



Bioenergy Call, Phase I

Study Overview and Data Requirements

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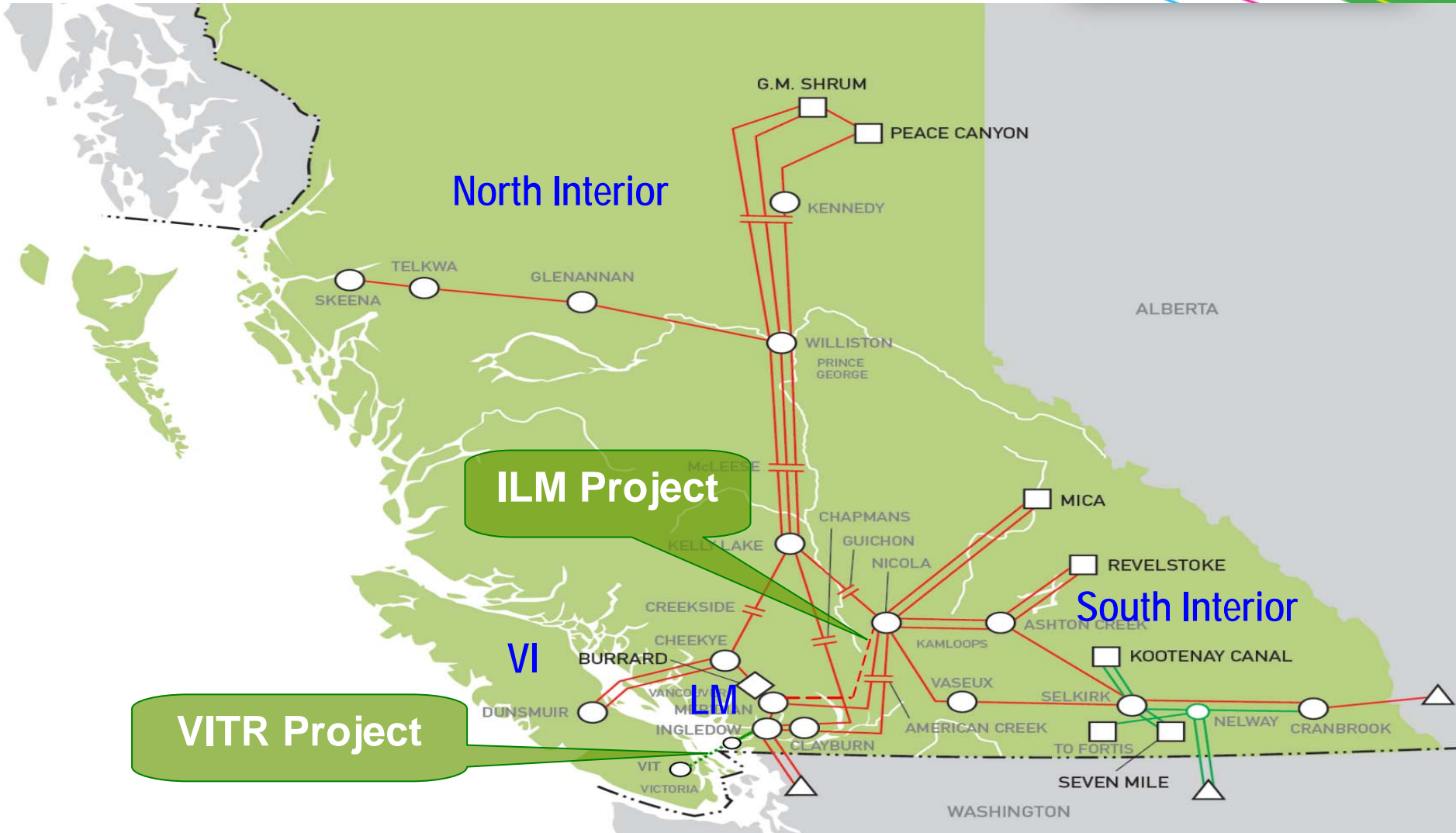
Interconnection Planning, BCTC

Feb. 20, 2008

Outline

1. **BC Transmission System**
2. **BCTC Studies for BioEnergy Call**
3. **Data Requirements for Interconnection Studies**
4. **Application Data Sheets (GIES form)**

BC Transmission System



BC Transmission System

- **Bulk Transmission System**

500 kV, 360 kV and parts of 230 kV

- **Regional Transmission System** ← T-IPP

60 kV, 138 kV and 230 kV system

Distribution System Managed by BCH

Voltage level ≤ 35 kV

← D-IPP



BC Transmission
CORPORATION

Building Connections

General Guidelines for T-IPP vs D-IPP

- If your project is 15 MW+, then you are likely a transmission customer and you should:
 - Submit your Interconnection Request to BCTC by March 7, 2008; and
 - Finalize your complete application by April 7, 2008
- If your project is smaller than 15 MW, then you are likely a distribution interconnection customer and you should:
 - Submit your application to BC Hydro by February 29, 2008

Can you connect your generators into the transmission system like this?



Can you plug your generators into the transmission system like this?

- **No!**
- **BCTC shall ensure that the transmission system reliability meets industry standards (NERC)**
- **Interconnection studies are necessary to look at the interconnection from the thermal, voltage, frequency and stability perspectives to ensure the system can accommodate the interconnection**
- **The studies also provide important information for your consultants to specify your generating facilities**

Transmission Interconnection Requirements

“69 kV to 500 kV Technical Interconnection Requirements (TIR) for Power Generators”

The above document can be found on BCTC’s web:

http://www.bctc.com/generator_interconnection/generator_interconnection_requirements/

Interconnection Studies for the BioEnergy Call

- BCTC, following the CEAP process, will perform Feasibility Study for each IR
 - Requested by the applicant
 - Performed on stand-alone basis
- If the application is successfully selected by BC Hydro, then BCTC will perform the:
 - System Impact Study; and
 - Facility Study

Interconnection Feasibility Study

- **Preliminarily evaluates the feasibility of the proposed interconnection to the transmission system;**
- **Consist of a power flow and short circuit analysis;**
- **Provides a list of facilities and non-binding good faith estimate of cost responsibility and a non-binding good faith estimated time to construct.**

Feasibility Study Report

Table of Content (template)

1.0	General.....	1
2.0	Study Purpose and Scope.....	1
3.0	Study Assumptions	1
4.0	Study Results and Required Upgrades.....	1
5.0	Cost Estimate and Project Schedule	3
6.0	Other Information	4
7.0	Appendix A – Project Single Line Diagram and Locational Map.....	1
8.0	Appendix B – Other Study Assumptions.....	2

Interconnection System Impact Study

- **Evaluates the impact of the proposed interconnection on the reliability of the transmission system;**
- **Consists of a short circuit analysis, a stability analysis and a power flow analysis; and**
- **Provides a list of facilities that are required as a result of the interconnection request and non-binding good faith estimate of cost responsibility and a non-binding good faith estimated time to construct.**

Interconnection Facility Study

- **Specifies and estimates the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the Interconnection System Impact Study in accordance with good utility practice to physically and electrically connect the generating facility to the transmission system;**
- **Identifies the:**
 - **electrical switching configuration of the connection equipment;**
 - **nature and estimated cost of any TPIF and NU necessary to accomplish the interconnection; and**
 - **an estimate of the time required to complete the construction and installation of such facilities**

Interconnection Study Reports

All the previous interconnection study reports for transmission-connected generating projects are posted on BCTC's web:

http://www.bctc.com/the_transmission_system/engineering_reports_studies/sgip_a_e.htm

Inputs to Interconnection Studies

- **Interconnection Request (IR) – prepared by IPP**
 - Generation Interconnection Equipment Statement (GIES)
- **Same Set of Study Base cases –prepared by BCTC**


Generation Interconnection Equipment Statement (GIES)

A standard data input format

- covers all types of generating facilities in the system;
- has two categories of data requests for Feasibility Studies:
 - Required data (Shaded cells);
 - Additional data (non-shaded cells)
- contains a Macro to check completeness of the required data and to highlight the section with missing required data

GIES Forms

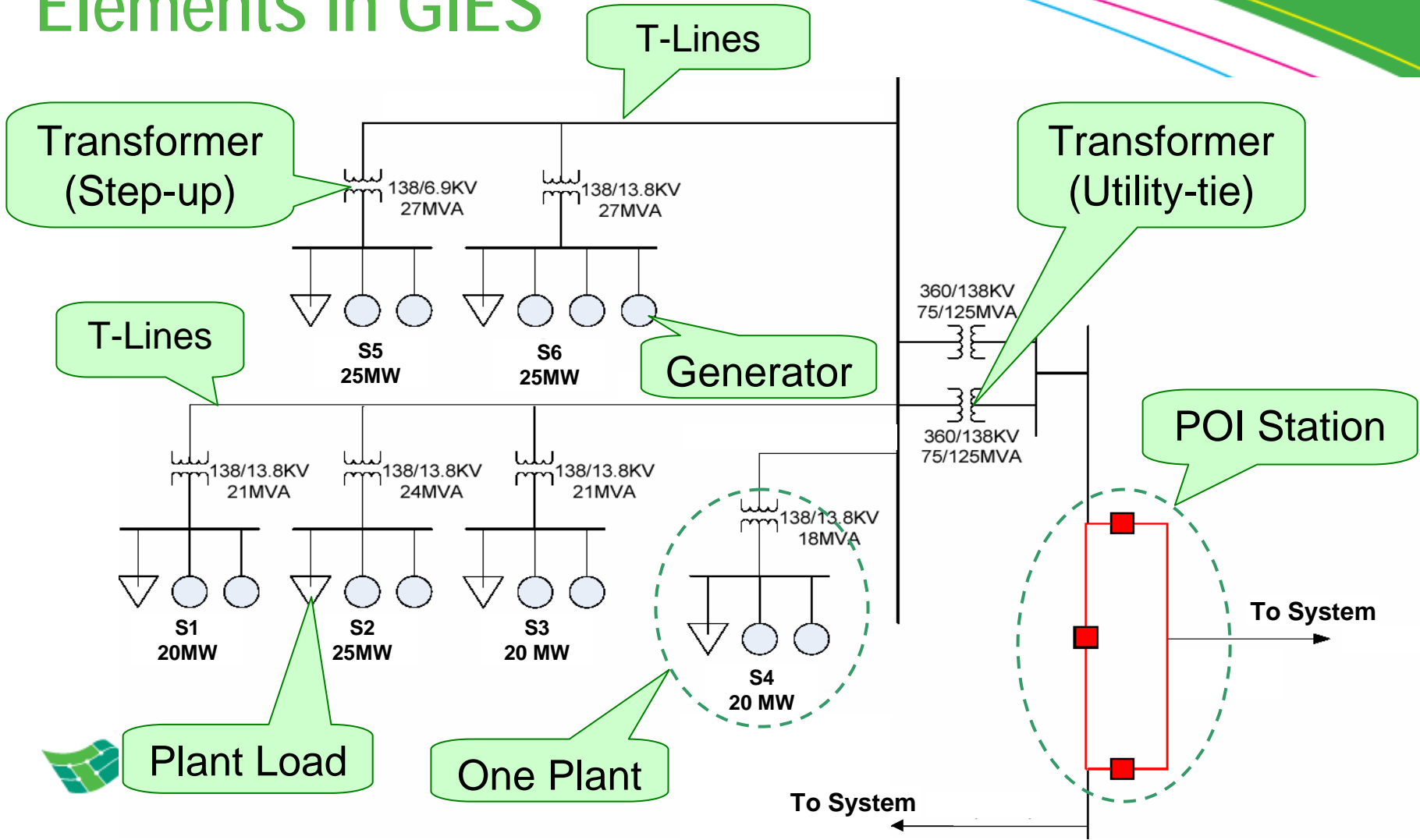
- The electronic version with Macro is available on BCTC's website
- Hard copies are available in your information package

 GENERATOR INTERCONNECTION EQUIPMENT STATEMENT Version: GIEP-09-01 BCTC Service Voltages 69 KV to 500 KV			
Section 1 - Applicant Information			
Company Name	Street Address		
Contact Name	Latitude		
Phone	City		
Fax	Province / State		
E-Mail	Country		
	Postal / Zip Code		
Section 2 - Project Information			
Project Name			
Client / Designer			
Call Number			
Technical Contact	Name, Phone Number, E-Mail		
Project	A) Single conductors B) Overhead (single or double) conductors C) Overhead bundled D) Overhead bundled with		
B-Service Data (Mandatory)			
Provide site geophysical coordinates with accuracy equivalent to the 200 decimal point. Attach a 7.5 minute quadrangle map of the site with latitude and longitude grid. Attach the point, station, and elevation of the site property line on the map. Attach a plan view of the proposed interconnection.			
Latitude (degrees and minutes)	Longitude (degrees and minutes)		
Instructions for Section 3:			
For Feasibility studies, "Typical" values are acceptable. Detailed data in the Feasibility Study column are "required information". Please include all listed information if it is available.	<table border="1"> <tr> <th>Column 1 - Feasibility Study</th> <th>Column 2 - Detailed Information</th> </tr> </table>	Column 1 - Feasibility Study	Column 2 - Detailed Information
Column 1 - Feasibility Study	Column 2 - Detailed Information		
Section 3 - Plant Information			
0.01 Plant Designation			
0.02 Maximum Rated Power (Capacity) of the BCTC Transmission System	(MW)		
0.03 Contingent Capacity to BC Hydro	(MW)		
0.04 GIEP Plant Overriding Capacity	(MW)		
0.05 Total number of generators in plant			
0.06 Total number of generator transformers in plant			
0.07 Total Plant Load (MW)	(MW)		
0.08 Total Plant Load (VARS)	(MVAR)		
0.09 Total Plant Factor Load (See Appendix C-10 in the Design & Section 11 of the GIEP-09-01)	(MW)		
0.10 Total Plant Static Load	(MW)		
0.11 Total Plant Static Power Factor	(PF)		
0.12 Total Plant Available Cost per MWh	(\$/MWh)		
0.13 Referral to be included	(Yes/No)		
0.14 Plant interconnection interconnectivity following a fault indicating that it is agreed on the transmission line?	(Yes/No)		
0.15 Bus length from generator to interconnection station	(km)		
0.16 Line length from interconnection station to Transmission Provider's transmission line	(km)		
0.17 Tower location - identified in the field and plotted on drawing. To be coordinated with Transmission Provider	(Y)		
0.18 Number of third party easements required for transmission line. To be coordinated with Transmission Provider			
0.19 Block Size Capacity (MW/PU)?			
0.20 Is the Overriding Capacity in the Transmission Provider's service area (MW/PU)?			
0.21 "Pilot" to be included in the Transmission Provider's service area (MW/PU)?			
0.22 Minimum Number Poles to be included	(MW/PU)		
0.23 Maximum Overhead Poles to be included	(MW/PU)		
0.24 Maximum Overhead Poles to be included	(MW/PU)		

Generation Interconnection Equipment Statement (GIES)

Section	Information
1	Applicant
2	Project
3	Plant
4	Hydro, Gas and Thermal Generation
5	Wind Generator
6	Transformer (Generator step-up)
7	Transformer (Utility Tie)
8	HV Circuit Breaker
9	Transmission Line
10	Protection
11	Drawing


Elements in GIES



Plant Load

One Plant


Example - Correctly Filled GIES Form

 British Columbia Transmission CORPORATION™		GENERATOR INTERCONNECTION EQUIPMENT STATEMENT Version: GIEP- 08- 01		BCTC Service Voltages 69 kV to 500 kV		
Section 1 - Applicant Information						
Applicant	Company Name:	ABC	Street Address:	1234 BioMass Road		
	Contact Name:	John Smith	Unit/Suite:	708		
	Phone:	(604) 234-2647	City:	Kamloops		
	Fax:	(604) 234-4647	Province / State:	BC		
	E-Mail:	john.smith@abc.com	Country:	Canada	Postal / Zip Code:	v5c2R1
Section 2 - Project Information						
Project	Project Name:	BiaMassBC				
	Owner / Developer:	ABC				
	Consultant Name:	BioMass Engineering				
	Technical Contact:	Name: Larry Fisher	Phone number: (604) 523-4635	E-mail: Larry.fisher@biomass.com		
	In-Service Dates (MM/DD/YYYY):	A) Begin construction:		B) Generator step-up transformer receives back fed power (i.e. for site construction):		
		C) Generator testing:		D) Commercial operation date: 10/31/2012		
Provide site geographical coordinates with seconds expressed to the 2nd decimal point. Attach a 7.5-minute quadrangle map of the site with longitude and latitude border scale. Sketch the plant, station, transmission line and property line on the map. Include dimensions of the proposed interconnection station.						
Longitude (degrees:minutes:seconds)			Latitude (degrees:minutes:seconds)			
122 : 52 : 4.12 W			50 : 15 : 21.34 N			

Example: Completeness Checked by Macro

OATT Feasibility Study Application	Status		
Section 1 - Applicant Information	Complete	Check data	Reset
Section 2 - Project Information	Complete	Check data	Reset
Section 3 - Plant Information	Complete	Check data	Reset
Section 4 - Hydro, Gas or Thermal Generator Information		Check data	Reset
<u>Unit No.</u>	<u>Status</u>		Reset all
Unit 1	Complete		
Unit 2	Complete		
Unit 3	Complete		
Unit 4	Complete		
Unit 5	Complete		
Unit 6	<Empty>		

Example: Missing Data in GIES

 British Columbia Transmission CORPORATION™		GENERATOR INTERCONNECTION EQUIPMENT STATEMENT Version: GIEP- 08- 01		BCTC Service Voltages 69 kV to 500 kV	
Section 1 - Applicant Information					
Applicant	Company Name:	ABC	Street Address:	1234 BioMass Road	
	Contact Name:	John Smith	Unit/Suite:	708	
	Phone:	(604) 234-2647	City:	Kamloops	
	Fax:	(604) 234-4647	Province / State:	BC	
	E-Mail:	john.smith@abc.com	Country:	Canada	Postal / Zip Code:
Section 2 - Project Information					
Project	Project Name:	BiaMassBC			
	Owner / Developer:	ABC			
	Consultant Name:	BioMass Engineering			
	Technical Contact:	Name: Larry Fisher	Phone number: (604) 523-4635	E-mail: Larry.fisher@biomass.com	
	In-Service Dates (MM/DD/YYYY):	A) Begin construction: 05/01/2008		B) Generator step-up transformer receives back fed power (i.e. for site construction): 08/01/2010	
	C) Generator testing: 0101/2012		D) Commercial operation date: 		
Provide site geographical coordinates with seconds expressed to the 2nd decimal point. Attach a 7.5-minute quadrangle map of the site with longitude and latitude border scale. Sketch the plant, station, transmission line and property line on the map. Include dimensions of the proposed interconnection station.					
Longitude (degrees:minutes:seconds)			Latitude (degrees:minutes:seconds)		
122 : 52 : 4.12 W			50 : 15 : 21.34 N		

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Building Connections

Example: Incompleteness checked

OATT Feasibility Study Application

Status

Section 1 - Applicant Information	Complete	Check data	Reset
Section 2 - Project Information	Incomplete	Check data	Reset
Section 3 - Plant Information	Complete	Check data	Reset
Section 4 - Hydro, Gas or Thermal Generator Information		Check data	Reset
<u>Unit No.</u>	<u>Status</u>	Reset all	
Unit 1	Complete		
Unit 2	Complete		
Unit 3	Complete		
Unit 4	Complete		
Unit 5	Complete		
Unit 6	<Empty>		

Example: Non-applicable Items in GIES

Instructions for Section 5:				
For Feasibility studies, "Typical" values are acceptable. Shaded cells in the Feasibility Study column are "required information". Please include additional information if it is available.				
Section 5 - Wind Generator Information		Type 1	Type 2	
Wind Generator	5.01.	Unit Designation		
	5.02.	Manufacturer		
	5.03.	Model		
	5.04.	Serial Number		
	5.05.	Rated MVA		
	5.06.	Rated MW		
	5.07.	Rated Power Factor (specify 'leading" or "lagging")		
	5.08.	Rated kV		
	5.09.	Rated Amperes		
	5.10.	Maximum fault current (net from Windfarm)		
	5.11.	Number of Phases		
	5.12.	Generator Rated Speed		
	5.13.	Generator Type (WRIM, SCIM, Double-Fed Induction, Full Converter, other - specify)		
	5.14.	Slip at rated speed		

Non-applicable item can be left blank or filled with NA



Questions?



Thanks!