orders or trades are orders or trades that satisfy the criteria defined in section 3.3.
Portfolio	Grouping of assets on the Platform which can be freely assigned by the Participant. Assets cannot appear in multiple portfolios. Portfolios offer to the Order Book of the lowest common grid node of all constituent assets, i.e. a portfolio with all assets in Child Node 1 would offer to the Child Node 1 Order Book, whereas a portfolio with assets in both Child Node 1 and Child Node 2 would appear at the Parent Node Order Book.
ShortFlex	ShortFlex orders are orders that, when purchased, are to be dispatched by the FSP (i.e. energy, not capacity). Once purchased (matched), they become ShortFlex contracts (also used: trades).
Simulated IESO	The s*imulated* IESO access the different markets as if it was the IESO. Unless otherwise agreed, this role is taken by Essex Powerlines. Purchases made by the *simulated* IESO are delivered by the FSP and paid by PowerShare.
Simulated IESO's Real-time Energy Market (RTEM)	In the Simulated IESO Energy Market Service, the close to real-time market only accessible to the *simulated* IESO. The market is open 5-120min prior to dispatch. Orders may be activated for intervals of 5 minutes.