APPENDIX 1 to LGIP

Interconnection Request for a Large Generating Facility

1. The undersigned Interconnection Customer submits this request to interconnect its Large Generating Facility with Transmission Provider's Transmission System pursuant to a Tariff.

2. This Interconnection Request is for (check one):

_____ A proposed new Large Generating Facility.

_____ An increase in the generating capacity or a Material Modification of an existing Generating Facility.

_____ Provisional Interconnection Service related to an existing Interconnection Request or Interconnection Agreement. Existing Interconnection Queue Number associated with Provisional Interconnection Service Request is _____.

_____ Surplus Interconnection Service related to an existing Large Generator Interconnection Agreement (LGIA). Existing LGIA Customer offering Surplus Interconnection Service

_____

Surplus Interconnection Customer

_____

Existing Large Generator Location and Related POI where Surplus Service is offered

_____

_____

For Surplus Service, also include (1) proof that Existing LGIA Customer and Surplus Interconnection Customer have entered into a Surplus arrangement and (2) the System Impact Study performed for the Existing Generating Facility with its application or indicate that such study is not available.

3. The type of interconnection service requested (check one):

_____ Energy Resource Interconnection Service

_____ Network Resource Interconnection Service

4. _____ Check here only if Interconnection Customer requesting Network Resource Interconnection Service also seeks to have its Generating Facility studied for Energy Resource Interconnection Service

5. Interconnection Customer provides the following information: for a proposed new Large Generating Facility, an increase to generating capacity or a Material Modification of an existing Generating Facility, or for Provisional Service related to an existing Interconnection Request or Interconnection Agreement. For Surplus Service, the applicant provides the following information for the Surplus Generator that plans to utilize the Surplus Interconnection Service offered at the existing Large Generator Interconnection Customer's Point of Interconnection.

   a. Address or location or the proposed new Large Generating Facility site (to the extent known) or, in the case of an existing Generating Facility, the name and specific location of the existing Generating Facility;

   b. Maximum summer at degrees ___ C and winter at degrees ___ C megawatt electrical output of the proposed new Large Generating Facility or the amount of megawatt increase in the generating capacity of an existing Generating Facility;

   c. General description of the equipment configuration;

   d. Commercial Operation Date (Day, Month, and Year);

   e. Name, address, telephone number, and e-mail address of Interconnection Customer's contact person;

   f. Approximate location of the proposed Point of Interconnection (optional);

   g. Interconnection Customer Data (set forth in Attachment A);

   h. Primary frequency response operating range for electric storage resources;

   i. Requested capacity (in MW) of Interconnection Service (if lower than the Generating Facility Capacity);

   j. If applicable, (1) the requested operating assumptions (i.e., whether the interconnecting Generating Facility will or will not charge at peak load) to be used by Transmission Provider that reflect the proposed charging behavior of a Generating Facility that includes at least one electric storage resource, and (2) a description of any control technologies (software and/or hardware) that will limit the operation of the Generating Facility to its intended operation.

6. Applicable deposit amount as specified in the LGIP.

7. Evidence of Site Control as specified in the LGIP (check one)

   _____ Is attached to this Interconnection Request

   _____ Will be provided at a later date in accordance with this LGIP

8. This Interconnection Request shall be submitted to the representative indicated below: [To be completed by Transmission Provider]

9. Representative of Interconnection Customer to contact: [To be completed by Interconnection Customer]

10. This Interconnection Request is submitted by:

Name of Interconnection Customer: _____

By (signature): _____

Name (type or print): _____

Title:_____

Date: _____

Attachment A to Appendix 1 Interconnection Request

LARGE GENERATING FACILITY DATA UNIT RATINGS

kVA_____ F_____ Voltage _____

Power Factor _____

Speed (RPM)_____ Connection (e.g. Wye) _____

Short Circuit Ratio_____ Frequency, Hertz _____

Stator Amperes at Rated kVA_____ Field Volts _____

Max Turbine MW_____F _____

Primary frequency response operating range for electric storage resources:
Minimum State of Charge: _____

Maximum State of Charge: _____

COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA

Inertia Constant, H =_____kW sec/kVA

Moment-of-Inertia, WR^2 = _____lb. ft.^{2}

REACTANCE DATA (PER UNIT-RATED KVA)

DIRECT AXIS			**QUADRATURE AXIS**	
Synchronous - saturated	X_{dv}	_____	X_{qv}	_____
Synchronous - unsaturated	X_{di}	_____	X_{qi}	_____
Transient - saturated	X'_{dv}	_____	X'_{qv}	_____
Transient - unsaturated	X'_{di}	_____	X'_{qi}	_____
Subtransient - saturated	X''_{dv}	_____	X''_{qv}	_____
Subtransient - unsaturated	X''_{di}	_____	X''_{qi}	_____
Negative Sequence - saturated	$X2_v$	_____		
Negative Sequence - unsaturated	$X2_i$	_____		
Zero Sequence - saturated	$X0_v$	_____		
Zero Sequence - unsaturated	$X0_i$	_____		
Leakage Reactance	Xl_m	_____		

FIELD TIME CONSTANT DATA (SEC)

Open Circuit	T'_{do}	_____	T'_{qo}	_____
Three-Phase Short Circuit Transient	T'_{d3}	_____	T'_{q}	_____
Line to Line Short Circuit Transient	T'_{d2}	_____		
Line to Neutral Short Circuit Transient	T'_{d1}	_____		
Short Circuit Subtransient	T''_{d}	_____	T''_{q}	_____
Open Circuit Subtransient	T''_{do}	_____	T''_{qo}	_____

ARMATURE TIME CONSTANT DATA (SEC)

Three Phase Short Circuit	T_{a3}_____
Line to Line Short Circuit	T_{a2}_____
Line to Neutral Short Circuit	T_{a1}_____

NOTE: If requested information is not applicable, indicate by marking "N/A."

MW CAPABILITY AND PLANT CONFIGURATION LARGE GENERATING FACILITY DATA

ARMATURE WINDING RESISTANCE DATA (PER UNIT)

Positive	R_1 R_2	_____
Negative		_____
Zero	R_0	_____

Rotor Short Time Thermal Capacity I_2^2t = _____

Field Current at Rated kVA, Armature Voltage and PF =_____amps Field Current

at Rated kVA and Armature Voltage, 0 PF =_____amps

Three Phase Armature Winding Capacitance =_____microfarad

Field Winding Resistance =_____ohms_____C

Armature Winding Resistance (Per Phase) =_____ohms_____C

CURVES

Provide Saturation, Vee, Reactive Capability, Capacity Temperature Correction curves. Designate normal and emergency Hydrogen Pressure operating range for multiple curves.

GENERATOR STEP-UP TRANSFORMER DATA RATINGS

Capacity Self-cooled/Maximum Nameplate
_____/_____kVA

Voltage Ratio (Generator Side/System side/Tertiary)
_____/_____/_____kV

Winding Connections (Low V/High V/Tertiary V (Delta or Wye))
_____/_____/_____

Fixed Taps Available _____

Present Tap Setting _____

IMPEDANCE

Positive Z_1 (on self-cooled kVA rating)_____%_____X/R

Zero Z_0 (on self-cooled kVA rating)_____%_____X/R

EXCITATION SYSTEM DATA

Identify appropriate IEEE model block diagram of excitation system and power system stabilizer (PSS) for computer representation in power system stability simulations and the corresponding excitation system and PSS constants for use in the model.

GOVERNOR SYSTEM DATA

Identify appropriate IEEE model block diagram of governor system for computer representation in power system stability simulations and the corresponding governor system constants for use in the model.

WIND GENERATORS

Number of generators to be interconnected pursuant to this Interconnection Request:_____

Elevation:_____ _____Single Phase _____Three Phase

Inverter manufacturer, model name, number, and version:

_____

List of adjustable setpoints for the protective equipment or software:

_____

Note: A completed General Electric Company Power Systems Load Flow (PSLF) data sheet or other compatible formats, such as IEEE and PTI power flow models, must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device, then they shall be provided and discussed at Scoping Meeting.

INDUCTION GENERATORS

(*) Field Volts: _____

(*) Field Amperes: _____

(*) Motoring Power (kW): _____

(*) Neutral Grounding Resistor (If Applicable): _____

(*) I_2^2t or K (Heating Time Constant): _____

(*) Rotor Resistance: _____

(*) Stator Resistance: _____

(*) Stator Reactance: _____

(*) Rotor Reactance: _____

(*) Magnetizing Reactance: _____

(*) Short Circuit Reactance: _____

(*) Exciting Current: _____

(*) Temperature Rise: _____

(*) Frame Size: _____

(*) Design Letter: _____

(*) Reactive Power Required In Vars (No Load): _____

(*) Reactive Power Required In Vars (Full Load): _____

(*) Total Rotating Inertia, H:_____Per Unit on KVA Base

Note: Please consult Transmission Provider prior to submitting the Interconnection Request to determine if the information designated by (*) is required.

MODELS FOR NON-SYNCHRONOUS GENERATORS

For a non-synchronous Large Generating Facility, Interconnection Customer shall provide (1) a validated user-defined root mean squared (RMS) positive sequence dynamics model; (2) an appropriately parameterized generic library RMS positive sequence dynamics model, including model block diagram of the inverter control and plant control systems, as defined by the selection in Table 1 or a model otherwise approved by the Western Electricity Coordinating Council, that corresponds to Interconnection Customer's Large Generating Facility; and (3) if applicable, a validated electromagnetic transient model if Transmission Provider performs an electromagnetic transient study as part of the interconnection study process. A user-defined model is a set of programming code created by equipment manufacturers or developers that captures the latest features of controllers that are mainly software based and represents the entities' control strategies but does not necessarily correspond to any generic library model. Interconnection Customer must also demonstrate that the model is validated by providing evidence that the equipment behavior is consistent with the model behavior (e.g., an attestation from Interconnection Customer that the model accurately represents the entire Large Generating Facility; attestations from each equipment manufacturer that the user defined model accurately represents the component of the Large Generating Facility; or test data).

Table 1: Acceptable Generic Library RMS Positive Sequence Dynamics Models

GE PSLF	***Siemens PSS/E****	***PowerWorld Simulator***	***Description***
pvd1		*PVD1*	*Distributed PV system model*
der_a	*DERAU1*	*DER_A*	*Distributed energy resource model*
regc_a	*REGCAU1, REGCA1*	*REGC_A*	*Generator/converter model*
regc_b	*REGCBU1*	*REGC_B*	*Generator/converter model*
wt1g	*WT1G1*	*WT1G and WT1G1*	*Wind turbine model for Type-1 wind turbines (conventional directly connected induction generator)*
wt2g	*WT2G1*	*WT2G and WT2G1*	*Generator model for generic Type-2 wind turbines*
wt2e	*WT2E1*	*WT2E and WT2E1*	*Rotor resistance control model for wound- rotor induction wind-turbine generator wt2g*
reec_a	*REECAU1, REECA1*	*REEC_A*	*Renewable energy electrical control model*

GE PSLF	***Siemens PSS/E****	***PowerWorld Simulator***	***Description***
reec_c	*REECCU1*	*REEC_C*	*Electrical control model for battery energy storage system*
reec_d	*REECDU1*	*REEC_D*	*Renewable energy electrical control model*
wt1t	*WT12T1*	*WT1T and WT12T1*	*Wind turbine model for Type-1 wind turbines (conventional directly connected induction generator)*
wt1p_b	*wt1p_b*	*WT12A1U_B*	*Generic wind turbine pitch controller for WTGs of Types 1 and 2*
wt2t	*WT12T1*	*WT2T*	*Wind turbine model for Type-2 wind turbines (directly connected induction generator wind turbines with an external rotor resistance)*
wtgt_a	*WTDTAU1, WTDTA1*	*WTGT_A*	*Wind turbine drive train model*
wtga_a	*WTARAU1, WTARA1*	*WTGA_A*	*Simple aerodynamic model*
wtgp_a	*WTPTAU1, WTPTA1*	*WTGPT_A*	*Wind Turbine Generator Pitch controller*
wtgq_a	*WTTQAU1, WTTQA1*	*WTGTRQ_A*	*Wind Turbine Generator Torque controller*
wtgwgo_a	*WTGWGOAU*	*WTGWGO_A*	*Supplementary control model for Weak Grids*
wtgibffr_a	*WTGIBFFRA*	*WTGIBFFR_A*	*Inertial-base fast frequency response control*
wtgp_b	*WTPTBU1*	*WTGPT_B*	*Wind Turbine Generator Pitch controller*
wtgt_b	*WTDTBU1*	*WTGT_B*	*Drive train model*

GE PSLF	***Siemens PSS/E****	***PowerWorld Simulator***	***Description***
repc_a	*Type 4: REPCAU1 (v33),* *REPCA1 (v34)* *Type 3: REPCTAU1 (v33),* *REPCTA1 (v34)*	*REPC_A*	*Power Plant Controller*
repc_b	*PLNTBU1*	*REPC_B*	*Power Plant Level Controller for controlling several plants/devices* *In regard to Siemens PSS/E*:* *Names of other models for interface with other devices:* *REA3XBU1, REAX4BU1- for interface with Type 3 and 4 renewable machines* *SWSAXBU1- for interface with SVC (modeled as switched shunt in powerflow)* *SYNAXBU1- for interface with synchronous condenser* *FCTAXBU1- for interface with FACTS device*
repc_c	*REPCCU*	*REPC_C*	*Power plant controller*