ONTARIO ENERGY ASSOCIATION

Report of the OEA Interconnection Working Group

November 13, 2019

To shape our energy future for a stronger Ontario.

Ontario Energy Association

ABOUT

The Ontario Energy Association (OEA) is the credible and trusted voice of the energy sector. We earn our reputation by being an integral and influential part of energy policy development and decision making in Ontario. We represent Ontario's energy leaders that span the full diversity of the energy industry.

OEA takes a grassroots approach to policy development by combining thorough evidence based research with executive interviews and member polling. This unique approach ensures our policies are not only grounded in rigorous research, but represent the views of the majority of our members. This sound policy foundation allows us to advocate directly with government decision makers to tackle issues of strategic importance to our members.

Together, we are working to build a stronger energy future for Ontario.

The recommendations contained in this report represent the advice of the OEA's Interconnection Working Group (IWG). They are not meant to represent the positions or opinions of the OEA as an organization or individual OEA members, OEA Board members, or their organizations. The IWG has a broad range of members, and there may not always be a 100 percent consensus on all positions and recommendations. Accordingly, the positions and opinions of members and their organizations may not be reflected in this report.

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BACKGROUND

In February of 2019, the OEA created a committee of its members to investigate the connection process for behind-the-meter (BTM) non-injecting storage facilities in Ontario. The primary focus was on projects that involved both an LDC and Hydro One (as transmitter). The process began with the creation of a broader steering committee with representatives of Ontario's five largest LDCs and representatives of the OEA's storage company members.

After some initial discussions by the committee, it became apparent that some of the issues were very specific and technical, and that a smaller working group should be created with the appropriate expertise to dive into the issues in more detail. As a result, the OEA Interconnection Working Group (IWG) was created in the spring of 2019. The working group began meeting bi-weekly to work through issues identified within the group.

The working group is made up of representatives from the following organizations:

Utility	Project Developer
Alectra	Enel X
Elexicon	NRStor
Hydro One (HONI)	Rodan
Hydro Ottawa	Stem
London Hydro	
Toronto Hydro	

This report summarizes the key findings and actions of the working group. It is important to note that while the group's work has focused exclusively on behind-the-meter (BTM) non-injecting storage projects, some of the actions discussed and being implemented can be applied to the connection process for other projects, so that the connection process does not favour any specific type of connection and/or technology.

The OEA IWG recommends that the OEB use this document as a foundation on which to proceed with the pending consultation on the interconnection process in Ontario (EB-2019-0207) and looks forward to participating in future consultations by the OEB's initiatives related to DERs. This report outlines key areas for improvements where consensus was obtained with some improvements being made currently. This report also identifies areas where additional consultation will be required.

ISSUES REVIEW

A. Identification of Issues

The group identified the following five areas for discussion with respect to the connection process:

1. Application Process
2. Connection Impact Assessment (CIA)
3. Connection Cost Agreement (CCA)
4. Construction/Commissioning
5. Connection /operating agreement (including Permission to Operate)

The working group determined that the first three areas be the primary focus of its efforts.

B. Review of Issues

1. "Fast Track" Process

In the course of discussing ways to accelerate the application and connection process in Ontario, the working group discussed the feasibility of adopting a fast track process for behind-the-meter non-injecting projects, similar to the California Rule 21 "Fast Track" process[1] or fast track processes being used in other jurisdictions. After exhaustive discussion, the working group concluded by consensus that the most productive use of the group's time would be to focus on improving the current Ontario process rather than focusing on the creation of an expedited process for low risk projects in Ontario.

The group came to this conclusion based on market structure and policy differences between California and Ontario, such as:

- Ontario's Industrial Conservation Initiative (ICI) program is driving larger BTM projects (projects are typically a ~500kW minimum, seeking to displace up to 100% of load during system peak hours) compared to California (typically 25% load displacement is the goal of a project)
- California is largely served by a relatively small number of utilities compared to the many LDCs and distribution-transmission separation in Ontario, introducing multiple interactions and information interactions when connecting projects
- A cursory review of recent projects by HONI which suggested that most projects they had been involved with in the past year would not have passed the Rule 21 fast track screens, hence an equivalent process in Ontario would not have resulted in a benefit for project proponents.
- The OEB's Transmission System Code establishes maximum short circuit levels permitted at Distribution delivery points. This provides a maximum arc-flash hazard

[1] https://www.cpuc.ca.gov/Rule21/

level that customers can plan for when purchasing equipment. Many of Hydro One's supply stations are already at their limit, and are therefore constrained from accepting any additional short circuit (SC) contributions. Many others are very close to their limit. Therefore, it is necessary for any BTM request to be assessed against short circuit limits.

- The project developer participants of the working group believe that as the DER market evolves in Ontario that there is still an opportunity of an expedited process for smaller/low risk BTM non-injecting projects.

2. HONI/LDC Application Forms and Process Review

In recognition that most projects will include HONI as transmitter the group reviewed in detail HONI's Form B to identify:

(A) opportunities to improve documentation/clarity on how to complete an application;
(B) opportunities to introduce greater automation into the application form; and,
(C) streamline applications by identifying information fields in the forms that are not applicable for non-injecting BTM storage projects.

This was a fruitful discussion and will result in changes streamlining Hydro One's Connection Application Form B. A detailed list of the recommended improvements to HONI Form B as well as HONI's resulting action on each recommendation is provided in Appendix A. The working group recommends that the OEB process considers the attached list of improvements in looking to streamline and standardize the LDC application forms.

During discussions on application streamlining it was noted that there is a tension between lower information requirements in the initial stage of an application and the risk of rework or delays later in the process as additional project details emerge.

Furthermore, the following are key areas for improvement identified:

(A) Each Form B submitted by an LDC requires a "study agreement" to be signed between HONI & LDC

Action: The group discussed the potential for a Master Study Agreement to be signed between HONI & LDCs outlining all the necessary terms & conditions, eliminating the need to prepare/submit separate study agreements for each project.

(B) Form B Applications being returned by the HONI/LDC to the proponent because of missing/inaccurate information

Action: The group discussed a standardized process for applications missing minor pieces of information to have the LDC/HONI advise what is missing to the applicant, so that the applicant could provide the required/missing information without losing position their position in queue. The group discussed the establishment of a standardized timeframe for re-submitting missing information (e.g., 10 calendar days) or making minor corrections. There was consensus that 10 calendar days was a reasonable timeframe to allow proponents to correct minor deficiencies.

(C) Some LDCs require a high level of detail for protection philosophy and settings for BTM non-export projects. Unlike the previous FIT program most applicants do not have a contract and as such are trying to minimize upfront engineering costs for the impact assessment to be completed.

Action: The group developed a sample protection philosophy outlining all protection elements for the application process. Detailed protection settings would be submitted later if it is determined project will move forward to connection cost agreement. A number of the LDCs on the working group thought the example protection philosophy developed provided a good example of the information LDCs were looking for early in the application process, and that it would be helpful if proponents provided something similar that was specific to their project with the application.

A copy of the sample protection philosophy for behind-the-meter non-injecting storage facilities is provided in Appendix B.

(D) Some LDCs require a high level of detail as to the planned operational profile of the proposed project. The bulk of current applications are submitted for Global Adjustment cost mitigation. It is extremely difficult to forecast on a monthly basis the anticipated operational profile.

Action: The group developed a sample mode of operation profile for a Global Adjustment cost mitigation project that provides LDCs with a clearer picture of planned project operation that could be used by proponents with adjustments for any differences related to a specific application.

A copy of the sample mode of operation profile is provided in Appendix C.

2a. Application Quality Issues

As part of this discussion on the application forms process review, the IWG discussed ways in which project proponents can improve their applications in order to expedite the process. To assist applicants, the LDCs and HONI provided an overview of common application issues and/or errors (i.e., Form B) submitted by project proponents that delay application processing because these quality issues create extra work for both the LDCs and proponents. A full list of common application quality issues identified that cause project delays is included in Appendix D.

This led the group to discuss ways to improve applications. One of the outcomes of the discussion was an agreement from the LDC participants to provide examples of SLDs that meet minimum requirements, with the caveat that the SLD must be specific to the project, not a generic diagram (cases were cited where proponents submitted SLDs from other projects).

Action: HONI and LDCs will work to develop examples of SLD that meet minimum requirements for applicants to use as a template.

3. Connection Impact Assessment

The group discussed the time taken to complete the Connection Impact Assessment (CIA) process. Project proponents stated that for a project requiring a CIA from both HONI and the LDC, the current process requires LDC to complete CIA first before HONI begins their review (i.e., a sequential process).

Action: HONI agreed that it is possible to start its CIA concurrently with the LDC's CIA work, if the LDC provides the impedance of the conductor between the LDC boundary, and the project's Point of Common Coupling (PCC). HONI noted that they have already been doing this in some instances. The net impact of parallel CIA being conducted could reduce the CIA processing timeframe from the existing 60 plus 60 days to somewhere around 80/90 days.

4. Assignment of Project Manager (PM)

The group discussed expediting the assignment of a HONI project manager was discussed, so that project proponents could order equipment to begin project construction. HONI explained that PM Notification and assignment are difficult until the CCRA is signed and payment made. The reason for this is that PMs are hesitant to work on projects that may not proceed because their time is billable on a at cost basis.

Action: HONI agreed to review this matter, indicating that it may be possible to expedite projects that require monitoring only (i.e., no associated control room protections required) through maintaining contact between the applicant and HONI account manager rather than assigning a project manager.

5. Approvals Process Flow Charts

In undertaking this review, the working group developed a series of flow charts to facilitate discussions around the various steps in the application process for a behind-the-meter storage project. While these diagrams are not meant to be definitive documentation of the existing process, it is hoped that they will give all participants a better understanding of the various steps involved in the overall process and provide a starting point for future discussions of process improvements.

Appendix E includes the following flow charts that break down different aspects of the process:

- High Level Flow
- Application Submission Sub-Flow
- LDC/HONI Process Sub-Flow
- CCA and Build Flow

Appendix A: Hydro One's Connection Impact Assessment (CIA) Form B

The following represents a summary of Hydro One's planned actions in response discussions held with the OEA's IWG, held between May and Oct 2019. As noted earlier in the report, the actions below are the result of IWG discussions focused exclusively on (BTM) non-injecting storage projects, however, some of the actions can potentially be applicable for other projects.

<u>SECTION A: APPLICATION INFORMATION</u>
Application Type: - Option to be added.
Program Type: - Option to be added.
IESO Contract # - Made an optional field; may be relevant for future IESO initiatives.
IESO Reference # - Made an optional field; may be relevant for future IESO initiatives.

<u>SECTION B: PROJECT LOCATION</u>
Lot Number(s) Concession Number(s): Will remain as optional field. It is required for rural addresses.

<u>SECTION C: CONTACT INFORMATION</u>

<u>SECTION D: CUSTOMER STATUS</u>
Is the owner an HST Registrant? Timing being discussed…This information is required to prepare a CCA contract. It will be required and will cause delays at a later date if not provided.

What is the barcode of the nearest pole serving the project location? Will be disabled for BTM

[Form broken] after clicking on "There is an existing Hydro One account at this location", it does not allow entry of account number and account holders name. Will be fixed.

Customer Legal Name/ Account holder name - Under discussion; but will likely remain. This is required for internal records, the CIA and the CCA. CIA would need to be officially revised if Customer name is not correct and/or does not match the CCA.

<u>SECTION E:</u>
[Form broken] Generator Fuel Type: * drop down box not working? Will be fixed

<u>SECTION F: PROJECT INFORMATION</u>
Station Name: Feeder: Being discussed. Likely to be disabled or made optional.
Energy Type: Fuel Type: CHP only: Will be updating to better reflect options.
Mounting, Crown Land & Water primary Source; Will be disabled for non-solar, non-hydraulic projects.

<u>SECTION G: LOAD INFORMATION</u>
Will add clarification to this entire section. Original intent is for Station Service load. But for HONI cases the load of battery charging needs to be assessed.

SECTION H: CONNECTION INFORMATION
DOM not required for BTM – will make fields optional.

POC Latitude: POC Longitude:
PCC Latitude: PCC Longitude:
Generation Facility Latitude: Generation Facility Longitude:
GPS Coordinates will only be required for the "Generation facility", the other options will be disabled.

Length of Line from POC to PCC: _ Length of Line from PCC to Generation Facility: Will be disabled.
Conductor Type/Size (between PCC and Generator): ____ will be optional
Connection Figure A1/A2/A3: 4th connection figure being considered

SECTION I: ENERGY STORAGE
[Form broken] after "Does the Project Include Energy Storage" Will be fixed

Total Energy Storage Size:
Energy Storage Facility Control Strategy:
'Operating Philosophy' document submitted by OEA will be considered as a template submission for this section.

SECTION J: LOAD DISPLACEMENT INFORMATION
Investigating broken link.
Some BTM deliberately go non-parallel due to station short circuit limits. No changes needed.

SECTION K: EMERGENCY BACKUP GENERATOR INFORMATION

SECTION L: GENERATION CHARACTERISTICS
Review of section being undertaken; however unlikely there will be any changes. Details required for SC study.

SECTION M: INTERFACE TRANSFORMER
Review of section being undertaken; however unlikely there will be any changes. Details required for SC study.

SECTION N: INTERMEDIATE TRANSFORMER
Review of section being undertaken; however unlikely there will be any changes. Details required for SC study.

SECTION O: HIGH-VOLTAGE GROUNDING TRANSFORMER
Review of section being undertaken; however unlikely there will be any changes. Details required for SC study.

Appendix B: Sample Protection Philosophy

This document is a summary of a sample protection philosophy for the battery energy storage system (BESS). Detailed protection settings will be submitted after the utility has completed their analysis of the connection application submitted.

The protection system of the battery energy storage system (BESS) will be designed to:

- Detect internal faults with the generator facility, downstream of the Point of Common Coupling (PCC), and automatically disconnect the BESS
- Detect external faults on the utility feeder and automatically disconnect the BESS
- Detect islanding conditions and disconnect the BESS
- Detect export of power from the BESS to the utility feeder and automatically disconnect the BESS

Internal Faults Within the Generator Facility

The following protections are in place to protect against internal faults resulting from the BESS:

- **Multi-Function Relay** - At the PCC, a multi-function relay will be installed to monitor internal faults resulting from the BESS. The 52 Trip Breaker will trip if it detects the following:
    - 25 – Synchronization Check
    - 27 – Undervoltage
    - 59 – Overvoltage
    - 81O/U – Under and Over Frequency
    - ID – Active Anti-Islanding
- **Inverter Breakers** - Each inverter is equipped with an AC breaker at the output of the inverter providing additional overcurrent protection

- **Facility Overcurrent Protection** - All circuits within the facility are protected from both phase-to-phase and phase-to-ground faults by appropriate overcurrent protection devices. Fuses are sized to clear under fault conditions within the generator facility

External Phase and Ground Faults in the Distribution System

The following protections are in place to protect against external faults resulting from the utility feeder:

- **Multi-Function Relay** – At the main utility service, prior to the first facility load, a multi-function relay will be installed to monitor faults from the utility feeder. The 52 Trip Breaker at the BESS PCC will trip under the following faults:
    - 27 – Undervoltage
    - 32R – Reverse Power
    - 50/51 – Overcurrent
    - 59 – Overvoltage
    - 81O/U – Under and Over Frequency

  - 67 – Directional
- **Inverter Protection**: The inverters proposed for this project are certified to UL 1741, IEEE 1547 CSA C22.2 107.1-01 standards and will behave accordingly.

Anti-Islanding

- The Energy Resource Facility will operate in a grid following mode and will not operate islanded.
- **Anti-Islanding Inverters** – The BESS inverters contain both passive and active anti-islanding protection as required by IEEE 1547 and UL1741 SA. If the utility normal power supply is interrupted, the inverters detect the loss of power and disconnect.

Reverse Power

- **Reverse Power Protection** – In addition to the multi-function relay at the utility supply monitoring reverse power (32R), the load is continually monitored to ensure the BESS discharge is below the consumption of the facility. This additionally protects against power injection to the utility grid.

Directional Overcurrent

- **Directional overcurrent protection -** Directional overcurrent relays are normally used on incoming line circuit breakers on buses which have two or more sources. They are connected to trip an incoming line breaker for fault current flow back into the source, so that a fault on one source is not fed by the other sources.

Special Comment Regarding Inverter Based Generation

The inverters specified for this project have a limited fault current contribution.

- Because inverters are current-limited devices, unlike rotating generators, the fault current is very close to the maximum output current, limiting the fault current in the system to 120% - 140% of FLA.

Table 1: Protection Summary Matrix

Description	IEEE Device	Internal Faults	External Faults	Anti-Islanding	Reverse Power
Over-Voltage	59	X	X	X	
Under-Voltage	27	X	X	X	
Over-Frequency	81O	X	X	X	
Under-Frequency	81U	X	X	X	
Instantaneous Over-Current Phase	50	X	X		
Timed Over-Current Phase	51	X	X		
Reverse Power	32R			X	X
Directional	67	X	X		
Active Anti-Islanding	IEEE 1547			X	

Table 2: Protection Elements

Protection Element Function	Device #	Feeder Protection Relay/Shunt Trip	IEEE 1741 SA Inverter
Over-Voltage	59	X	Y
Under-Voltage	27	X	Y
Over-Frequency	81O	X	Y
Under-Frequency	81U	X	Y
Synchronization Check	25	X	Y
Reverse Power	32R	X	
Overcurrent	50/51	X	Y
Directional	67	X	
Active Anti-islanding	ID		X

X = Primary Y = Secondary

Appendix C: Global Adjustment Cost Mitigation Operation Philosophy

This document is a summary of a sample Operational Plan for the behind-the-meter battery energy storage system (BESS). The operation of the BESS will be primarily designed to reduce customer Global Adjustment charges in their electrical bill. Controller settings and protection elements will be implemented to ensure that customer demand will always be greater than battery discharge to ensure no electricity is exported onto the distribution grid. Although reducing GA charges is the primary objective of the BESS in Ontario, similar operation modes could be implemented for other revenue opportunities in the future, such as the IESO Demand Response program.

Operational Modes

Feature/Mode	Description	Notes
Facility Load Monitoring	Via on site monitoring the BESS controller monitors the total facility load (kW) on a 1 Hz basis	Customer Ethernet or cellular data connection utilized for communication to the customer's contracted Network Operation Center (NOC)
BESS Monitoring	Via on site monitoring the BESS controller monitors battery charge and discharge (kW) on a 1 Hz basis	Customer Ethernet or cellular data connection utilized for communication to the customer's contracted Network Operation Center (NOC)
Charge	To maximize savings, the BESS charges during off-peak or lower kWh periods.	Integration with the customer tariff or contracted energy delivery may be implemented.
Charge Limitations	To ensure that a new peak demand is no set by the battery's charge, the BESS controller charges only when the net load (facility + battery charge rate) is below a given kW threshold, either by billing cycle or 12-month period	At no point will the system charge to create a new peak billing load. This is achieved through software control of the battery charge commands in conjunction with the 1 Hz monitoring.
Discharge	To reduce facility Global Adjustment charges the BESS will discharge during the forecasted 5 peak hours of the Ontario system	Discharge rate is dependent on customer demand during discharge period. Typically, the discharge will be over a 2-hour period.
Discharge Limitations	The BESS will never discharge more than the available facility load to avoid net electrical export to the grid	
Idle	When not in use for Global Adjustment reduction, the system is held in an idle state	During idle state, the battery is maintained in a state of charge (SOC) that will limit battery degradation. Typically, 50-70% SOC.
Discharge Frequency	Based on prior peak prediction performance, the BESS is expected to discharge fully 10-50 times per year	Actual number of discharge cycles per year will vary according to Ontario weather

Appendix D: Common Application Quality Issues

Two utilities provided an overview of common issues that delay application processing.

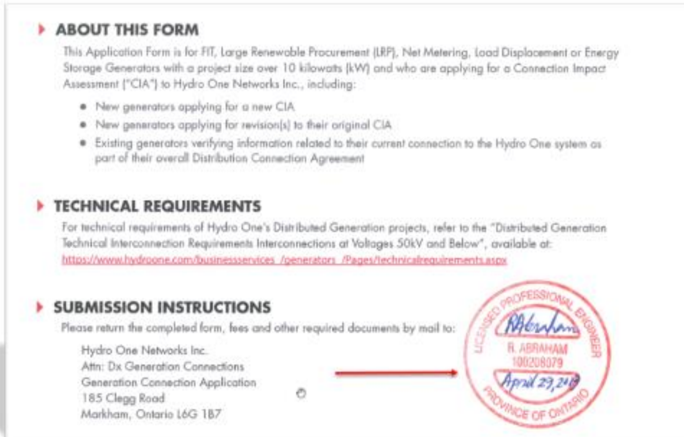
Common Form B Errors

OEA Connection Process Working group

Implications of Form B Errors

- Form B application will be deemed incomplete which will delay the CIA initiation
- Time delay due to back and forth communication between customer and utility

Form B stamp



ABOUT THIS FORM

This Application Form is for FIT, Large Renewable Procurement (LRP), Net Metering, Load Displacement or Energy Storage Generators with a project size over 10 kilowatts (kW) and who are applying for a Connection Impact Assessment ("CIA") to Hydro One Networks Inc., including:

- New generators applying for a new CIA
- New generators applying for revision(s) to their original CIA
- Existing generators verifying information related to their current connection to the Hydro One system as part of their overall Distribution Connection Agreement

TECHNICAL REQUIREMENTS

For technical requirements of Hydro One's Distributed Generation projects, refer to the "Distributed Generation Technical Interconnection Requirements Interconnections at Voltages 50kV and Below", available at: https://www.hydroone.com/businessservices_/generators_/Pages/technicalrequirements.aspx

SUBMISSION INSTRUCTIONS

Please return the completed form, fees and other required documents by mail to:

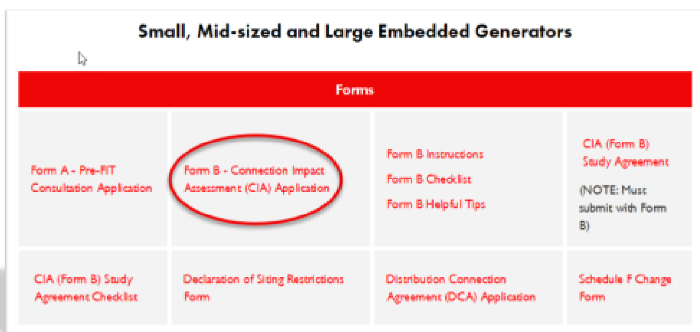
Hydro One Networks Inc.
Attn: Dx Generation Connections
Generation Connection Application
185 Clegg Road
Markham, Ontario L6G 1B7

LICENSED PROFESSIONAL ENGINEER
R. ABRAHAM
100208079
April 29, 201
PROVINCE OF ONTARIO

Latest Form B Application

Download and use the <u>latest</u> Form B application

Often out dated copy of Form B application is submitted



Small, Mid-sized and Large Embedded Generators

Forms			
Form A - Pre-FIT Consultation Application	Form B - Connection Impact Assessment (CIA) Application	Form B Instructions Form B Checklist Form B Helpful Tips	CIA (Form B) Study Agreement (NOTE: Must submit with Form B)
CIA (Form B) Study Agreement Checklist	Declaration of Siting Restrictions Form	Distribution Connection Agreement (DCA) Application	Schedule F Change Form

POC / PCC Coordinates

Coordinates provided aren't clear representations of the designated station and feeder location

Example

Given station: Campbell TS M24

Given coordinates: 43.3148, -80.1836

Nothing in the surrounding area leads to Campbell TS or the given feeder

POC / PCC Coordinates Cont.

Missing Feeder Conductor Type

Feeder conductor type is unavailable

SECTION D: CONNECTION INFORMATION

Please complete the following fields regarding the connection to the Hydro One transformer station.

Transformer Station

LV Bus Designation

Feeder Designation

Feeder Voltage

Is the feeder owned entirely by the LDC?

(•) Yes ( ) No

Is SCADA monitoring through ICCP available?

(•) Yes ( ) No

The following fields refer the conductor between the generator and the Hydro One transformer station, or between the generator and the LDC/Hydro One boundary.

LDC Feeder Length

LDC Feeder Conductor Type

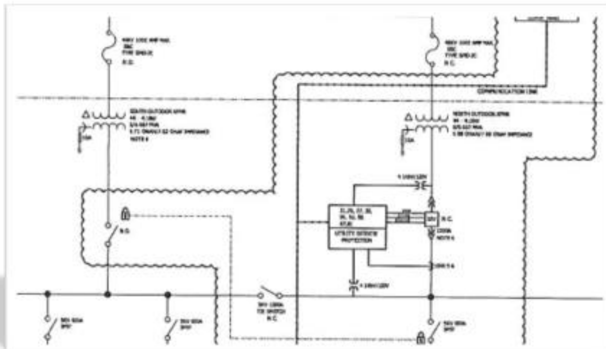
N/A

Charging / Discharging for Battery Energy Storage System (BESS)

The customer is supposed to submit a detailed description of control strategy, tentative kVAR & kW schedules for both load and generation (by time of day and year), maximum load, switch in / out conditions etc.

Unclear SLD

The SLD is very unclear and unreadable



Section E

Hydro One Form B application submitted without populating section E which is mandatory for LDC dedicated feeders.

SECTION E: CONNECTION REQUIREMENTS FROM LDC

Transfer Trip
○ Yes ○ No

DGEO Signal
○ Yes ○ No

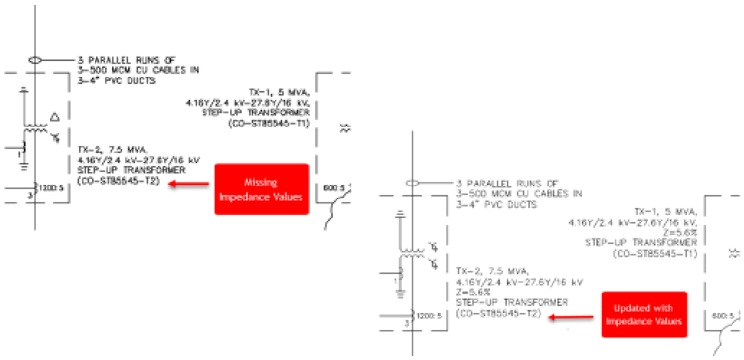
Feeder Protection Change Required
○ Yes ○ No

Feeder Relay Directioning
○ Yes ○ No

Low Set Block Signal (LSBS)
○ Yes ○ No

Mismatch between SLD and Form B application

- Transformer impedance, transformer ratings, etc.



Missed Important Information

- Ensure you list the full legal business name and you include your Ontario Corporate Number (OCN) or Business Identification Number (BN). Your HST number is not your OCN or BN
- For Net Meter and Load Displacement, owner name must match Hydro One account
- Ensure that you choose the correct Energy Type (Section F) and complete the required sections that are applicable to your selection (check Sections I, J, K, Appendix B, Appendix C to see if they apply)
- Ensure that all required information is entered correctly in Section H and that your GPS coordinates for the POC, PCC and generation facility are in decimal format
- All information in Section L is required and must be complete. Omission of data in these fields may result in rejection of your application
- Double check Section P – Checklist to ensure all required documents and payment is included in your application

Common SLD Errors

- Delayed response to Hydro One's feedback on SLDs is a major cause of project delays
- Often missing the ANSI/IEEE protection device numbers
- Missing HONI station and feeder connection information
- Missing details such as transformer ___ kVA size, winding (delta/wye) configuration, etc.
- Missing Intertie PT and CT ratio and winding configuration
- Inconsistencies and errors between submitted documents – Form B, SLD, intertie settings summary, protection philosophy docs, etc.
- Missing indication of required SCADA equipment
- Disconnect switches not being clearly labelled for the requirements of the TIR (i.e. accessible, visible break, lock-able, etc.)

Common SLD Errors Cont.

- Poor revision control/lack of revision control which leads to confusion when trying to address the issues with a specific SLD
- Correct nomenclature of HVI/LVI as per OGCC requirement
- Directional fault indicator not indicated
- HV and LV Fuse make & type not indicated
- Inverter make & model replaced without submitting a revised Form B
- Incomplete SLDs such as missing operating designation NC#, DG disconnect name and indication that inverters are CSA 22.2 No. 107.1 certified
- Poor readability of documents due to bad or repeated scanning
- Missing the tabulated summary of DG intertie protection settings (settings may be scattered throughout the protection philosophy document making it difficult and time consuming to review)

Common Deficiencies:

Form B

- Not clearly showing if there is existing generator. When asked for clarifications, they claim the existing does not affect new project. Thus, not indicated. (10.i – FORM B)
- Impedance values for interface transformer (17.f, 17.g – FORM B) and intermediate transformer (18.f, 18.g - FORM B).
- winding connection for interface transformer (17.f, 17.g – FORM B) and intermediate transformer (18.f, 18.g – FORM B).

SLD

- Demarcation point between the utility and the customer
- Interface transformer – Alectra ID
- Interface and intermediate transformers: main specs (KVA, impedance, etc.)
- Clear indication of each type of meters i.e. GLB, Load, Utility, Customer, etc.
- Clear indication of indoor vs outdoor equipment
- Clear indication of new vs. existing equipment

Protection Philosophy

- typical protection elements:
  - reverse power relay
  - over current
  - over/under frequency
  - over/under voltage
- It should be clear layers of protection: step by step (depending on the complexity of the project) and case by case.

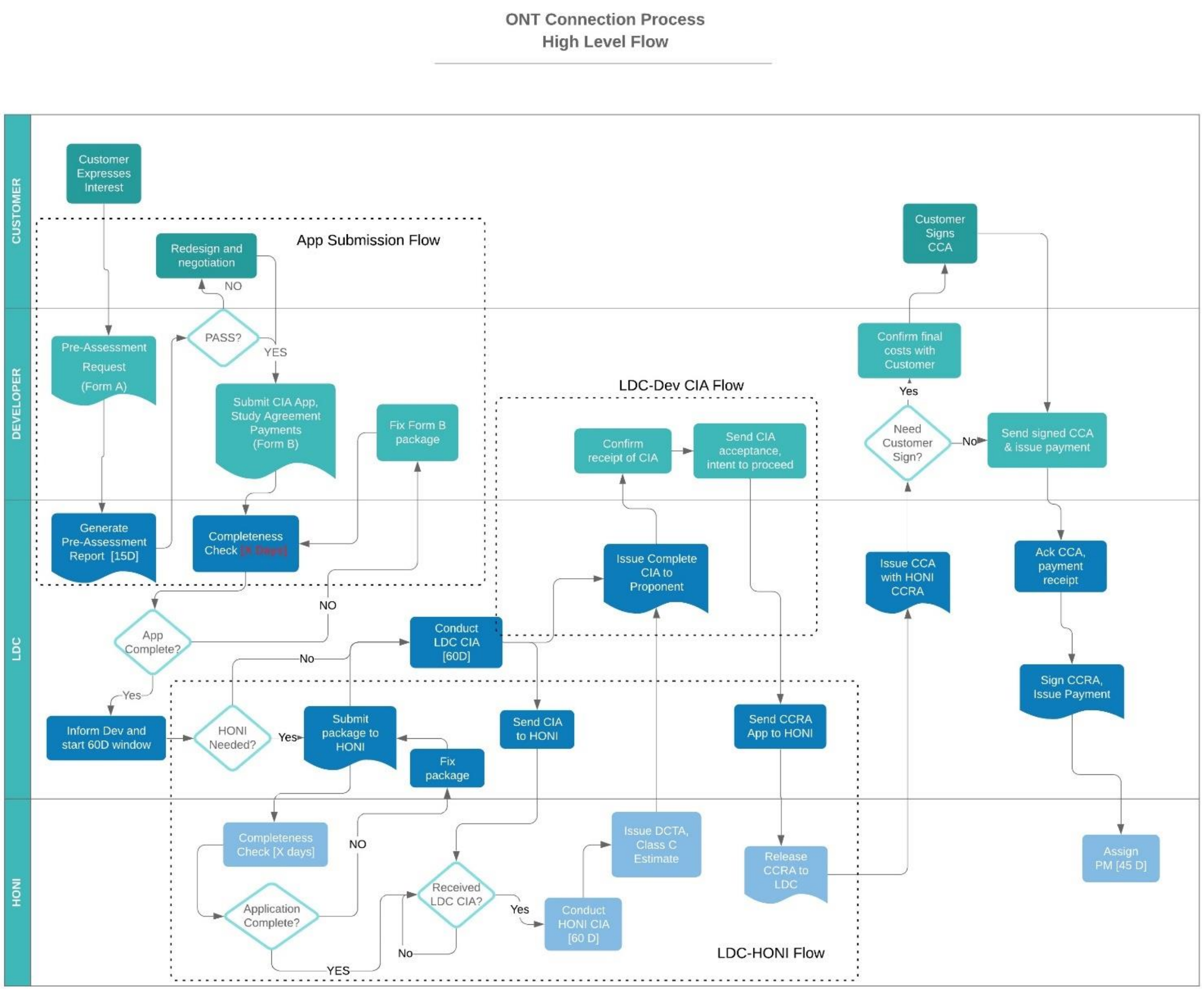
Sequence of Operations

- clear description of normal vs abnormal operations.

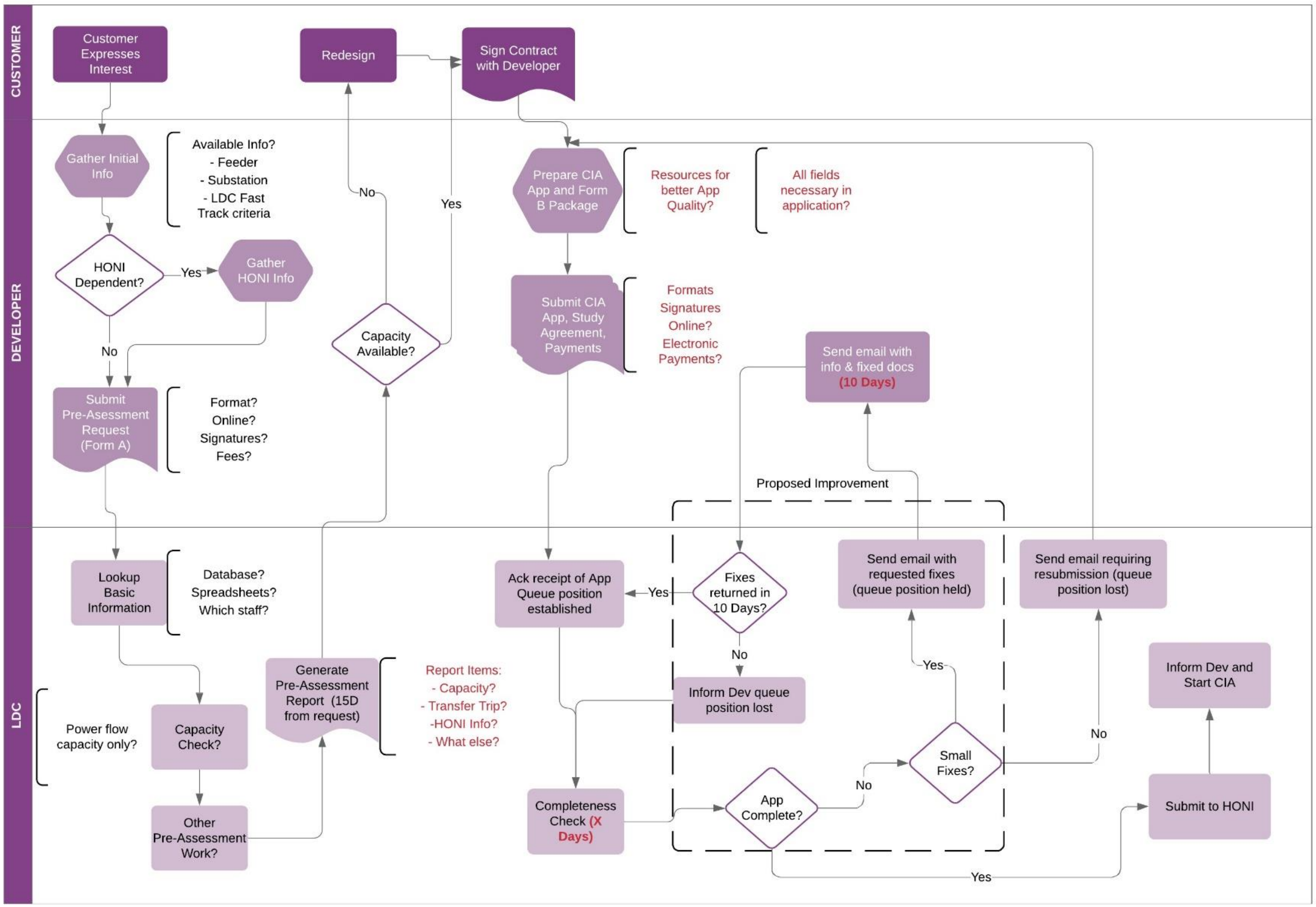
The expectation:

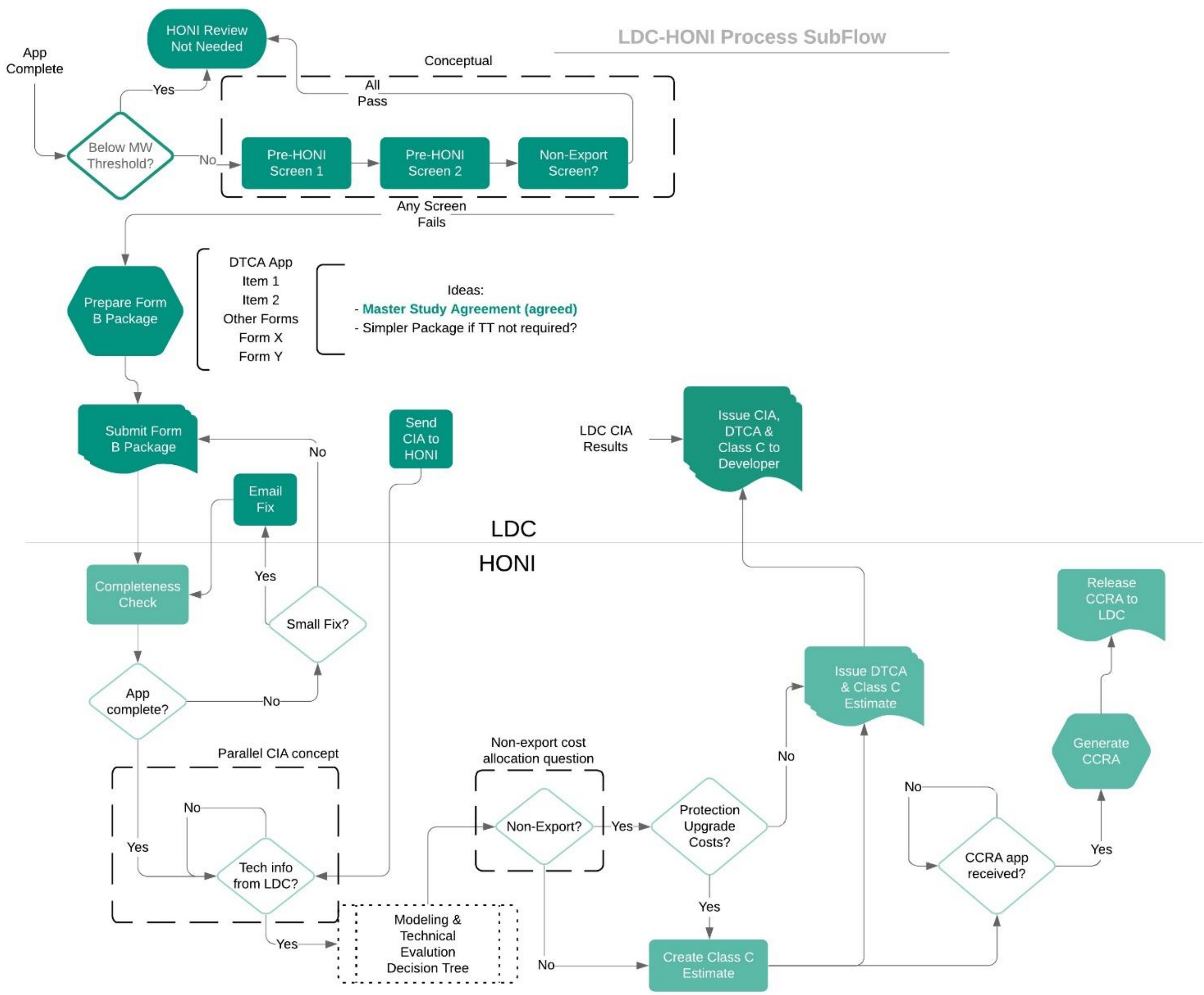
- Normal operations (connected to the utility):
  - Which specific breaker ID is closed, which specific breaker ID is opened as per the SLD
  - Charging batteries – Peak Shaving, Global Adjustment Curtailment etc.
- Abnormal operations (outage):
  - Which specific breaker ID is closed, which specific breaker ID is opened as per the SLD
  - Using/discharging batteries

Appendix E: Process Flow Charts



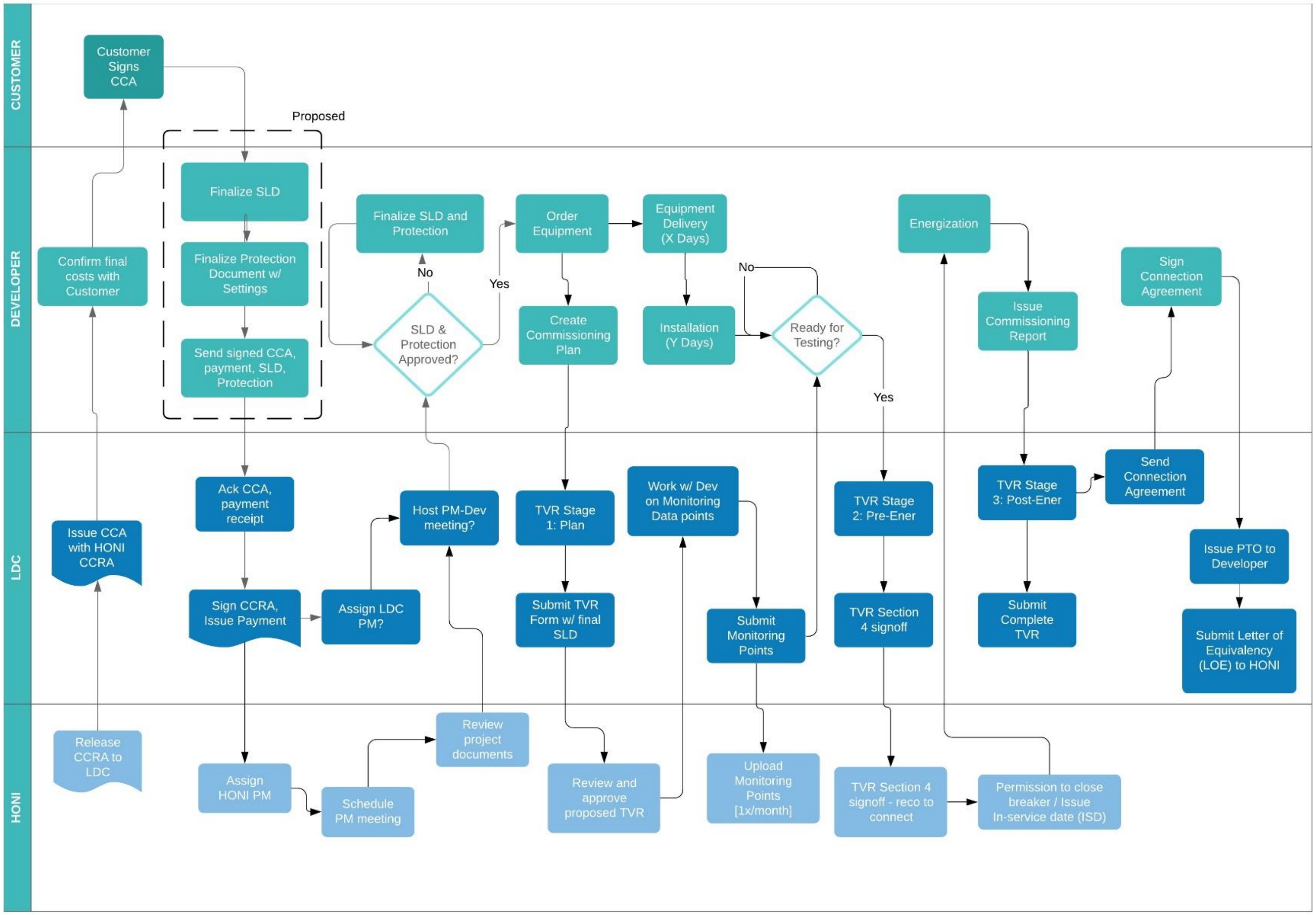
Application Submission Sub-Flow





LDC-HONI Process SubFlow
App Complete
HONI Review Not Needed
Yes
Below MW Threshold?
No
Conceptual
All Pass
Pre-HONI Screen 1
Pre-HONI Screen 2
Non-Export Screen?
Any Screen Fails
Prepare Form B Package
DTCA App
Item 1
Item 2
Other Forms
Form X
Form Y
Ideas:
- Master Study Agreement (agreed)
- Simpler Package if TT not required?
Submit Form B Package
No
Send CIA to HONI
LDC CIA Results
Issue CIA, DTCA & Class C to Developer
Email Fix
LDC
HONI
Yes
Completeness Check
Small Fix?
App complete?
No
Release CCRA to LDC
Issue DTCA & Class C Estimate
Generate CCRA
Parallel CIA concept
Non-export cost allocation question
No
No
Tech info from LDC?
Yes
Non-Export?
Yes
Protection Upgrade Costs?
No
CCRA app received?
Yes
Yes
Modeling & Technical Evalution Decision Tree
No
Create Class C Estimate

CCA, Build &
Commisioning Flow



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Ontario Energy Association

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