IDAHO PURPA GENERATOR INTERCONNECTION REQUEST (Application Form)

Transmission Provider: IDAHO POWER COMPANY

Designated Contact Person:	Generator Interconnection Team
Address:	1221 W. Idaho Street, Boise ID 83702
Telephone Number:	208-388-2658
Fax:	208-388-5504
E-Mail Address:	generatorinterconnection@idahopower.com

An Interconnection Request is considered complete when it provides all applicable and correct information required below.

Preamble and Instructions

An Interconnection Customers who request interconnection must submit this Interconnection Request by hand delivery, mail, e-mail, or fax to the Transmission Provider.

Processing Fee or Deposit:

If the Interconnection Request passes ALL screens of SGIP Section 2.2.1, the application may be submitted under the Fast Track Process, and the non-refundable processing fee is \$500. Please contact Idaho Power if you have any questions.

All Interconnection Requests that <u>do not pass the Fast Track screens</u>, shall submit a deposit of \$1,000 for projects up to 30 MW in size and \$10,000 for projects greater than 30 MW in size towards the cost of the feasibility study.

Interconnection Customer Information

Legal Name of the Interconnection Customer (or, if an individual, individual's name)

Name:		
Contact Person:		
Mailing Address:		
City:	State:	Zip:
Facility Location (if different from above):		
Telephone (Day):	Telephone (Evening):	
Fax:	E-Mail Address:	

Alternative Contact Infor	mation (if different from the Interconnection Customer)					
Contact Name:						
Title:						
Address:						
Telephone (Day):	Telephone (Evening):					
Fax:	E-Mail Address:					
Application is for:New Small Generating FacilityCapacity addition to Existing Small Generating Facility						
If capacity addition to e	existing facility, please describe:					
Will the Small Generatin	g Facility be used for any of the following?					
To Supply Power To Supply Power	to the Interconnection Customer? Yes <u>No</u> <u>No</u> to Others? Yes <u>No</u> <u>No</u>					
For installations at location Facility will interconnect	ons with existing electric service to which the proposed Small Generating , provide:					
(Local Electric Service P [*To be provided by the the Transmission Provide	rovider*) (Existing Account Number*) Interconnection Customer if the local electric service provider is different from er]					
Requested Point of Interc	connection:					
Interconnection Custome	r's Requested In-Service Date:					

Small Generating Facility Information

Data apply only to the Small Generating Facility, not the Interconnection Facilities.

Energy Source: Solar Wind Hydro Hydro Type (e.g. Run-of-River): Diesel Natural Gas Fuel Oil Other (state type)
Prime Mover: Fuel Cell Recip Engine Gas Turb Steam Turb Microturbine PV Other
Type of Generator: Synchronous Induction Inverter
Generator Nameplate Rating:kW (Typical) Generator Nameplate kVAR:
Interconnection Customer or Customer-Site Load:kW (if none, so state)
Typical Reactive Load (if known):
Maximum Physical Export Capability Requested:kW
List components of the Small Generating Facility equipment package that are currently certified:
Equipment Type Certifying Entity 1.
Generator (or solar collector) Manufacturer, Model Name & Number: Version Number:
Nameplate Output Power Rating in kW: (Summer) (Winter) Nameplate Output Power Rating in kVA: (Summer) (Winter)
Individual Generator Power Factor Rated Power Factor: Leading:Lagging:
Total Number of Generators in wind farm to be interconnected pursuant to this Interconnection Request: Elevation: Single phase Three phase
Inverter Manufacturer, Model Name & Number (if used):
List of adjustable set points for the protective equipment or software:
Small Generating Facility Characteristic Data (for rotating machines)
RPM Frequency:

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

Synchronous Generators:			
Direct Axis Synchronous Reactance, Xd:	P.U.		
Direct Axis Transient Reactance, X'd:		P.U.	
Direct Axis Subtransient Reactance, X ["] _d :		-	P.U.
Negative Sequence Reactance, X ₂ :	P.U.		_
Zero Sequence Reactance, X_0 :	P.U.		
KVA Base:			
Field Volts:			
Field Amperes:			
1			
Induction Generators:			
Motoring Power (kW):			
I ₂ ² t or K (Heating Time Constant):		_	
Rotor Resistance, Rr:			
Stator Resistance, Rs:			
Stator Reactance, Xs:			
Rotor Reactance, Xr:			
Magnetizing Reactance, Xm:			
Short Circuit Reactance, Xd":			
Exciting Current:			
Temperature Rise:			
Frame Size:			
Design Letter:			
Reactive Power Required In Vars (No Loa	ud):		
Reactive Power Required In Vars (Full Lo	ad):		
Total Rotating Inertia, H:	Per Unit	on kVA	A Base

Note: Please contact the Transmission Provider prior to submitting the Interconnection Request to determine if the specified information above is required.

Excitation and Governor System Data for Synchronous Generators Only

Provide appropriate IEEE model block diagram of excitation system, governor system and power system stabilizer (PSS) in accordance with the regional reliability council criteria. A PSS may be determined to be required by applicable studies. A copy of the manufacturer's block diagram may not be substituted.

Interconnection Facilities Information

Will a transforme	er be used	between the g	enerator and the	point of con	nmon coupling?	Yes	No
		U		1	1 0 -		

Will the transformer be provided by the Interconnection Customer? Yes No

Transformer Data (If Applicable, for Interconnection Customer-Owned Transformer):

If Three Phase:

Transformer Primary:VoltsDeltaWyeWye GroundedTransformer Secondary:VoltsDeltaWyeWye GroundedTransformer Tertiary:VoltsDeltaWye Grounded

Transformer Fuse Data (If Applicable, for Interconnection Customer-Owned Fuse):

(Attach copy of fuse manufacturer's Minimum Melt and Total Clearing Time-Current Curves)

Manufacturer:	Type:		_Size:	Speed:
Interconnecting Circuit	t Breaker (if applicat	<u>ole):</u>		
Manufaaturar		Turnor		
I oad Rating (Amps):	Interrunting	Iype: Rating (Amps):	 Trin S	need (Cycles):
Load Rating (7 mps)	miterrupting	Rating (7 mps).	111p 5	
Interconnection Protec	tive Relays (If Appli	cable):		
If Microproce	essor-Controlled:			
List of Functions and	l Adjustable Setpoi	ints for the protec	tive equipmen	nt or software:
Setpoint Function			Minimum	Maximum
1				
•				
2.				
2				
5		<u> </u>		
4				
5.				
6				
If Discrete Compone	nts:			
(Enclose Copy of any I	Proposed Time-Over	current Coordinatio	on Curves)	
Manufacturer:	Type:	Style/Catalog No.	:	Proposed Setting:
Manufacturer:	Type:		:	Proposed Setting:
Manufacturer:	Type:	_Style/Catalog No.	.:	Proposed Setting:
Manufacturer:	Type:	_Style/Catalog No.	.:	Proposed Setting:
Manufacturer:	Type:	_Style/Catalog No.	.=	Proposed Setting:
Current Transformer D	Data (If Applicable):			
(Enclose Copy of Man	ufacturer's Excitation	n and Ratio Correct	tion Curves)	
Manafastan				
Type:	Accuracy Class:	Proposed Rati	o Connection:	
1 ypc			o connection.	
Manufacturer:				
Туре:	Accuracy Class:	Proposed Rati	o Connection:	
Potential Transformer	Data (If Applicable)	<u>:</u>		
Manufacturar				
Type:	Accuracy Class:	Proposed Rati	o Connection.	
· , po				
Manufacturer:				
Туре:	Accuracy Class:	Proposed Rati	o Connection:	

Wind Turbine Generating Facility Required Data

1. Single Machine Equivalent One-Line Diagram

Please provide a single machine equivalent one-line diagram similar to figure below:



2. Interconnection Transmission Line

- Point of Interconnection (substation or transmission line name):
- Line voltage = $_kV$
- MVA Normal Rating = ____MVA
- MVA Emergency Rating = ____MVA
- R = _____ohm or _____pu on 100 MVA and line kV base (positive sequence)
- X = _____ohm or _____pu on 100 MVA and line kV base (positive sequence)
- $B = \mu F$ or _____pu on 100 MVA and line kV base (positive sequence)

3. Station Transformer

(Note: If there are multiple transformers, data for each transformer should be provided)

- Nameplate Normal Rating (ONAN/ONAF/ONAF): / / MVA
- Emergency Rating (ONAN/ONAF/ONAF): / / MVA
- Nominal Voltage for each winding (Low /High /Tertiary): / / kV
- Available taps:_____(indicate fixed or with LTC), Operating Tap:_____
- Positive sequence ZHL: ____%, ____X/R on transformer self-cooled (ONAN) MVA
- Winding connection vector group (delta-wye-gnd, delta-delta, etc.):

4. Collector System Equivalent Model

- Collector system voltage = ____kV
- MVA Normal Rating = ____MVA
- MVA Emergency Rating = ____MVA
- R = ____ohm or ____pu on 100 MVA and collector kV base (positive sequence)
- X = _____ohm or _____pu on 100 MVA and collector kV base (positive sequence)
- $B = \mu F$ or _____pu on 100 MVA and collector kV base (positive sequence)
- Attach a one-line diagram of the collector layout indicating conductor length, type, and size.

5. Wind-turbine Generator (WTG) Pad-Mounted Transformer

- Number of generator step-up transformers: _______
- Individual Nameplate rating:_____MVA
- Individual Emergency rating:______MVA
- Nominal voltage for each winding (Low /High): _____/ ___kV
- Available taps: _____(indicate fixed or with LTC), Operating Tap:_____

- Positive sequence impedance (Z1)____%, ___X/R on transformer self-cooled MVA
- Winding connection vector group (delta-wye-gnd, delta-delta, etc.):

6. Wind-turbine Generator (WTG) Powerflow Data

Proposed projects may include one or more WTG Types (See Note 6.1 below). Please provide the following data for each turbine type included in the proposed project:

- Number of WTGs: ______
- Nameplate Rating (each WTG):_____MVA
- Nameplate Rating (each WTG):_____MW
- WTG Manufacturer and Model: ______
- WTG Type (See Note 6.1): _____

For Type 1 or Type 2 WTGs:

- Uncompensated power factor at full load: ______
- Power factor correction capacitors at full load: _____Mvar
- Number of shunt stages and size ______
- Please attach capability curve describing reactive power or power factor range from 0 to full output, including the effect of shunt compensation.

For Type 3 and Type 4 WTGs:

- Maximum under-excited power factor at full load: ______
- Maximum under-excited power factor at full load: ______
- Control mode: _____(voltage control, fixed power factor) (See Note 6.2)
- Please attach capability curve describing reactive power or power factor range from 0 to full output.

NOTE 6.1 - WTG Type can be one of the following:

- Type 1 Squirrel-cage induction generator
- Type 2 Wound rotor induction machine with variable rotor resistance
- Type 3 Doubly-fed asynchronous generator
- Type 4 Full converter interface

NOTE 6.2 - Type 1 and Type 2 WTGs typically operate on fixed power factor mode for a wide range of output level, aided by turbine-side power factor correction capacitors (shunt compensation).

With a suitable plant-level controller, Type 3 and Type 4 WTGs may be capable of dynamically varying power factor to contribute to voltage control mode operation, if required by the generator interconnection agreement. Please consult with the WTG manufacturer when in doubt. The interconnection study will determine the voltage control requirements for the project. Plant-level reactive compensation requirements are engineered to meet specific interconnection requirements. WTG reactive capability data described above could significantly impact study results and plant-level reactive compensation requirements.

7. Plant Reactive Power Compensation

Provide the following information for plant-level reactive compensation, if applicable:

Individual shunt capacitor and size of each: _____MVA

- Dynamic reactive control device, (SVC, STATCOM): ____
- Control range_____MVAr (lead and lag)
- Control mode (e.g., voltage, power factor, reactive power): ____
- Regulation point or bus _____
- Description of control strategy
- Operating characteristic
- Automatic control model pickup levels and time delay setpoints
- Indicate if the project includes a plant controller ______

8. Wind-turbine Generator (WTG) Dynamics Data

- Provide dynamic models for transient stability analysis in PSLF format using models approved for use by WECC listed in the WECC Approved Dynamic Model Library.
- Provide low/high voltage-ride-through dynamic models using an approved PSLF format or the equipment low/high voltage protection settings.
- Provide over/under frequency-ride-through dynamic models using an approved PSLF format or the equipment over/under frequency protection settings.

Note 8.1 - Please reference the WECC Wind Plant Dynamic Modeling Guidelines for additional information regarding the dynamics modeling needs of Idaho Power and WECC.

Photo Voltaic (PV) Generating Facility Required Data

1. Single Machine Equivalent One-Line Diagram

Please provide a single machine equivalent one-line diagram similar to figure below:



2. Interconnection Transmission Line

- Line voltage = ____kV
- MVA Normal Rating = ____MVA
- MVA Emergency Rating = ____MVA
- R = _____ohm or _____pu on 100 MVA and line kV base (positive sequence)

- X = _____ohm or _____pu on 100 MVA and line kV base (positive sequence)
- $B = \mu F \text{ or} pu \text{ on } 100 \text{ MVA} \text{ and line } kV \text{ base (positive sequence)}$

3. Station Transformer

(Note: If there are multiple transformers, data for each transformer should be provided)

- Nameplate Normal Rating (ONAN/ONAF/ONAF): / / MVA
- Emergency Rating (ONAN/ONAF/ONAF): ____/___MVA
- Nominal Voltage for each winding (Low /High /Tertiary): / / kV
- Available taps: _____(indicate fixed or with LTC), Operating Tap: _____
- Positive sequence ZHL: ____%, ____X/R on transformer self-cooled (ONAN) MVA
- Winding connection vector group (delta-wye-gnd, delta-delta, etc.):

4. Collector System Equivalent Model

- Collector system voltage = ____kV
- MVA Normal Rating = ____MVA
- MVA Emergency Rating = ____MVA
- R = _____ohm or _____pu on 100 MVA and collector kV base (positive sequence)
- X = _____ohm or _____pu on 100 MVA and collector kV base (positive sequence)
- $B = \mu F \text{ or} pu \text{ on } 100 \text{ MVA} \text{ and collector } kV \text{ base (positive sequence)}$
- Attach a one-line diagram of the collector layout indicating conductor length, type, and size.

5. Inverter Step-Up Transformer

- Number of inverter step-up transformers: ______
- Individual Nameplate rating:_____ MVA
- Individual Emergency rating:_____ MVA
- Nominal voltage for each winding (Low /High): _____/ kV
- Available taps: _____(indicate fixed or with LTC), Operating Tap:_____
- Positive sequence impedance (Z1) <u>%</u>, <u>X/R</u> on transformer self-cooled MVA
- Winding connection vector group (delta-wye-gnd, delta-delta, etc.):

6. Inverter and PV Module Data

- Number of Inverters: ______
- Nameplate Rating (each Inverter): _____/ ____kW/kVA
- Describe Inverter reactive capability control mode (i.e. voltage control, power factor, voltage droop control, etc):
- Describe Inverter reactive capability control range maximum and minimum values:
- Provide Reactive Capability Curve (Plot of Reactive Capability vs. Real Power)
- PV Inverter Short Circuit Current: ______
- Inverter Manufacturer and Model #: ______
- PV Module Manufacturer and Model #: _______

7. Plant Reactive Power Compensation

Provide the following information for plant-level reactive compensation, if applicable:

- Individual shunt capacitor and size of each: _____MVA
- Dynamic reactive control device, (SVC, STATCOM): ______
- Control range_____MVAr (lead and lag)
- Control mode (e.g., voltage, power factor, reactive power):
- Regulation point or bus ______
- Description of control strategy
- Operating characteristic
- Automatic control model pickup levels and time delay setpoints
- Indicate if the project includes a plant controller ______

8. Photo-Voltaic Generator Dynamics Data

- Provide dynamic models for transient stability analysis in PSLF format using models approved for use by WECC listed in the "WECC Approved Dynamic Model Library" found at www.wecc.biz.
- Provide low/high voltage-ride-thourgh dynamic models using an approved PSLF format or the equipment low/high voltage protection settings.
- Provide over/under frequency-ride-thourgh dynamic models using an approved PSLF format or the equipment over/under frequency protection settings.
- Please reference the "WECC Solar Plant Dynamic Modeling Guidelines" found at www.wecc.biz for additional information regarding the dynamics modeling needs of Idaho Power and WECC.

Small Generating Facility Characteristic Data (for inverter-based machines)

Max design fault contribution current: _____ Instantaneous ____ or RMS? _____

Harmonics Characteristics:

Start-up requirements:

General Information

Enclose copy of site electrical one-line diagram showing the configuration of all Small Generating Facility equipment, current and potential circuits, and protection and control schemes. This one-line diagram must be signed and stamped by a licensed Professional Engineer if the Small Generating Facility is larger than 50 kW. Is One-Line Diagram Enclosed? _____Yes____No

Enclose copy of any site documentation that indicates the precise physical location of the proposed Small Generating Facility (e.g., USGS topographic map or other diagram or documentation).

Proposed location of protective interface equipment on property (include address if different from the Interconnection Customer's address)

Enclose copy of any site documentation that describes and details the operation of the protection and control schemes. Is Available Documentation Enclosed? Yes No

Enclose copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable). Are Schematic Drawings Enclosed? Yes No

Applicant Signature

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Request is true and correct.

For Interconnection Customer:

Signed

Date:

Printed