# **Appendix 3: Comparison of Existing and Proposed DG Interconnection Agreements**

Category	OEB Distribution System Code Appendix F	OEB Transmission System Code	BC Hydro	Alberta	Interstate Renewable Energy Council	Markham Hydro Distribution Inc. (Power Stream)	Public Services Commission of Wisconsin	FERC Appendix F
Size	Mid-Size (500 kW to <10 MW) connected on distribution systems at voltages above 15 kV	Transmission Connected	All distribution connected generation	All distribution connected generation	• Up to 10 MW	Substation     Connection	• 20 kW to 15 MW	• Up to 20 MW
Main Sections	Connection Requirements in Appendix F	<ul> <li>The agreement consists of 9 main prts plus Schedules:</li> <li>General (13 sub parts)</li> <li>Representations and warranties (two sub parts)</li> <li>Liability and Majeure (two sub parts)</li> <li>Dispute Rsolution (one sub part)</li> <li>Term, Termination and Event of Default (two sub parts)</li> <li>Disconnection and Reconnection ( one sub part)</li> <li>Exchange and Confidentiality of Information (one sub part)</li> <li>Transmission Service and other Charges (one sub part)</li> <li>Technical and Operating Requirements (five sub parts)</li> <li>Schedules (11 schedules)</li> </ul>	<ul> <li>The agreement consists of 10 main sections:</li> <li>1. System &amp; Services</li> <li>2. Terms &amp; Termination</li> <li>3. Interconnection Operation</li> <li>4. Liabilities</li> <li>5. Force Majeure</li> <li>6. Regulatory Approvals</li> <li>7. Dispute</li> <li>8. Notice</li> <li>9. General provision</li> <li>Schedule A – connection requirements.</li> </ul>	<ul> <li>The agreement cosmists of 9 main sections:</li> <li>Recitals         <ol> <li>Intent of Parties</li> <li>Operating Authority</li> <li>Operating in Charge</li> <li>Description</li> <li>Suspension of Interconnection</li> <li>Safe Work Planning</li> <li>Maintenance Outage</li> <li>Access</li> <li>Revision and Approvals</li> <li>Signatures</li> </ol> </li> </ul>	<ul> <li>The agreement cosmists of 10 main sections plus exhibits:</li> <li>Recitals         <ol> <li>Scope and Limitations</li> <li>Inspection, Testing, Authorization and Access</li> <li>Term, Termination and Disconnection</li> <li>Cost responsibility</li> <li>Billing, payment, Milestone, Financial Security</li> <li>Assignment, Liability, Indemnity, Force Majeure, Consequential Damages, Default</li> <li>Insurance</li> <li>Disputes Resolution</li> <li>Miscellaneous</li> <li>Notice Signatures</li> </ol> </li> </ul>	<ul> <li>The agreement cosmists of 6 main sections and 7 Appendices : Recitals</li> <li>Introduction</li> <li>Definitions</li> <li>Assignment of responsibility</li> <li>Work Co-ordination and protection</li> <li>Electrical Plant Revisions</li> <li>General</li> </ul>	<ul> <li>The agreement consists of 16 section: Recitals</li> <li>Design Requirements</li> <li>Representation and Warranties</li> <li>Interconnection Device</li> <li>Modifications to DG facility</li> <li>Insurance</li> <li>Indemnification</li> <li>Commissioning</li> <li>Access</li> <li>Disconnection for maintenance</li> <li>Disconnection without notice</li> <li>Disputes</li> <li>Amendments</li> <li>Term</li> <li>Assignment</li> <li>Signatures</li> </ul>	<ul> <li>The agreement cosmists of 14 main Articles</li> <li>Scope and Limitations</li> <li>Inspection, Testing, Authorization and Access</li> <li>Term, Termination and Disconnection</li> <li>Cost responsibility</li> <li>Cost responsibility for Network upgrades</li> <li>Billing, payment, Milestone, Financial Security</li> <li>Assignment, Liability, Indemnity, Force Majeure, Consequential Damages, Default</li> <li>Insurance</li> <li>Confidentiality</li> <li>Disputes</li> <li>Taxes</li> <li>Miscellaneous</li> <li>Notice</li> <li>Signatures</li> </ul>
Number of Pages	• 37	• 91	• 18 pages including cover page and table of contents	• 3	• 12	12 plus Appendices	• 4	28 pages including cover page and table of contents
Table of Constants	s • N/A	• 4 pages	Two pages	Not included	Not included	One page	Not included	Two pages

## **Comparison of Existing and Proposed DG Interconnection Agreements**

Category	OEB Distribution System Code Appendix F	OEB Transmission System Code	BC Hydro	Alberta	Interstate Renewable Energy Council	Markham Hydro Distribution Inc. (Power Stream)	Public Services Commission of Wisconsin	FERC Appendix F
Recitals	• N/A	• 4 points	• 5 items 1/3 of page	two paragraphs	• Three points- 1/3 of page	Three paragraphs	• 5 items (1/3 of a page	• two statements
Technical Requirements	<ul> <li>Appendix F details the connection process with includes Distributor's response time</li> <li>Appendix F details connection requirements which are mainly based on IEEE 1547 and CSA.</li> </ul>	• Schedules E, F and G detail requirements (23 pages).	• Connection requirements are attached as Schedule A. Project Specific connection requirement issued by BC Hydro in addition to the published "35 kV and Below Interconnection Requirements for Power Generators"	The agreement assumes that all applicators codes and regulations have been met prior to connection	• Reference to IEEE 1547. Some specific requirements are listed in the agreement	Reference to OEB     Distribution System     Code, IEEE, CSA,     ANSI,	Reference to the Wisconsin Administrative Code PSC 119.     No technical requirements are described in the document with the exception of the requirement of a disconnect switch so as to provide visual isolation for work protection.	Reference to IEEE and other standards Some specific requirements are listed in the agreement
Representations and Warranties	• N/A	• Sub section each for Generator and Transmitter	• included	Not Included	• Included in the Miscellaneous	Not covered	• 5 bullet points	Included in the Miscellaneous
Cost Allocation/Respon sibilities	Cost of the required additions and modification of the distribution system to accommodate the generator is borne with the generator	Schedule B covers mechanism for payment of transmission charges but operational costs are not covered	Not covered	Not covered	• Cost responsibility of Interconnection facilities and distribution system	Cost of switching beyond prescribed and work responsibility between parties is covered	Not covered	Cost responsibility of Interconnection facilities and distribution system
Interconnection point	Isolating disconnect switch required as part of the Technical Requirements	• Isolating disconnect switch required as part of the technical requirements in Schedule E	Connection requirement document	Included in project description	• Not mentioned, but part of interconnection approval process and to be shown on the single line diagram which will be attached as an Exhibit	Connection point and interface item well described	Disconnects switch	• Not mentioned, but part of interconnection approval process and to be shown on the single line diagram which will be attached as an Exhibit
Notification of modifications	• Impact assessment will determine the required modifications for connection	• Schedule A gives contact details and Section 28 and Schedule D provide for transmitter approval of certain modifications	• three paragraphs outlining notification process and liabilities	• Not included except that the DG must meet all of the applicable codes and regulation	• One paragraph requiring the generator to give notice prior to change	Not covered	• one paragraph outlining notification lead time for the various categories of generation	One paragraph requiring the generator to give notice prior to change
Insurance	Not Covered	No express provision	• Liability insurance required - \$5M	Not covered	• Not a requirement but recommended	Not Covered	Liability insurance requirements – two paragraphs	Not a requirement but recommended
Indemnification	Not Covered	• Covered in the liability section and Schedule K	Liabilities and Indemnities – three point including insurance requirements	Not covered	• Five paragraphs in Article 6	Not Covered	• one paragraph	• Five paragraphs in Article 6
Commissioning and Testing	• Addressed but not in detail. Based on ESA.	• Covered in Section 28 and in the technical	Must follow BC     Hydro	Not covered in agreement but	• The Generator shall test and	Reference to codes     and utility practices	• Distributor reserves the right to test of witness	• The Generator shall test and inspect its Small Generator

## **Comparison of Existing and Proposed DG Interconnection Agreements**

Category	OEB Distribution System Code Appendix F	OEB Transmission System Code	BC Hydro	Alberta	Interstate Renewable Energy Council	Markham Hydro Distribution Inc. (Power Stream)	Public Services Commission of Wisconsin	FERC Appendix F
	• Appendix F should be revised to include the complete IEEE 1547 series in which P1547.1 covers commissioning and testing	requirements for new and modified facilities	commissioning procedures (Separate document)	thoroughly covered the Alberta Distributed Generation Interconnection Guide as Appendix H	inspect its Small Generator Facility and interconnection facilities prior to interconnection, and in accordance with IEEE 1547 Standards.		testing prior to in-service	Facility and interconnection facilities prior to interconnection, and in accordance with IEEE and other standards.
Access to Facility	Not Addressed	• Section 27.1 and 27.13	• requirement for BCH staff to enter the generator's property	• requirement for "Wire Owner" staff to enter the generator's property	• requirement for Distributor staff to enter the generator's property	• requirement for Distributor staff to enter the generator's property	• requirement for Distributor staff to enter the generator's property	• requirement for Distributor staff to enter the generator's property
Disconnection for repairs (planned outage)	Not addressed	The Transmitter has the right to request disconnection of the generator for maintenance purposes upon reasonable notice	BC Hydro has the right to request disconnection of the generator for maintenance purposes upon reasonable notice	The Wire Owner has the right to request disconnection of the generator for maintenance purposes upon reasonable notice	The distributor has the right to request disconnection of the generator for maintenance purposes upon reasonable notice.	• The distributor has the right to request disconnection of the generator for maintenance purposes upon reasonable notice	• The distributor has the right to request disconnection of the generator for maintenance purposes upon reasonable notice.	• The distributor has the right to request disconnection of the generator for maintenance purposes upon reasonable notice.
Disconnection without notice	Not addressed	<ul> <li>Part Six dedicated to disconnection</li> <li>Transmitter reserves the right to disconnect if (among others) :</li> <li>Termination of Agreement</li> <li>Non compliance</li> <li>Emergency</li> <li>Default</li> </ul>	<ul> <li>BC Hydro reserves the right to disconnect :</li> <li>Termination of Agreement</li> <li>Non compliance</li> <li>Emergency</li> <li>Default</li> </ul>	<ul> <li>The Wire Owner reserves the right to disconnect :</li> <li>Termination of Agreement</li> <li>Non compliance</li> <li>Emergency</li> <li>Default</li> </ul>	<ul> <li>The Wire Owner reserves the right to disconnect :</li> <li>Termination of Agreement</li> <li>Non compliance</li> <li>Emergency</li> <li>Default</li> <li>Well covered</li> </ul>	Not adequately covered	<ul> <li>The Distributor reserves the right to disconnect :</li> <li>Termination of Agreement</li> <li>Non compliance</li> <li>Emergency</li> <li>Default</li> </ul>	<ul> <li>The Wire Owner reserves the right to disconnect :</li> <li>Termination of Agreement</li> <li>Non compliance</li> <li>Emergency</li> <li>Default</li> <li>Well covered</li> </ul>
Notices	Not addressed	Specified in section 5 and contacts provided in Schedules A and J	•	•	• Contact of both parties to be provided	• Contact of both parties to be provided	•	• Contact of both parties to be provided
Dispute	Not addressed	• Part 4 deals with dispute resolution	Parties right to     appeal	Not Covered	Process Included but not applicable in Ontario	Not covered	Generator right to appeal	Process Included but not applicable in Ontario
Amendments	• The Code may be amended only in accordance with the procedures set out by the Board in the licence issued to a distributor.	<ul> <li>Section 9 describes amendment procedures.</li> <li>Can't amend without leave of Board except where expressly allowed and mutual agreement</li> </ul>	• agreement by both parties	Not Covered	Not Covered	• agreement by both parties	• agreement by both parties	• agreement by both parties
Force Majeure	• Item 2.3 of the main body of the Code covers Force Majeure	Section 16 covers Force     Majeure	Outlines Force     Majeure conditions	Not Covered	Outlines Force     Majeure     conditions. Two     paragraphs	Not Covered	• -	Outlines Force Majeure conditions. Two paragraphs
Assignment	Not Addressed	Written notice	Written notice	Notice required	Written notice	Written notice	Written notice	Written notice

## **Comparison of Existing and Proposed DG Interconnection Agreements**

Category	OEB Distribution System Code Appendix F	OEB Transmission System Code	BC Hydro	Alberta	Interstate Renewable Energy Council	Markham Hydro Distribution Inc. (Power Stream)	Public Services Commission of Wisconsin	FERC Appendix F
Term of agreement	Required as part of     "Condition of Service	Ongoing until both parties agree to terminate or generator ceases to generate or is in default	Ongoing until both parties agree to terminate or generator ceases to generate or default	Ongoing until both parties agree to terminate or generator ceases to generate or default	Ongoing until both parties agree to terminate or generator ceases to generate or default	•	Ongoing until both parties agree to terminate or generator ceases to generate or default	Ongoing until both parties agree to terminate or generator ceases to generate or default
Attachments	<ul> <li>Appendix A to G</li> <li>Appendix F covers embedded generation</li> </ul>	<ul> <li>Schedule A: single line diagram, description of the customer's connection point</li> <li>Schedule B: transmission services and associated charges</li> <li>Schedule C: cure periods for defaults</li> <li>Schedule D: fault levels and modifications requiring approval by the transmitter</li> <li>Schedule E: general technical requirements</li> <li>Schedule F: additional technical requirements</li> <li>Schedule G: protection system requirements</li> <li>Schedule H: facilities deemed compliant and obligation to comply</li> <li>Schedule J: contacts for purposes of notice</li> <li>Schedule K: special provisions</li> </ul>	<ul> <li>Specific Connection requirements including Single line diagram.</li> <li>Contact List</li> </ul>	Single line Diagram and Contact List	<ul> <li>Exhibits to be attached:</li> <li>Details of interconnection</li> <li>Operations requirements – as per IEEE 1547</li> <li>Cost sharing</li> <li>Restrictions</li> <li>Copies of Feasibility, Impact and Facilities Study Agreement</li> </ul>	<ul> <li>Appendix A – Distributor Contacts</li> <li>Appendix B – Customer Contacts</li> <li>Appendix C – Equipment Identification</li> <li>Appendix D - Single line Diagram</li> <li>Appendix E – Contractor notification Form</li> <li>Appendix F - Scheduled time of Operation</li> <li>Appendix G - Addendum</li> </ul>	Single line Diagram and Contact List	<ul> <li>Attachments:</li> <li>Glossary of Terms</li> <li>Description of Costs</li> <li>One Line Diagram</li> <li>Milestones</li> <li>Additional Operating requirements for Transmitter</li> <li>Transmission Provider estimate</li> </ul>
OTHERS	•	•	•	•	•	•	•	•
Connection Requirements	Appendix F	• Technical requirements part of agreement	Separate detailed connection requirement document	Separate detailed connection requirement document	• Separate detailed connection requirement document	• Separate detailed connection requirement document	Separate detailed connection requirement document	Separate detailed connection requirement document
Connection Requirement Document	• Appendix F	• The Transmission System Code forms an integral part of the Connection Agreement	35 kV and Below Interconnection Requirements for Power Generators	<ul> <li>Alberta Distributed Generation Interconnection Guide</li> <li>67 Pages includes sample agreement as Schedule C</li> </ul>	• Relies on IEEE 1547, UL 1741 and FERC Order 2006 for certification of generators	OEB Distribution System code and other standards	Wisconsin Administration Code Chapter PSC 119	Connection requirements rely on IEEE and other applicable standards