



End-to-End Connection Process and Timeline

Part I

May 18, 2010

Welcome

We appreciate you taking the time today to join us as we deliver the next in a series of webinars to help you with various aspects of the connection process.

Our aim is to provide regular, timely and meaningful information to help bring your projects to fruition.

Agenda

1. Review of end to end connection process (Part I)
 - High Level Process Steps to Connect
 - Connection Impact Assessment (CIA); including Distance Limitation impacts
 - Initial Cost Estimate
 - Connection Cost Estimate (CCE)
 - Connection Cost Agreement (CCA)
2. Next Steps (Part II)
3. HST Impacts
4. List of Station Capacity and List of Applications
5. Update from last Webinar

Part I: Steps to Connect

Current Status:

- OPA has awarded FIT Contract

Next Steps (Part I):

- Apply for Connection Impact Assessment (CIA)
 - A CIA is a more detailed assessment of a project's impact on the grid
- Upon completion of the CIA:
 - CIA report is provided along with an Initial Cost Estimate
 - Determine if Connection Cost Estimate (CCE) is required
- Apply and Execute Connection Cost Agreement (CCA)

Step 1: Connection Impact Assessment (CIA)

- Proponent applies for a CIA with Hydro One by submitting a completed Form B application and Study Agreement electronically (fax or email)
- Each FIT application is assigned a unique impact assessment priority time window by the OPA
 - Capacity Allocation Required (CAR) projects will have been scheduled a **1 hour** window
 - Refer to page 2, Item 18 of your FIT Contract for your project's specific Priority Start and Stop times
- You will be the only FIT project applying to Hydro One during that 1 hour window for a CIA which will establish and retain your priority order

CIA Application

- Applications must be submitted in the allocated time window
 - Applications received prior to the allotted window will be reported to the OPA, which could jeopardize your OPA contract
 - Applications received late risk losing their priority sequence
- Once the application has been received by Hydro One the Business Customer Centre (BCC) will send you a confirmation email stating the date and time the electronic documents were received

CIA Application

- The electronic CIA application package consists of:
 - ✓ Copy of a completed Form B - stamped by a licensed Ontario Professional Engineer
 - ✓ Signed Study Agreement
 - ✓ Single Line Diagram - stamped by a licensed Ontario Professional Engineer
 - ✓ A scanned copy of your CIA payment in full - if payment is being made via wire transfer must attach the proof of transfer from the financial institution
- Original documents for the application package must be received by Hydro One no later than **5 business days** following your electronic submission
 - This ensures your project priority

Capacity Allocation Exempt (CAE)

- OPA awards CAE project a FIT Contract
 - OPA does not complete DAT and TAT for CAE projects
- Each CAE FIT application was assigned a unique impact assessment priority time window by the OPA
- Once a completed CIA application is received, Hydro One will review and confirm if there is capacity for the project
- Each station and feeder has a capacity limit which needs to be evaluated

Capacity Allocation Exempt (CAE)

Outcome of the test for capacity:

Option A - *Capacity Available*

- CIA is completed

Option B - *Capacity Not Available*

- Hydro One will notify the Ontario Energy Board (OEB) and the Generator in writing if there is no capacity available
- Hydro One will not take any further steps to connect until a response is received from the OEB

Step 2: CIA Report

Report includes:

- Background And Objective of the Impact Assessment
 - Executive Summary
 - Connection Impact Assessment Study Data and Assumptions
 - Impacts to the Hydro One Distribution System
 - Impacts to the Hydro One Supply Station
 - Other Requirements / Considerations
- As per Distribution System Code the CIA will be provided to you within **60 days** of the receipt of a completed application for a Distribution connected generation facility
 - The application is deemed “completed” once Hydro One verifies the electronic package has all required information included and is technically accurate

Initial Cost Estimate

- CIA Report also includes an initial cost estimate of the proposed connection
- Initial Cost Estimate includes:
 - A typical breakdown of the project by cost responsibility:
 - » Engineering Costs
 - » Material Costs
 - » Labour and Equipment
 - » Administrative Activities
 - Fee for Detailed Connection Cost Estimate Report (optional) which is 30% of customer's engineering costs indicated on the Initial Cost Estimate

Initial DG Connection Cost Estimate Breakdown Sample

[PROJECT NAME]
 [DEVELOPER NAME]
 10 MW [TYPE] Generation
 Project ID # [###]

Revision [#]

[DATE]

Distribution System Cost Responsibility	Customer	Hydro One	Total
Connection Assets	\$ 55,000	\$ -	\$ 55,000
Expansions	\$ 4,692,000	\$ 900,000	\$ 5,592,000
Renewable Enabling Improvements	\$ -	\$ 150,000	\$ 150,000
TOTAL - Distribution System	\$ 4,747,000	\$ 1,050,000	\$ 5,797,000

Transmission System Cost Responsibility	Customer	Hydro One	Total
Station	\$ 299,000	\$ -	\$ 299,000
Telecom	\$ 392,000	\$ -	\$ 392,000
TOTAL - Transmission System	\$ 691,000	\$ -	\$ 691,000

Grand Total Cost Responsibility	Customer	Hydro One	Total
GRAND TOTAL (Distribution + Transmission)	\$ 5,438,000	\$ 1,050,000	\$ 6,488,000

Fee to customer for Class A CCE report (optional) \$ 186,000

Note: GST/HST is extra.

Distribution System	
Connection Assets	
<i>Engineering & Construction Services</i>	
Project planning	\$ 3,000
Project management	\$ 1,000
Review of single-line diagram and protection philosophy	\$ 5,000
Review of draft and final COVER	\$ 6,000
<i>Customer Operations</i>	
Secondary meter upgrade/installation	\$ 23,000
Customer connection at the demarcation point	\$ 12,000
DK Cover/Protection review	\$ 5,000
SUBTOTAL - Connection Assets (cost to be paid by customer)	\$ 55,000
Expansions	
<i>Engineering & Construction Services</i>	
Project planning	\$ 3,000
<i>Customer Operations</i>	
Reconductor 3 phase single circuit	\$ 5,589,000
SUBTOTAL - Expansions	\$ 5,592,000
Less: Expansions - Contribution from Hydro One Networks Inc.	\$ (900,000)
SUBTOTAL - Expansions (cost to be paid by customer)	\$ 4,692,000
Renewable Enabling Improvements (REI)	
<i>Engineering & Construction Services</i>	
Project planning	\$ 3,000
Project management	\$ 7,000
Engineering coordination	\$ 4,000
Voltage regulating controller(s)	\$ 17,000
Single-phase distribution station (DS) recloser(s)	\$ 119,000
SUBTOTAL - Renewable Enabling Improvements (REI)	\$ 150,000
Less: REI - Contribution from Hydro One Networks Inc.	\$ (150,000)
SUBTOTAL - REI (cost to be paid by customer)	\$ -
TOTAL - Distribution System	\$ 5,797,000
Less: Total contribution from Hydro One Networks Inc.	\$ (1,050,000)
TOTAL - Distribution System (cost to be paid by customer)	\$ 4,747,000
Transmission System	
Station	
<i>Engineering & Construction Services</i>	
Project planning	\$ 3,000
Project management	\$ 14,000
Engineering coordination	\$ 7,000
Protection coordination and settings	\$ 23,000
Feeder protection upgrade to D60 relay	\$ 114,000
Potential transformers (PTs)	\$ 94,000
Modification(s) to existing SCADA infrastructure	\$ 44,000
SUBTOTAL - Station (cost to be paid by customer)	\$ 299,000
Telecom	
<i>Engineering & Construction Services</i>	
Project planning	\$ 3,000
Project management	\$ 18,000
Engineering coordination	\$ 10,000
Transfer trip using NDS570 at transformer station (TS)	\$ 102,000
High voltage transfer trip using NDS570	\$ 74,000
Optical Isolator(s) at transformer station(s) (TS)	\$ 180,000
Customer support for wireless SCADA (DG monitoring)	\$ 4,000
NOMS outage request & Xng database update	\$ 1,000
SUBTOTAL - Telecom (cost to be paid by customer)	\$ 392,000
TOTAL - Transmission System (cost to be paid by customer)	\$ 691,000
Grand Total	
GRAND TOTAL (Distribution System + Transmission System)	\$ 6,488,000
Less: Total contribution from Hydro One Networks Inc.	\$ (1,050,000)
GRAND TOTAL CONTRIBUTION REQUIRED FROM CUSTOMER	\$ 5,438,000

Note: GST/HST is extra.

Distribution Cost Responsibility Summary*

Distribution Investment Type	Previous Cost Responsibility	Revised Cost Responsibility
Distribution Connection Assets	Generator	Generator (no change)
Distribution Expansions	Generator	Costs up to a "Renewable Expansion Cost Cap" of \$90,000 per MW: Distributor Costs in excess of cap: Generator Costs of Expansions included in an OEB-Approved Plan: Distributor
Dx Renewable Enabling Improvements (REI)	Generator	Distributor
Upstream Dx or Tx Investments	Generator	Generator (no change)

* In accordance with the Distribution System Code, as amended Oct. 21, 2009.

System Impact Assessment (SIA) & Transmission Customer Impact Assessment

- SIA and Transmission Customer Impact Assessment are required for projects greater than 10MW
 - An SIA is conducted by the IESO in order to assess the impact of the connection proposal on the reliability of the integrated power system
 - Hydro One Distribution will initiate the SIA with the IESO once the initial CIA is completed
 - The IESO will coordinate the Transmission Customer Impact Assessment with Hydro One Transmission
 - The SIA and Transmission Customer Impact Assessment will be completed within 150 days

Distance Limitation Criteria

- OPA will provide a letter to the proponent from Hydro One when the FIT Contract is awarded
 - Letter indicates the project is impacted by the Distance Limitation Criteria
- The letter will direct you to contact Hydro One's BCC
- A Hydro One DG Consultant will contact you to review the voltage fluctuation issue and discuss preliminary findings from the DAT (if available)
- Detailed options for your project to connect will be evaluated after completion of the initial CIA
 - The initial CIA will identify upgrades which will allow the project to pass the distance limitation criteria

CIA Distance Limitation Impacts

- Project is impacted by the Distance Limitation Criteria
 - CIA will still be completed within 60 days
 - Hydro One will contact impacted projects to review options after the completion of the initial CIA
 - CIA report will include an option to satisfy the Distance Limitation Criteria for the project to connect which may include:
 - » moving the PCC and/or
 - » reducing capacity

CIA Distance Limitation Impacts

- If the initial CIA is completed and the options proposed by Hydro One are not feasible for the project, the Generator may choose to propose a solution on their side of the PCC:
 - Submit proposed solution to Hydro One based on Hydro One's functional and performance standards for an alternative solution
 - Revised CIA will be completed
 - Proposed solution will need to undergo detailed acceptance testing prior to being allowed to connect
 - If connected, the generator will be closely monitored to ensure technical boundaries are maintained

Step 3: Connection Cost Estimate (optional)

- CIA is completed and provided to the proponent
- You have the **option** to apply for a detailed Connection Cost Estimate (CCE)
 - A CCE includes:
 - » Full detailed report from site visits, staking activities, equipment, additional connection requirements
 - » More accurate connection cost information
- Proponent will contact Hydro One's BCC to apply and make payment
- CCE will be completed and sent to the proponent within **90 days** of the receipt of a completed CCE application

Step 4: Connection Cost Agreement

- Applicant will contact Hydro One's Business Customer Centre to apply for the CCA
 - Payment for 100% of estimated connection cost is required (customer's contribution per estimate)
- The Generator is required to execute the Connection Cost Agreement (CCA) within 6 months of the initial completed CIA being sent to the proponent
 - CCA application to Hydro One must be submitted at least 45 days in advance of the 6 month deadline to allow for completion

Connection Cost Agreement (CCA)

- Upon execution of CCA, in-service date will be negotiated at the kick-off meeting
- If CCA is not executed within 6 months, or payment in full is not received, Hydro One will release the capacity and withdraw the CIA. Upon connection, payment is trued up against actual costs

Next Steps

- Part II of the connection process discussion will be held via webinar late June:
 - Engineering, Procurement and Construction
 - Confirmation of Verification Evidence Report
 - Distribution Connection Agreement
 - Connection Requirements
 - Post-Connection Activities
 - Etc.

Impact of HST on CIA

- Your CIA fee may be subject to GST, HST, or a combination of both, during the transition period for the implementation of HST

Payment Received	Applicable Tax
Before May 21, 2010	100% GST
From May 21, 2010 to June 10, 2010	50% GST and 50% HST
After June 10, 2010	100% HST

List of Allocated Capacity

- Station capacity on Hydro One's List of Allocated Capacity was adjusted in preparation for FIT
- The Connection Availability Table posted by the OPA at FIT launch includes station capacity values
- OPA's values account for RESOP contracts awarded at the time of FIT launch
- Station capacity values represent the technical capability of the station to accept new generation

List of Allocated Capacity (Old)

AGIMAK DS		
Thermal Capacity (MW) = 7		
Short Circuit Capacity (MVA) = 652		
	F1	F2
Allocated Capacity (MW)	0	0

AGINCOURT TS												
Thermal Capacity (MW) = Sum of Buses												
Short Circuit Capacity (MVA) = N/A												
S = 11						Y = 11						
Thermal Bus Capacity (MW)												
Short Circuit Bus Capacity (MVA)												
S = 124												
Y = 125												
	M2	M4	M5	M5	M10	M12	M1	M3	M5	M7	M11	
Allocated Capacity (MW)	0	0	0	0	0	0	0	0	0	0	0	0

Station may supply another LDC's territory.
[Refer to OPA FIT LDC.](#)
[locator tool to find LDC.](#)

*ALBION TS			
Thermal Capacity (MW) = Sum of Buses			
Short Circuit Capacity (MVA) = N/A			
S = 9		JY = 9	
Thermal Bus Capacity (MW)			
Short Circuit Bus Capacity (MVA)			
S = 113			
JY = 112			
For any information or inquiries please contact Hydro Ottawa			

Station may supply another LDC's territory.
[Refer to OPA FIT LDC.](#)
[locator tool to find LDC.](#)

ALEXANDER DS		
Thermal Capacity (MW) = 10		
Short Circuit Capacity (MVA) = N/A		
	F1	F4
Allocated Capacity (MW)	5.5	5.4

[ALEXANDER DS IS](#)
[Southwest of SOUTH](#)
[MARCH TS MS](#)

ALLANBURG TS			
Thermal Capacity (MW) = 22			
Short Circuit Capacity (MVA) = 195			
	M5	M7	M8
Allocated Capacity (MW)	0	0	0

ALLISTON TS						
Thermal Capacity (MW) = 62						
Short Circuit Capacity (MVA) = 407						
	M1	M2	M3	M4	M5	M6
Allocated Capacity (MW)	0	0	0	10	0	10

ALMONTE TS			
Thermal Capacity (MW) = 24			
Short Circuit Capacity (MVA) = N/A			
J = 17		G = 29	
Thermal Bus Capacity (MW)			
Short Circuit Bus Capacity (MVA)			
J = 1115			
G = 1161			
	M25	M25	M25
Allocated Capacity (MW)	5	0	0

ARDOCH DS		
Thermal Capacity (MW) = 6		
Short Circuit Capacity (MVA) = 75		
	F1	F2
Allocated Capacity (MW)	0	0

ARMITAGE TS DESN 1								
Thermal Capacity (MW) = 110								
Short Circuit Capacity (MVA) = 402								
	M11	M12	M13	M14	M21	M22	M23	M24
Allocated Capacity (MW)	0	0	0	0	0	0	0	0

Station may supply another LDC's territory.
[Refer to OPA FIT LDC.](#)
[locator tool to find LDC.](#)

List of Station Capacity and List of Applications

- Distribution System Code requires Distributors to:
 - ✓ Publish information on the capacity for new generators on the Dx system
 - ✓ Identify the potential capacity available for the connection of generation to stations owned by Hydro One
 - ✓ List current applications for the connection of renewable generation facilities by application date and including the proposed name-plate capacity
- List of Station Capacity: technical information – voltage level, minimum load, station thermal capacity, short circuit capacity, and upstream TS and feeder
- List of Applications: document lists ALL applications eligible for a CIA on the Hydro One Distribution system

Sample – List of Station Capacity

Station Name	BUS Name	Dx Details Feeders	Tx - LV Level (KV)	Station Minimum Load	Station Thermal Capacity (MVA)	Station Short Circuit Capacity (MVA)	Upstream TS	Upstream TS feeder
AGIMAK DS	Total	F1, F2	24.9	1.0	7.0	652		
AGINCOURT TS	B	M2,M4,M5,M8,M10,M12	27.6	14.4	10.8	124		
AGINCOURT TS	Y	M1,M3,M5,M7,M11	27.6	13.2	10.8	125		
AGINCOURT TS	Total	M2,M4,M5,M8,M10,M12,M1,M3,M5,M7,M11	27.6	27.4	Sum of Buses	0		
ALBION TS	Total	N/A	12.5	35.8	Sum of Buses	0		
ALBION TS	BQ	N/A	12.5	20.9	9.0	113		
ALBION TS	JY	N/A	12.5	14.3	9.0	112		
ALEXANDER DS	B1	F1,F3	27.6	4.5	12.5	N/A	SOUTH MARCH TS	M5
ALEXANDER DS	B2	F2,F4	27.6	2.3	10.3	N/A	SOUTH MARCH TS	M5
ALEXANDER DS	Total	F1,F2,F3,F4	27.6	6.9	14.9	N/A	SOUTH MARCH TS	M5
ALLANBURG TS	Total	M6, M7, M8	27.6	9.8	21.8	212		
ALLISTON TS	Total	M1, M2, M3, M4, M5, M6	44	21.6	61.5	467		
ALMONTE TS	J	M25	44	1.8	21.8	1142		
ALMONTE TS	Q	M26, M28	44	7.7	28.7	1148		
ALMONTE TS	Total	M25,M26,M28	44	10.6	29.1	0		
ARDOCH DS	Total	F1, F2	12.5	0.5	6.5	75		
ARMITAGE TS DEGN 1	QJ	M11, M12, M13, M14, M21, M22, M23, M24	44	59.6	118.0	411		
ARMITAGE TS DEGN 2	EY	M31, M32, M33, M34, M41, M42, M43, M44	44	60.4	85.2	300		
ARNPRIOR TS	Total	M1, M2	44	15.4	33.1	907		
AYLMER TS	Total	M1, M2	27.6	3.2	10.0	529		
BARRIE TS	Total	M1, M2, M3, M4, M5, M6, M7	44	24.5	68.5	644		
BASIN TS	A5A6	T3A5, T3A6, T5A5, T5A6	13.8	10.7	9.0	65		
BASIN TS	A7A8	T3A7,T3A8, T5A7, T5A8	13.8	9.5	8.1	65		
BASIN TS	Total	T3A5, T3A6, T5A5, T5A6, T3A7, T3A8, T5A7, T5A8	13.8	21.5	Sum of Buses	0		
BATHURST TS DEGN 1	B	M10,M4,M5, M6, M8	27.6	14.9	39.9	94		
BATHURST TS DEGN 1	Y	M1,M2,M3,M7,M9	27.6	11.8	41.8	108		
BATHURST TS DEGN 1	Total	M1,M2,M3,M7,M9,M10,M4,M5, M6, M8	27.6	26.6	Sum of Buses	0		
BATHURST TS DEGN 2	Total	M23,M25,M27,M31,M24,M26,M30,M32	27.6	24.0	Sum of Buses	0		
BATHURST TS DEGN 2	J	M24,M26,M30, M32	27.6	11.7	27.8	97		
BATHURST TS DEGN 2	Q	M23,M25,M27,M31	27.6	12.3	33.8	98		
BATTERSEA DS	T1	F1,F2	12.5	1.1	7.1	409		
BATTERSEA DS	T2	F3	12.5	1.0	7.7	396		
BATTERSEA DS	Total	F1,F2,F3	12.5	2.0	8.0	0		
BEACH TS - DEGN1	B1B2	M11, M12, M13, M14, M21, M22, M23, M24	13.8	9.2	0.5	21		
BEACH TS - DEGN1	Total	M11, M12, M13, M14, M21, M22, M23, M24,M51,M52,M53,M54,M61,M62,M63	13.8	17.4	Sum of Buses	34		
BEACH TS - DEGN1	Y1Y2	M51,M52,M53,M54,M61,M62,M63,M64	13.8	8.2	5.4	41		
BEACH TS - DEGN2	Total	M41,M42,M43, M44, M31,M32,M33,M34,M71,M72,M73,M74,M81,M82,M83,M84	13.8	0.4	Sum of Buses	21		
BEACH TS - DEGN2	J1J2	M71,M72,M73,M74,M81,M82,M83,M84	13.8	7.1	2.8	34		
BEACH TS - DEGN2	Q1Q2	M41,M42,M43, M44, M31,M32,M33,M34	13.8	6.7	5.8	20		

Sample – List of Applications

Project Number	Station	Tx Feeder	Dx Station	Dx Feeder	CIA Initiated Date	Proposed Total Capacity (kW)
752	ALLANBURG TS	KM3			11/28/2006	1,056
2179	ALLISTON TS	M4			9/7/2007	10,000
1830	ALLISTON TS	M6			5/15/2008	10,000
63	ALMONTE TS	M25			3/7/2007	5,000
1076	ARMITAGE TS	M43			8/16/2007	1,500
1845	ARMITAGE TS	M32			5/15/2008	10,000
1846	ARMITAGE TS	M32			5/15/2008	10,000
1208	ARNPRIOR TS	M2			9/28/2007	10,000
1209	ARNPRIOR TS	M2			9/28/2007	10,000
561	AYLMER TS	M2			12/4/2006	848
2098	AYLMER TS	M2			7/17/2008	10,000
1266	BASIN TS	A17BN, A19BN, A25BN			2/5/2007	4,160
746	BATHURST TS	M7			10/1/2006	6,000
1054	BATTERSEA DS	F1			11/14/2007	498
2168	BEAMSVILLE TS	M1			2/12/2008	10,000
2167	BEAMSVILLE TS	M2			2/12/2008	10,000
2022	BEAMSVILLE TS	M2			6/20/2008	10,000
1946	BEARDMORE DS	F2			6/18/2008	700
1668	BEAVERTON TS	M27	PORT BOLSTER DS	F2	4/2/2008	100
10,110	BEAVERTON TS	M24			2/12/2009	2,000
10,140	BEAVERTON TS	M24			2/12/2009	2,500
8	BELLE RIVER TS	M2			2/29/2000	10,000
837	BELLEVILLE TS	M5	STIRLING DS	F3	8/22/2007	498
10,130	BELLEVILLE TS	M7			2/12/2009	6,800
1123	BRANTFORD TS	M26			8/15/2007	8,100
1402	BROCKVILLE TS	M3	BROCKVILLE SCHOFIELD DS	F41	1/7/2008	90
1932	BROWN HILL TS	M1			5/22/2008	10,000
1017	BUCHANAN TS	M21			7/18/2007	10,000
1018	BUCHANAN TS	M21			7/18/2007	10,000
1994	BUCHANAN TS	M22			6/9/2008	2,850
2125	BUCHANAN TS	M22			7/4/2008	10,000
2126	BUCHANAN TS	M22			7/4/2008	7,000
750	BUNTING TS	BUM55 (BUM61)			5/30/2006	2,000

List of Station Capacity and List of Applications

- Proponents may reference the lists in order to determine capacity limits and general feasibility
- LOSC and LOA are located on the Distribution-Connected Generators webpage

<http://www.hydroone.com/Generators/Pages/Distribution.aspx>

- Released April 30, 2010

Update from last Webinar

Technical Working Group on Feeder Distance Issues

- Working Group on Technical Issues Regarding Distributed Generation Connections to Long Feeders has been established
- Terms of Reference were sent to five associations:
 - CanWEA, CanSIA, APAO (Agri-Energy Producers Association of Ontario), OWA and OSEA
- Associations were asked to delegate two technical representatives to attend on their behalf
- Kick-off meeting was held April 8th
- Third meeting was on May 6th
- Duration of Working Group 8-10 weeks

Thank You

We trust that today's webinar was helpful to you and we thank you for joining us today.

We appreciate your questions and your feedback, so please do not hesitate to contact us.

Your input will help us to ensure that these webinars are meaningful and helpful to you.

Important Contact Information

Hydro One

Web: www.HydroOne.com

E-mail: DXGenerationConnections@HydroOne.com

Phone: 1-877-447-4412 (Option #2)

Ontario Power Authority

Web: www.powerauthority.on.ca

Phone: 1-888-387-3403